PUB. 127

SAILING DIRECTIONS (ENROUTE)

★

EAST COAST OF AUSTRALIA AND NEW ZEALAND

★

Prepared and published by the
NATIONAL GEOSPATIAL-INTELLIGENCE AGENCY
Springfield, Virginia

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2013

TWELFTH EDITION

Preface

Pub. 127, Sailing Directions (Enroute) East Coast of Australia and New Zealand, Twelfth Edition, 2013, is issued for use in conjunction with Pub. 120, Sailing Directions (Planning Guide) Pacific and Southeast Asia. Companion volumes are Pubs. 125 and 126.

Digital Nautical Charts 5 and 6 provide electronic chart coverage for the area covered by this publication.

This publication has been corrected to 3 August 2013, including Notice to Mariners No. 31 of 2013. Subsequent Publication Data Updates (PDUs) have corrected this publication to 3 May 2014, including Notice to Mariner No. 18 of 2014.

Explanatory Remarks

Sailing Directions are published by the National Geospatial-Intelligence Agency (NGA), under the authority of Department of Defense Directive 5105.40, dated 12 December 1988, and pursuant to the authority contained in U. S. Code Title 10, Sections 2791 and 2792 and Title 44, Section 1336. Sailing Directions, covering the harbors, coasts, and waters of the world, provide information that cannot be shown graphically on nautical charts and is not readily available elsewhere.

Sailing Directions (Enroute) include detailed coastal and port approach information which supplements the largest scale chart produced by the National Geospatial-Intelligence Agency. This publication is divided into geographic areas called "Sectors."

Bearings.—Bearings are true, and are expressed in degrees from 000° (north) to 360°, measured clockwise. General bearings are expressed by initial letters of points of the compass (e.g. N, NNE, NE, etc.). Adjective and adverb endings have been discarded. Wherever precise bearings are intended degrees are used.

Charts.—Reference to charts made throughout this publication refer to both the paper chart and the Digital Nautical Chart (DNC).

Coastal Features.—It is assumed that the majority of ships have radar. Available coastal descriptions and views, useful for radar and visual piloting are included in geographic sequence in each Sector.

Corrective Information.—Users should refer corrections, additions, and comments to NGA's Maritime Operations Desk, as follows:

1. Toll free: 1-800-362-6289
2. Commercial: 571-557-5455
3. DSN: 547-5455
4. DNC web site: http://dnc.nga.mil/NGAPortal/DNC.portal
5. Maritime Domain web site: http://msi.nga.mil/NGAPortal/MSI.portal
6. E-mail: navsafety@nga.mil
7. Mailing address: Maritime Safety Office
   National Geospatial-Intelligence Agency
   Mail Stop N64-SH
   7500 Geoint Drive
   Springfield VA 22150-7500

New editions of Sailing Directions are corrected through the date of the publication shown above. Important information to amend material in the publication is available as a Publication Data Update (PDU) from the NGA Maritime Domain web site.

NGA Maritime Domain Website
http://msi.nga.mil/NGAPortal/MSI.portal

Courses.—Courses are true, and are expressed in the same manner as bearings. The directives "steer" and "make good" a course mean, without exception, to proceed from a point of origin along a track having the identical meridianal angle as the designated course. Vessels following the directives must allow for every influence tending to cause deviation from such track, and navigate so that the designated course is continuously being made good.

Currents.—Current directions are the true directions toward which currents set.

Dangers.—As a rule outer dangers are fully described, but inner dangers which are well-charted are, for the most part, omitted. Numerous offshore dangers, grouped together, are mentioned only in general terms. Dangers adjacent to a coastal passage or fairway are described.

Distances.—Distances are expressed in nautical miles of 1 minute of latitude. Distances of less than 1 mile are expressed in meters, or tenths of miles.

Geographic Names.—Geographic names are generally those used by the nation having sovereignty. Names in parentheses following another name are alternate names that may appear on some charts. In general, alternate names are quoted only in the principal description of the place. Diacritical marks, such as accents, cedillas, and circumflexes, which are related to specific letters in certain foreign languages, are not used in the interest of typographical simplicity. Geographic names or their spellings do not necessarily reflect recognition of the political status of an area by the United States Government.

Heights.—Heights are referred to the plane of reference used for that purpose on the charts and are expressed in meters.

Index-Gazetteer.—Navigational features and place names are listed alphabetically in the back of the book. The approximate position, along with the Sector and paragraph numbers (e.g. **1.1**), facilitate location in the text.

Internet Links.—This publication provides internet links to web sites concerned with maritime navigational safety, including but not limited to, Federal government sites, foreign Hydrographic Offices, and foreign public/private port facilities. NGA makes no claims, promises, or guarantees concerning the accuracy, completeness, or adequacy of the contents of the web sites and expressly disclaims any liability for errors and omissions of these web sites.

Light and Fog Signals.—Lights and fog signals are not described, and light sectors are not usually defined. The Light Lists should be consulted for complete information.

Ports.—Directions for entering ports are depicted where appropriate by means of chartlets, sketches, and photos, which facilitate positive identification of landmarks and navigational

aids. These chartlets and sketches are not always to scale, however, and should be used only as a general informational guide in conjunction with the best scale chart. Specific port facilities are omitted from the standard format. They are tabulated in Pub. 150, World Port Index.

Radio Navigational Aids.—Radio navigational aids are not described in detail. Publication No. 117 Radio Navigational Aids and NOAA Publication, Selected Worldwide Marine Broadcasts, should be consulted.

Soundings.—Soundings are referred to the datum of the charts and are expressed in meters.

Special Warnings.—A Special Warning may be in force for the geographic area covered by this publication. Special Warnings are printed in the weekly Notice to Mariners upon promulgation and are reprinted annually in Notice to Mariners No. 1. A listing of Special Warnings currently in force is printed in each weekly Notice to Mariners, Section III, Broadcast Warnings, along with the notice number of promulgation. Special Warnings are also available on the Maritime Division web site.

Time.—Time are normally expressed as locat time unless specifically designated as Universal Coordinated Time (UTC).

Wind Directions.—Wind directions are the true directions from which winds blow.

Reference List

The principal sources examined in the preparation of this publication were:

British Hydrographic Department Sailing Directions.

Various port handbooks.

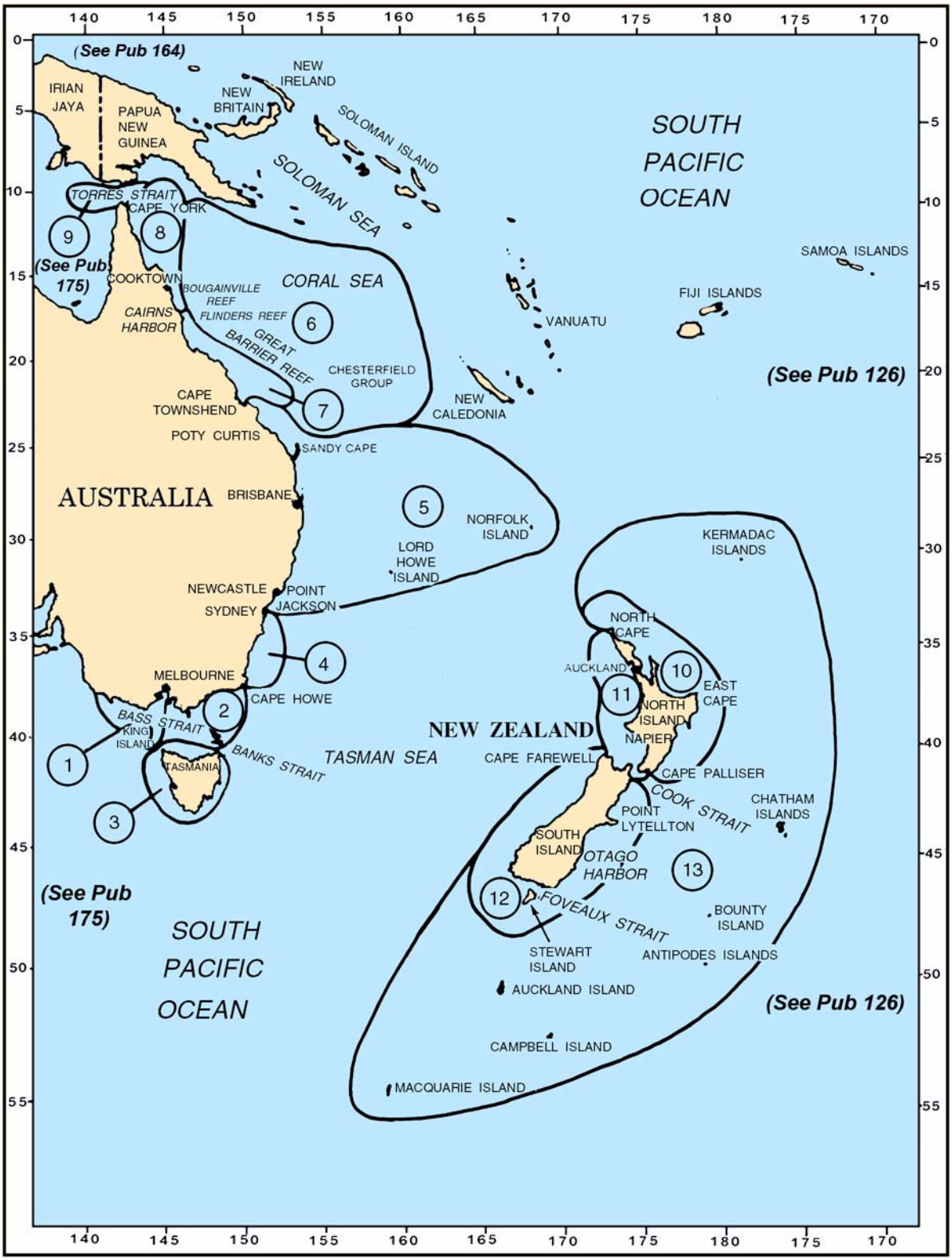
Reports from United States Naval and merchant vessels and various shipping companies.

Other U.S. Government publications, reports, and documents.

Charts, light lists, tide and current tables, and other documents in possession of the Agency.

Internet Web site, as follows:

1. Auckland, Ports of
   http://poal.co.nz
2. Australian Maritime Safety Authority
   http://www.amsa.gov.au
3. Australian Reef Pilots
   http://www.reefpilots.com.au
4. Brisbane Corporation, Port of
   http://www.portbris.com.au
5. Brisbane Marine Pilots
   http://www.brisbanepilots.com.au
6. Burnie Port Corporation
   http://www.burnieport.com.au
7. Port Authority
   http://www.cairnsport.com.au
8. CentrePort, New Zealand (Wellington)
   http://www.centreport.co.nz/centreport
9. Devonport, Port of
   http://www.portdev.com.au
10. Eden, Port of
    http://www.eden.nsw.gov.au
11. Gladstone Port Authority
    http://www.gpa.org.au
12. Hobart Ports Corporation
    http://www.hpc.com.au
13. Lyttelton Port Company Limited
    http://www.lpc.co.nz
14. Marine and Safety Tasmania
    http://www.mast.tas.gov.au
15. Marquis' Web
    http://users.mcmedia.com.au/~rca
    Views of Port Phillip Entrance
    Photos by courtesy of Rod Cairns
    rca@echuca.net.au
16. Melbourne Port Corporation
    http://www.melbport.com.au
17. Napier, Port of
    http://www.portofnapier.co.nz
18. Newcastle Port Corporation
    http://www.newportcorp.com
19. Northland Port Corporation
    http://www.northlandportcorp.co.nz
20. Port Corporation
    http://www.kemblaport.com.au
21. Port Marlborough
    http://www.portmarlborough.co.nz
22. Port Nelson
    http://portnelson.com
23. Port Otago Limited
    http://www.portotago.co.nz
24. Port Taranaki (Westgate)
    http://www.westgate.co.nz
25. Portland, Port of
    http://www.portofportland.com.au
26. PrimePort Timaru
    http://www.primeport.co.nz
27. Queensland Ports Corporation
    http://www.pcq.com.au/html/02_ports.htm
28. Rockhampton Port Authority
    http://www.rpa.qld.gov.au
29. Sydney Pilot Service
    http://www.sydneypilotservice.com.au
30. Sydney Ports
    http://www.sydneyports.com.au
31. Sydney Sea Pilots
    http://www.sydneyseapilots.com.au
32. Tauranga, Port of
    http://www.port-tauranga.co.nz
33. Torres Pilots
    http://www.torrespilots.com.au
34. Townsville Port Authority
    http://www.townsville-port.com.au
35. Transpower New Zealand
    http://www.transpower.co.nz
36. Victorian Channels Authority
    http://www.vicchannels.vic.gov.au
37. Westport Harbor
    http://www.westportharbour.co.nz



SECTOR LIMITS — PUB. **127**

Feet to Meters

Feet	0	1	2	3	4	5	6	7	8	9
0	0.00	0.30	0.61	0.91	1.22	1.52	1.83	2.13	2.44	2.74
10	3.05	3.35	3.66	3.96	4.27	4.57	4.88	5.18	5.49	5.79
20	6.10	6.40	6.71	7.01	7.32	7.62	7.92	8.23	8.53	8.84
30	9.14	9.45	9.75	10.06	10.36	10.67	10.97	11.28	11.58	11.89
40	12.19	12.50	12.80	13.11	13.41	13.72	14.02	14.33	14.63	14.93
50	15.24	15.54	15.85	16.15	16.46	16.76	17.07	17.37	17.68	17.98
60	18.29	18.59	18.90	19.20	19.51	19.81	20.12	20.42	20.73	21.03
70	21.34	21.64	21.95	22.25	22.55	22.86	23.16	23.47	23.77	24.08
80	24.38	24.69	24.99	25.30	25.60	25.91	26.21	26.52	26.82	27.13
90	27.43	27.74	28.04	28.35	28.65	28.96	29.26	29.57	29.87	30.17

Fathoms to Meters

Fathoms	0	1	2	3	4	5	6	7	8	9
0	0.00	1.83	3.66	5.49	7.32	9.14	10.97	12.80	14.63	16.46
10	18.29	20.12	21.95	23.77	25.60	27.43	29.26	31.09	32.92	34.75
20	36.58	38.40	40.23	42.06	43.89	45.72	47.55	49.38	51.21	53.03
30	54.86	56.69	58.52	60.35	62.18	64.01	65.84	67.67	69.49	71.32
40	73.15	74.98	76.81	78.64	80.47	82.30	84.12	85.95	87.78	89.61
50	91.44	93.27	95.10	96.93	98.75	100.58	102.41	104.24	106.07	107.90
60	109.73	111.56	113.39	115.21	117.04	118.87	120.70	122.53	124.36	126.19
70	128.02	129.85	131.67	133.50	135.33	137.16	138.99	140.82	142.65	144.47
80	146.30	148.13	149.96	151.79	153.62	155.45	157.28	159.11	160.93	162.76
90	164.59	166.42	168.25	170.08	171.91	173.74	175.56	177.39	179.22	181.05

Meters to Feet

Meters	0	1	2	3	4	5	6	7	8	9
0	0.00	3.28	6.56	9.84	13.12	16.40	19.68	22.97	26.25	29.53
10	32.81	36.09	39.37	42.65	45.93	49.21	52.49	55.77	59.06	62.34
20	65.62	68.90	72.18	75.46	78.74	82.02	85.30	88.58	91.86	95.14
30	98.42	101.71	104.99	108.27	111.55	114.83	118.11	121.39	124.67	127.95
40	131.23	134.51	137.80	141.08	144.36	147.64	150.92	154.20	157.48	160.76
50	164.04	167.32	170.60	173.88	177.16	180.45	183.73	187.01	190.29	193.57
60	196.85	200.13	203.41	206.69	209.97	213.25	216.54	219.82	223.10	226.38
70	229.66	232.94	236.22	239.50	242.78	246.06	249.34	252.62	255.90	259.19
80	262.47	265.75	269.03	272.31	275.59	278.87	282.15	285.43	288.71	291.99
90	295.28	298.56	301.84	305.12	308.40	311.68	314.96	318.24	321.52	324.80

Meters to Fathoms

Meters	0	1	2	3	4	5	6	7	8	9
0	0.00	0.55	1.09	1.64	2.19	2.73	3.28	3.83	4.37	4.92
10	5.47	6.01	6.56	7.11	7.66	8.20	8.75	9.30	9.84	10.39
20	10.94	11.48	12.03	12.58	13.12	13.67	14.22	14.76	15.31	15.86
30	16.40	16.95	17.50	18.04	18.59	19.14	19.68	20.23	20.78	21.33
40	21.87	22.42	22.97	23.51	24.06	24.61	25.15	25.70	26.25	26.79
50	27.34	27.89	28.43	28.98	29.53	30.07	30.62	31.17	31.71	32.26
60	32.81	33.36	33.90	34.45	35.00	35.54	36.09	36.64	37.18	37.73
70	38.28	38.82	39.37	39.92	40.46	41.01	41.56	42.10	42.65	43.20
80	43.74	44.29	44.84	45.38	45.93	46.48	47.03	47.57	48.12	48.67
90	49.21	49.76	50.31	50.85	51.40	51.95	52.49	53.04	53.59	54.13

Abbreviations

The following abbreviations may be used in the text:

Units

°C	degree(s) Centigrade	km	kilometer(s)
cm	centimeter(s)	m	meter(s)
cu.m.	cubic meter(s)	mb	millibars
dwt	deadweight tons	MHz	megahertz
FEU	forty-foot equivalent units	mm	millimeter(s)
gt	gross tons	nrt	net registered tons
kHz	kilohertz	TEU	twenty-foot equivalent units

Directions

N	north	S	south
NNE	northnortheast	SSW	southsouthwest
NE	northeast	SW	southwest
ENE	eastnortheast	WSW	westsouthwest
E	east	W	west
ESE	eastsoutheast	WNW	westnorthwest
SE	southeast	NW	northwest
SSE	southsoutheast	NNW	northnorthwest

Vessel types

LASH	Lighter Aboard Ship	Ro-Ro	Roll-on Roll-off
LNG	Liquified Natural Gas	ULCC	Ultra Large Crude Carrier
LPG	Liquified Petroleum Gas	VLCC	Very Large Crude Carrier
OBO	Ore/Bulk/Oil	VLOC	Very Large Ore Carrier
Lo-Lo	Lift-on Lift-off	FSO	Floating Storage and Offloading Vessels (System)
NGL	Natural Gas Liquids		

Time

ETA	estimated time of arrival	GMT	Greenwich Mean Time
ETD	estimated time of departure	UTC	Coordinated Universal Time

Water level

MSL	mean sea level	LWS	low water springs
HW	high water	MHWN	mean high water neaps
LW	low water	MHWS	mean high water springs
MHW	mean high water	MLWN	mean low water neaps
MLW	mean low water	MLWS	mean low water springs
HWN	high water neaps	HAT	highest astronomical tide
HWS	high water springs	LAT	lowest astronomical tide
LWS	low water springs		
LWN	low water neaps		

Communications

D/F	direction finder	MF	medium frequency
R/T	radiotelephone	HF	high frequency
GMDSS	Global Maritime Distress and Safety System	VHF	very high frequency
LF	low frequency	UHF	ultra high frequency

Navigation

LANBY	Large Automatic Navigation Buoy	SBM	Single Buoy Mooring
NAVSAT	Navigation Satellite	SPM	Single Point Mooring
ODAS	Ocean Data Acquisition System	TSS	Traffic Separation Scheme
CBM	Conventional Buoy Mooring System	VTC	Vessel Traffic Center
MBM	Multi-Buoy Mooring System	VTS	Vessel Traffic Service

Miscellaneous

The following abbreviations may be used in the text:

AIS	Automatic Identification System	MMSI	Maritime Mobile Service Identity Code
COLREGS	Collision Regulations	No./Nos.	Number/Numbers
IALA	International Association of Lighthouse Authorities	PA	Position approximate
		PD	Position doubtful
IHO	International Hydrographic Organization	Pub.	Publication
IMO	International Maritime Organization	SOLAS	International Convention for Safety of Life at Sea
LOA	length overall	St./Ste.	Saint/Sainte
UKC	Under keel clearance	ISPS	International Ship and Port facility Security

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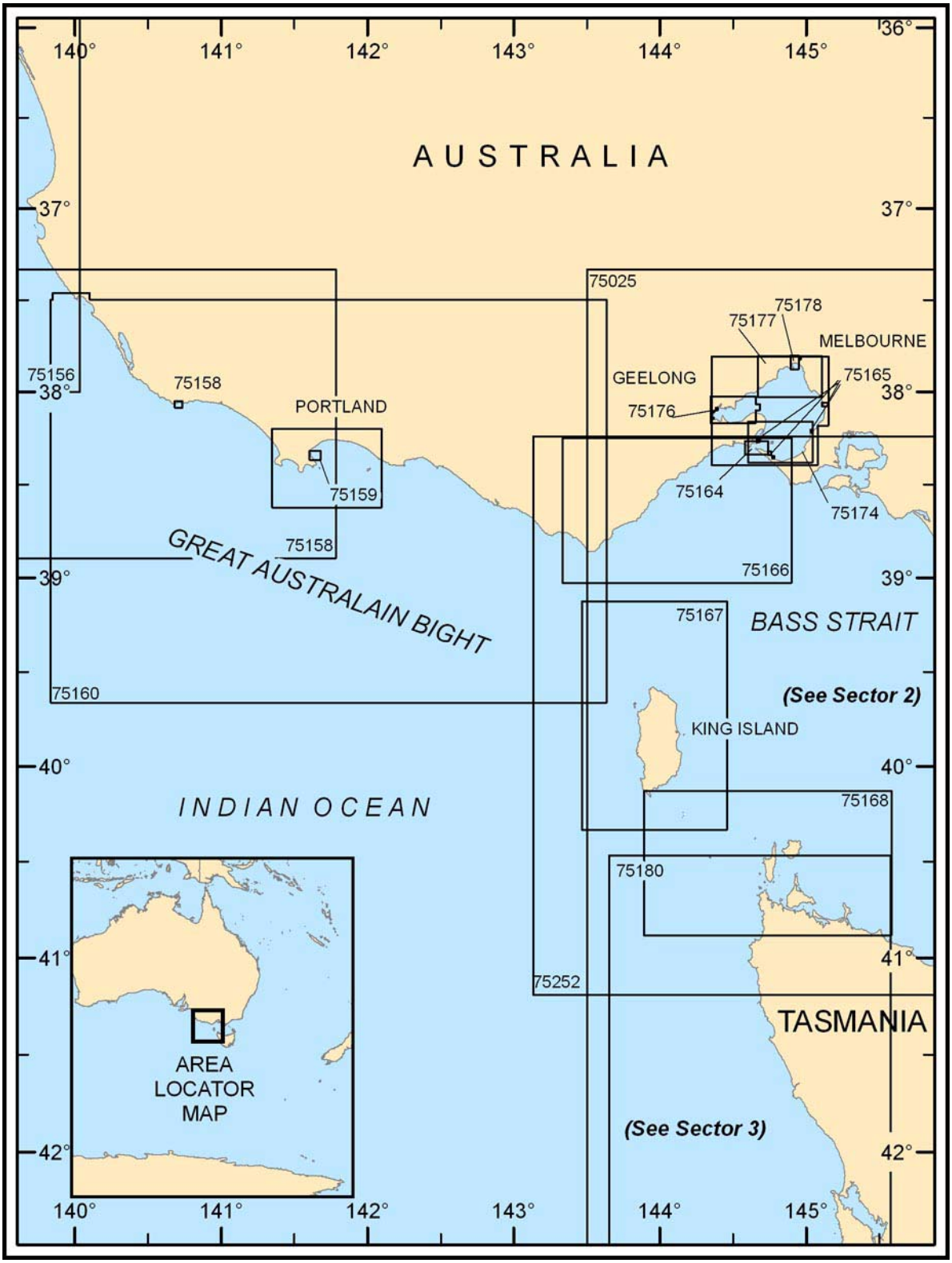
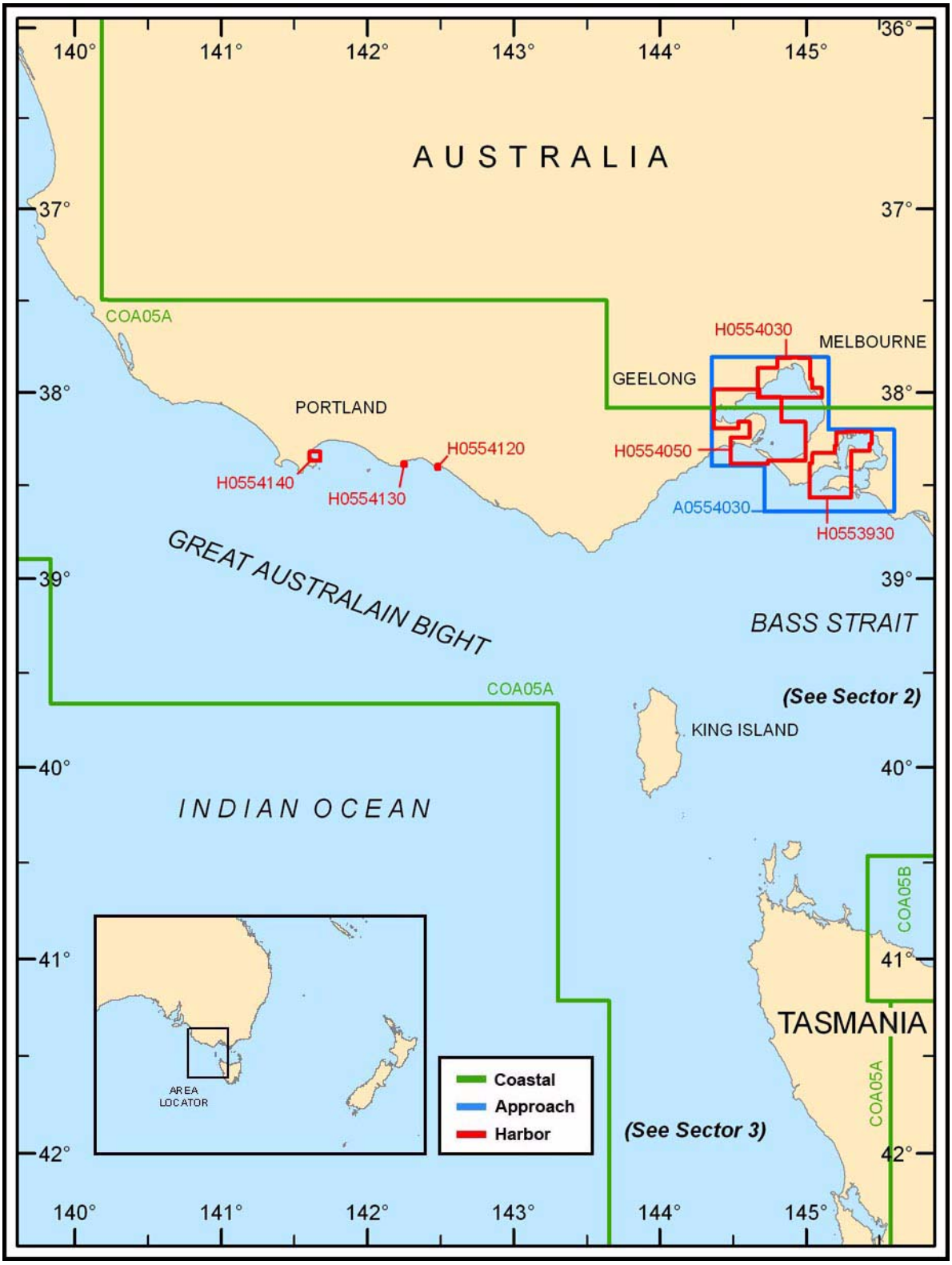


Additional chart coverage may be found in NGA/DLIS Catalog of Maps, Charts, and Related Products (Unlimited Distribution).

SECTOR 1 — CHART INFORMATION



Additional DNC library coverage may be found in NGA DNC 5 (Limited Distribution) disc within the README\GRAPHICS folder.

SECTOR 1 — DNC LIBRARY INFORMATION

SECTOR 1

AUSTRALIA—CAPE NORTHUMBERLAND TO PORT PHILLIP, INCLUDING THE WESTERN ENTRANCE OF BASS STRAIT

Plan.—This sector first describes the S coast of Australia from Cape Northumberland to Cape Otway, followed by a description of the western entrance of Bass Strait, including King Island. The S coast of Australia from Cape Otway to Port Phillip, which includes the ports of Melbourne and Geelong, is then described. The arrangement of the sector is from W to E.

Cape Northumberland to Portland Bay

1.1 **Cape Northumberland** (38°04'S., 140°40'E.), about 30m high, is rugged and cliffy, with a hill rising to an elevation of 41m behind it. It may be easily identified by Mount Gambier and Mount Schanck, each of which are extinct volcanoes, and are conspicuous about 14 and 8 miles NNE, respectively, of the cape. Mount Gambier is a peak, 189m high, with a tableland extending E of it. Mount Schanck is a truncated cone, 122m high.

A light is shown from a white tower with a red band on a knoll, about 0.4 mile NE of the S extremity of the cape. The light is connected to the telephone system.

The cape has been reported to be a good radar target at 20 miles.

West of Cape Northumberland, for 1 to 4 miles offshore, there are fields of kelp, the tops of the kelp trailing a long distance on the surface of the water. The kelp does not appear to grow in depths greater than 30m.

The coast between Cape Northumberland and Cape Otway, about 140 miles ESE, is generally of moderate elevation, wooded in places, and backed by higher wooded land.

Winds—Weather.—On the S coast of Australia, a large range of temperature is experienced. In a normal year, extreme temperatures of more than 38°C are experienced at Melbourne in January and February, while occasional values of around 0°C may be experienced in July.

Rainfall on this coast is adequate and fairly reliable. To the W of Melbourne, winter is the wet season and summer is relatively dry. Most places on the coast find August to be the wettest month and January the driest. In Melbourne, October is the wettest month, with an average rainfall of 76mm, and January is the driest month, with an average rainfall of 44mcm.

Fog is infrequent at sea and is only moderately frequent as well as short lived at some of the larger Australian ports.

Gales of force 8 and over are moderately frequent at sea off the S coast. Much of the bad weather experienced occurs at fronts associated with E moving lows.

There is a high frequency of gales in the Bass Strait due to the channalization of E and W winds.

At Warrnambool, the afternoon winds are predominantly SW in most months of the year, but are variable in July. The early morning winds are SW in summer, but are between the NE and NW in winter. The average wind speed varies from 7 to 11 knots.

At Melbourne, at 0900, N winds predominate in the winter months. In summer, the winds are rather variable, but S and SW winds are the most frequent. At 1500, N winds predominate in winter and S winds in summer. The afternoon winds average about 10 to 12 knots in summer and drop to 8 to 9 knots from April to August. The morning winds are a few knots lighter on the average.

Caution.—Crayfish and shark fishing vessels operate up to 90 miles from the coast between Cape Northumberland and Cape Otway. Vessels should keep a good lookout for them.

Between the months of November to June, inclusive, extensive lobster fishing takes place on the continental shelf W of **Cape Nelson** (38°26'S., 141°33'E.) and inshore of the 150m curve.

Mariners are requested, when passage permits, to transit outside the 200m curve in this area.

1.2 The coast between Cape Northumberland and Flint Point, about 5 miles E, is a low, sandy beach, with a bank behind it, and it is fronted by extensive drying ledges. A low, wooded range of hills extends 1.5 miles NE from Cape Northumberland; elsewhere the country is swampy for more than 1 mile inland. Flint Point is low and covered with heaps of stones.

Breaksea Reef, with depths of less than 4.9m, extends about 1.5 miles offshore, about 1.5 miles E of Cape Northumberland. The reef is steep-to on its W side, and the sea generally breaks over it with great violence.

Port Macdonnel, used by fishing vessels and pleasure craft with a draft of less than 1.5m, lies about 2 miles E of Cape Northumberland, and is situated on the shores of Macdonnel Bay, a slight indentation in the coast.

Danger Point (38°03'S., 140°48'E.), about 1.7 miles E of Flint Point, is low, with swamps inland of the point; a reef, with depths of less than 5.5m, extends about 1.5 miles S of the point.

A range of hills, attaining an elevation of 38m at its W extremity, begins about 3 miles NW of Danger Point and extends about 10 miles E to the Glenelg River. Mount Ruskin, 37m high, is located in this range, about 1.5 miles WNW of the mouth of the Glenelg River.

Green Point, about 3 miles E of Danger Point, is 15m high and so named from its verdant appearance. Ruby Rock, with a depth of 0.9m, lies about 2.5 miles SE of Green Point; during SE and E winds, the sea seldom breaks on this rock.

The coast between Green Point and the mouth of the Glenelg River, about 5.5 miles E, is a sandy beach backed by low sand hills. At the mouth of the river there is a sandy bar which is fordable at LW when the sea is smooth. Inside the bar the river is broad and deep.

The coast between the **Glenelg River** (38°04'S., 140°59'E.) and Cape Bridgewater, about 28 miles SE, is a succession of sand hummocks, about 46m high, partially covered with bushes, with the sand in many places showing and reaching to their

summits.

For about 14 miles from the Glenelg River, there are thickly-wooded tracts of rising ground, about 91m high, between 2 and 3 miles inland.

About 12 miles NW of Cape Bridgewater, a range of hills up to 158m high and heavily wooded lies about 2 miles inland of the coast hummocks. A group of high bare sand hummocks lies at the NW end of the range, between it and the coast. A large tract of sand lies from 7 to 4 miles from the cape.

Discovery Bay, between Cape Northumberland and the W side of Cape Bridgewater promontory, is rendered dangerous by an inward setting tide, and a heavy swell rolls in over the E part of the bay.

1.3 **Mount Kincaid** (38°11'S., 141°22'E.), 211m high, lies about 12 miles N of Cape Bridgewater, and about 4 miles from the coast. It is scarcely visible from seaward, its position being indicated by a few trees slightly elevated above the surrounding country.

Mount Richmond (38°16'S., 141°25'E.), 229m high, the most conspicuous landmark on this stretch of coast, lies about 7 miles N of Cape Bridgewater. It has a broad flat top and is thickly wooded, except on its SW side. A metal beacon on a concrete pillar, 4.6m high, stands on its summit.

Cape Bridgewater (38°24'S., 141°24'E.) is a windswept rocky outcrop, with only two forms of vegetation being able to exist there. A beach rises to a flat summit, 135m high, on the SE end of the promontory. The fall to Bridgewater Bay on its E side and to the S is sheer, but to the W and N, the downward slope is gradual. A prominent black metal beacon is situated on the summit of the cape and stands 4m high. The cape is visible at 25 miles in clear weather and has been reported to give good radar returns at 18 miles.

Anchorage.—During E gales, which usually last about 3 days, small vessels may obtain temporary anchorage in Descartes Bay, in 11m, sand, about 0.7 mile W of Mount Dryden. The latter, 70m high and grass-covered, is located close to the coast, about 3.5 miles N of Cape Bridgewater. A watch should always be kept for a change to the prevailing W winds.

Bridgewater Bay is entered between Cape Bridgewater and Cape Nelson, about 6.5 miles ESE. A heavy swell rolls in during S and SW breezes, and, except under favorable circumstances, vessels ride uneasily. The swell threatens to break in a depth of 37m on a line between Cape Bridgewater and Cape Nelson, and actually does break nearly 1 mile offshore.

Mount Chaucer, about 3 miles NNW of Cape Nelson, is a small peaked hill, 123m high, on which stands a beacon. A conspicuous mass of drift sand lies close W of Mount Chaucer.

1.4 **Cape Nelson** (38°26'S., 141°33'E.) is an irregular cape of jagged cliffs, 61m high, rising at the back and center to lightly timbered and grassy hummocks, the highest of which, Picnic Hill, is 118m high. The cape is bold on its SE side. A house and water tank are conspicuous on the cape. Cape Nelson has been reported to give good radar returns at 19 miles.

A lighthouse, 35m in height, stands on the S tip of Cape Nelson and appears as a white stone tower with a prominent red top. The light has a reported range of 21 miles. The light is connected by telephone with Portland.

Nelson Bay, entered between Cape Nelson and Cape Sir William Grant, about 4 miles ENE, has a coast faced with limestone and basaltic cliffs, 30 to 61m high.

Cape Sir William Grant, rising to an elevation of 62m, is conspicuous, crowned with trees, and is shaped like a helmet. A 10m shoal lies close off the cape.

Bald Hill, 65m high, stands about 1.5 miles NW of Cape Sir William Grant. A tower, at an elevation of 91m, is situated on top of Bald Hill. The E side of the cape is scarred by quarry excavations.

Point Danger (38°24'S., 141°39'E.), about 1.5 miles ENE of Cape Sir William Grant, is 16m high and abrupt.

Big Reef, with a depth of 3.9m, and on which the sea breaks heavily, lies about 0.8 mile S of the point.

Little Reef, with a least depth of 3.9m over its outer end, extends about 0.5 mile SE of Point Danger.

Lawrence Rocks, about 1.5 miles SE of Point Danger, consist of two conspicuous islets. The outer islet has two summits, the S and slightly higher islet is 35m high, with a flat summit. The inner islet, separated from the outer islet by a boat passage, is 22m high. Lawrence Rocks are steep-to, except NW of the inner islet. A 14m rocky patch lies about 0.3 mile S of Lawrence Rocks.

The passage between Point Danger and Lawrence Rocks is not safe. With strong winds from seaward, a current sets out through this passage, sometimes attaining a velocity of 3 knots, and during heavy S gales breaks across.

Portland Bay is entered between Point Danger and the entrance of the Fitzroy River, about 12.5 miles NE. Portland, on the W side of the bay, is the only large port on this stretch of coast, and is the natural outlet for the large agricultural and pastoral country of western Victoria.

Aspect.—In clear weather, when off Portland Bay, the lower volcanic peaks of Mount Eccles, 179m high, and Mount Napier, 443m high, located about 29 and 42 miles NE, respectively, of Cape Nelson, together with Mount Clay, 187m high, located about 7 miles WNW of the entrance to the Fitzroy River, will assist a vessel in identifying the coast. Mount Clay, with a fire watch tower, 16m high on its summit, is a flat-topped hill, with a notch in its center; except for the notch, it would resemble Mount Richmond, about 14 miles WSW.

Anchorage.—Portland Bay affords good anchorage, in a depth of 15m, 0.7 mile ENE of the harbor entrance. The anchorage is sheltered from all winds except from the SE.

Portland (38°21'S., 141°37'E.)

World Port Index No. 54140

1.5 The port of Portland lies in Portland Cove, W of Observatory Point, which is located about 3 miles NNW of Point Danger. The harbor is formed by two rubble breakwaters; Main Breakwater extends N and NNE from Observatory Point, and Lee Breakwater extends ESE from the W side of the harbor. Major exports include grain and woodchips.

The Port of Portland

http://www.portofportland.com.au

Whaler Point, the N entrance point of Portland Cove, lies

about 1 mile NW of Observatory Point, and is a limestone cliff, 32m high. Anderson's Point lies about 0.3 mile farther N.

Tides—Currents.—The tidal rise at Portland is 1.0m at MHHW and 0.1m at MLLW. The tide in Portland Bay, as regards its rise and fall, is greatly dependent on the winds.

Depths—Limitations.—Whaler Reef, a detached shoal lying 0.2 to 0.3 mile E of Whaler Point, has a least depth of 3m.

There are depths of 12.1m in the harbor entrance and over 13m in the approach.

The K.S. Anderson Wharf, which is 396m long and includes Berth No. 1 and Berth No. 2, lies on the W side of the root of Main Breakwater. These berths have alongside depths of 12.2m and 10.9m, respectively. Two 27.4m high traversing loaders, for handling bulk grain, are available at K.S. Anderson Wharf.

Berth No. 5 and Berth No. 6 lie across the basin from Berth No. 1 and have alongside depths of 12.2 and 12.0m respectively. A trawler wharf and slipways lay adjacent to the marina and yacht club.

The Smelter Berth, on the W side of Main Breakwater, is 205m long, with a depth of 12.2m alongside. It is used for alumina and aluminium fluoride.

The S.L. Patterson Tanker Berth, on the S side of Lee Breakwater, is 76m long, with a depth of 10.5m alongside.

Aspect.—Observatory Hill, about 26m high, lies close SW of Observatory Point, and a chimney, with an elevation of 76m, lies about 0.2 mile SSW of the point.

A light is shown from a white stone tower, 12m high, on Whaler Point.

There are several silos near the S end of No. 1 Dock. The Catholic Church spire is conspicuous about 0.2 mile SSW of the root of Lee Breakwater.

A chimney is conspicuous about 0.2 mile W of Whaler Point; a water tower, 58m high, lies about 0.1 mile W of Andersons Point.

Portland

Pilotage.—Pilotage is compulsory and available 24 hours for any vessels over 35m in length and/or over 350 gt, except for vessels exempted by law. Vessels should send their ETA and request for pilots at least 24 hours in advance to the Harbor Master. Pilots board vessels in position 38°20'S, 141°40'E.

Regulations.—The port limits are defined by a line extending N from Danger Point to the opposite shore of the bay. Departure drafts of 12.7m are allowed for Berth No. 1 and Berth No. 5 with written approval from the Harbor Master.

Anchorage.—Anchorage can be obtained, in 14.6 to 16.5m, about 0.5 to 0.7 mile ENE of the entrance to the harbor.

The quarantine anchorage, in a depth of 12.8m, lies E of Main Breakwater. The quarantine line runs N-S through the head of this breakwater.

The explosives anchorage is E of a line drawn 020° from Observatory Point and exceeding a distance of 0.8 mile from the shore.

Directions.—Approaching Portland Bay from the W, a vessel should endeavor to sight the high land of Cape Bridgewater, which, when seen from a distance of 12 or 15 miles SW, appears covered with white sand patches. After identifying Cape Nelson, steer a prudent distance off it and Lawrence Rocks. When Mount Clay is open E of Lawrence Rocks, alter course N and proceed to the anchorage or the harbor as convenient.

From the E, a vessel should pass about 0.5 mile S of **Lady Julia Percy Island** (38°25'S., 142°00'E.), then shape a course for the anchorage and harbor.

At night, from the W, vessels should not round Lawrence Rocks until Whaler Point Light is visible; then course may be altered N until in the white sector of Whaler Point Light.

1.6 Minerva Reef, with depths of less than 5.5m, extends about 0.7 mile from the greater part of the NW shore of Portland Bay, from about 1 mile N of Anderson Point to the entrance of the Surrey River. The whole area forms an uneven bottom, over which the sea breaks heavily at times.

The entrance of the **Surrey River** (38°16'S., 141°42'E.) is fronted by a bar and is spanned by a road bridge about 0.3 mile above its entrance.

The entrance of the Fitzroy River, about 7 miles E, shows up well as a break in the regular coastline. Julia Hill, 20m high, and surmounted by a white beacon, lies about 2 miles W of the entrance of the river. A prominent stranded wreck lies on the beach S of Julia Hill.

Julia Reef, with a least depth of 7.3m, is a large irregular area of ground on which the sea breaks in S gales, about 1.5 miles S of Julia Hill.

The entrance of Lake Yambuk lies about 10.5 miles ESE of the entrance of the Fitzroy River; the Shaw River enters its N end. Mount Hummock, 65m high, with a red conical beacon on its summit, lies about 3 miles SE of Lake Yambuk.

Mills Reef, about 1.5 miles W of Mount Hummock, consists of several rocks which dry about 0.9m and are covered with masses of kelp.

Boulder Point (38°24'S., 142°09'E.), about 6 miles ESE of Lake Yambuk, is backed by The Sands, conspicuous white sand dunes, 91m high, and one of best landmarks for making the low land of Port Fairy.

The coast from Boulder Point to the S end of Griffith Island, about 4.7 miles E, is low and covered with grass, with a few scattered trees. A water tower, with a dome top, is conspicuous about 3.2 miles E of The Sands.

A rock, with a depth of less than 1.8m, lies about 0.2 mile S of Boulder Point. A narrow strip of basaltic boulders, 3.7m high, about 1.5 miles E of The Sands, lies about 0.2 mile off-

shore; this projection is always indicated by breakers.

Lady Julia Percy Island (38°25'S., 142°00'E.), about 21 miles E of Cape Nelson and 4.5 miles offshore, is 53m high, flat-topped, and cliffy on all sides. The island has been reported to give good radar returns at 20 miles. It presents the same appearance from all directions, with the exception that its S end is somewhat higher than its other parts. A white cairn, 3m high, stands on the W point of the island.

Landing may be made, except in N winds, in a small cove on the N side of the island at some steps cut in the rock face.

The passage, about 3 miles wide between Lady Julia Percy Island and Mills Reef, is used by vessels with local knowledge in N winds. Vessels are cautioned that a heavy swell sets in from the SW, with winds from the SE to SW.

1.7 Port Fairy lies at the SW end of Port Fairy Bay, which is entered between Griffith Island and Reef Point, about 2.3 miles NE. Back Passage, on the W side of Griffith Island, is shallow, rocky, and closed by a rubble wall extending across it.

The Moyne River enters Moyne Lagoon at its N end and then flows through a narrow channel, with the town of Port Fairy on its W bank, to the sea. The entrance of the river lies between two stone training walls. Port Fairy is now principally a fishing port.

Depths—Limitations.—A drying reef extends about 0.1 mile E, and rocky ground, with depths of less than 5.5m, extends about 0.2 mile E and 0.3 mile N of the NE end of Griffith Island.

In 1976, a least depth of 2m could be carried from the entrance of the Moyne River to the N end of the wharves at Port Fairy, but due to freshets, this depth cannot be relied on.

Off Reef Point, volcanic boulders from 0.6 to 2.7m high, extend about 0.2 mile, and sunken rocks extend about 90m farther S.

Mariners are advised that depths at and along the river entrance are constantly changing. Dredging is carried out periodically. Less than charted depths may exist and local knowledge is required to enter the port.

Aspect.—Griffith Island is low, with its NE point about 4.6m high. A double-peaked hummock, 19m high, with a conspicuous red beacon on its N peak, lies near the S end of the island.

Griffith Island Light is shown from a tower, 11m high, at the NE extremity of Griffith Island.

Battery Hill, 15.8m high, lies about 0.3 mile W of the head of the N training wall.

Tower Hill (38°19'S., 142°23'E.), about 7.5 miles NE of Griffith Island Light, is 98m high, and the most remarkable landmark seen when approaching Port Fairy from the S. A conspicuous tower stands close NE of Tower Hill. **Tower Hill Lake** lies about 1 mile W of Tower Hill. Viewed from the W, Tower Hill is not clearly visible, except in clear weather, due to a higher tableland E of it. From the S, it appears W of this tableland as a conical peak. From the tableland, the land E and W is higher than the general coast line, and it slopes to about the same elevation at either side, with the land W appearing to be joined to Tower Hill.

Regulations.—The S limit of Port Fairy is a line drawn across the S entrance points of Back Passage, and the SE limit is a line joining Griffith Island Light and Tower Hill.

Anchorage.—Anchorage may be obtained, in about 9.1m, sand, about 0.8 mile NE of Battery Hill. Small vessels anchor, in about 5.5m, about 0.2 mile closer inshore. Vessels anchoring during the continuance of a SW gale may get as close in as their draft will permit.

The explosives anchorage is within a circle with a radius of 300m, centered 017°, 1,300m from Griffith Island Light.

These anchorages are bad with E winds, and vessels are recommended not to try to ride out a SE gale.

Directions.—After identifying the water tower about 2 miles W of Griffith Island, the double-peaked hummock and lighthouse on the island, and Tower Hill, steer to pass a prudent distance from the reef and foul ground extending from the NE end of Griffith Island. Then steer for the anchorage. At night, a vessel should not anchor until Battery Hill Light is opened.

If bound for the wharves at Port Fairy, pass N of the buoy, moored about 0.4 mile N of Griffith Island Light, then proceed to the entrance of the Moyne River. From the entrance, steer a mid-channel course to the wharves.

Caution.—Submerged pilings of an old jetty extend about 0.2 mile offshore abreast Battery Hill. Local knowledge is required due to constantly changing depths at and along the entrance to the river.

Coastal Features

1.8 The coast from Reef Point to **Sisters Point** (38°22'S., 142°19'E.), about 1.5 miles ENE, is a succession of bare sand hummocks, about 19m high, fringed by rocks, some of which dry and some of which are sunken, extending about 0.5 mile offshore. Sisters Point is conspicuous, having immediately over it two hummocks, 20m high, and so named from their similar appearance.

A small sandy point, fringed with boulders, lies one mile E of Sisters Point. **Armstrong Bay**, E of this point, is nearly filled with sunken rocks. **Helen Rock**, about 1.5 miles ESE of the sandy point, is a pinnacle with a depth of 1.8m; it is steep-to and the sea rarely breaks over it.

The coast from Armstrong Bay to **Pickering Point** (38°24'S., 142°28'E.), about 6 miles ESE, is sandy and backed by grassy hummocks, 30 to 49m high. A tract of bare sand lies between 1 and 2 miles W of Pickering Point. The coast for about 0.7 mile WNW of Pickering Point consists of sandstone cliffs, having numerous indentations, and with rocks, which dry 0.6m, and sunken rocks lying off it, in some places up to 0.3 mile offshore.

Warrnambool Harbor (38°24'S., 142°29'E.)

World Port Index No. 54120

1.9 Lady Bay, in which is included the port of Warrnambool, is an indentation extending from a reef S of Warrnambool Breakwater to the Hopkins River, about 1.5 miles ENE.

Warrnambool Harbor, located on the banks of the Merri River that lies on the W side of Lady Bay, is partially sheltered by the breakwater, and lies inside several islets. Numerous rocks extend SE from Pickering Point. The harbor is considered the best shelter, during SE gales, of any of the W ports of Victoria,

due to the outer swell being broken by shoal rocky ground which extends from the mouth of the Hopkins River. It is not safe to enter or leave this harbor during SW or S gales, as the sea then breaks across the entrance with great violence; a vessel approaching the harbor under such conditions should make for Portland Bay. The harbor is only used by fishing vessels.

Depths.—Limitations.—South Channel, leading to Warrnambool Harbor, lies between Annabella Reef and the shoal rocky ground, with depths of less than 9.1m, which extends to about 1 mile S and 1.2 miles SW from the entrance of the Hopkins River. A large amount of kelp is found in this channel and the channel was reported to have a least depth of 7.5m on the range line. This channel is unsafe in S and SW gales.

The rocky ground on the E side of South Channel breaks in bad weather and in a heavy swell; in calm weather, a vessel may cross it in any direction, but when approaching from the SE, a vessel will be beam to the swell.

Aspect.—Middle Island (38°24'S., 142°28'E.), 21m high and surmounted by a white beacon, and Merri Island, 14m high, close NW, lie in the entrance to the Merri River in an area of foul ground extending about 0.4 mile S of Pickering Point.

The Merri River enters the sea through Merri River Cutting close E of Pickering Point. The mouth of the river is usually closed, but floods wash the sands from its mouth, allowing the flow of a large body of water.

Breakwater Rock, 5m high, lies about 0.1 mile E of Middle Island, and close S of the root of Warrnambool Breakwater. The breakwater, built of concrete blocks, extends about 0.3 mile ENE of Breakwater Rock, and is connected by a wooden viaduct to the shore at the E side of the mouth of the Merri River. The N side of the breakwater is a wooden wharf, fitted with spring buffer piles; the depth alongside is subject to variation, especially at its outer end. In 1961, there were depths of 2.4 to 5.5m alongside its outer part.

Inner Reef and Annabella Reef, both of which dry, lie about 0.1 and 0.2 mile SE, respectively, of Breakwater Rock. Rocks, awash, extend about 0.1 mile SE of Annabella Reef; the sea breaks heavily in this area.

The N shore of Lady Bay is a low sandy ridge, backed by higher and well-wooded land and the town of Warrnambool. A hotel lies about 0.3 mile NNW of the root of the breakwater and a chimney lies about 0.1 mile farther NNE.

The entrance of the Hopkins River is rock-bound and shallow, but within there are depths of 5.5m for several miles. Hopkins Reef, which dries 0.9m at its seaward end, extends about 0.3 mile S from the river entrance.

East of the river, the land is open rising gradually from the shore and terminating in a grassy hill, 67m high. A hill known locally as Hopkins Hill, 37m high, and on which there is a white beacon, lies about 0.2 mile E of the river entrance.

Mount Warrnambool (38°19'S., 142°44'E.), about 11 miles inland and 14 miles ENE of Middle Island, is visible, in clear weather, from a vessel 5 miles offshore between Port Fairy and Warrnambool. It has a rounded, but not even summit, 217m high; a low spur of the same hill lies about 3 miles W.

Lights, in line bearing 008.3°, lead through South Channel. The front light is shown from a white stone tower in front of the town, and the rear light is shown from a white stone structure about 0.1 mile N of the front light.

A conspicuous round stone water tower, with a flat top, 65m high, lies about 1 mile N of the range lights.

Signals.—The port limits of Warrnambool Harbor is the area within a circle of 1 mile radius, centered on the rear range light.

A black ball by day, or a red light at night, shown at the masthead of a flagstaff near the rear range light, indicates that it is unsafe for vessels to enter the harbor. This station is unattended at night, and when a red light is shown at night, it will indicate the condition at sunset; changes during the night will not be indicated.

Anchorage.—Warrnambool Harbor is not suitable for large vessels. Anchorage can be taken where most convenient according to the draft and prevailing weather conditions; a good scope of chain should be used, as there is a heavy scend even in the finest weather. The anchorage area inside the breakwater for small vessels has been reduced due to silting, so that shelter from the breakwater is not as effective.

The quarantine anchorage lies E of the meridian drawn through the head of the breakwater.

The explosives anchorage lies within a circle with a radius of 300m, bearing 167°, 1,550m from the rear leading light.

Directions.—Tower Hill, previously described in paragraph 1.7, is the best guide to the locality. Mount Warrnambool, more than 10 miles inland, is often obscured by mist, and within 4 miles of the coast it is obscured by the land in front of it.

Warrnambool Harbor should be entered through South Channel with the range lights in line, bearing 008.3°. A depth of 10m can be carried through this channel by keeping the rear light structure a little more than its own width open W of the front light structure, but this leads very close to Annabella Reef. When the sun is near the meridian, the rear light structure is difficult to identify, but the front light structure in line with the W side of the water tower on the N side of the town may be taken as in line with the rear light structure.

Vessels entering the harbor through South Channel at night should alter course E off the range line when the light on the head of the breakwater is abeam.

Caution.—Vessels approaching from the SE at night should note that the rear range light is obscured when bearing less than 322°.

Warrnambool Harbor to Cape Otway

1.10 The coast from about 4 miles ESE of Warrnambool to Moonlight Head, about 38 miles SE, is cliffy and presents an almost level appearance; the only break to its uniformity is the broad-topped hill, 67.4m high, over the E bank of the Hopkins River, and a fall in the land 9 miles E of Warrnambool. The cliffs become higher as Moonlight Head is approached.

The coast from the Hopkins River to Flaxman Hill, about 14 miles SE, is apparently bold, but a heavy swell constantly rolls in and breaks in depths of about 9.1m. **Flaxman Hill** (38°33'S., 142°44'E.) is 79m high, with a stone cairn, 1.8m high, on its summit. Another hill, about 0.3 mile NW of Flaxman Hill, is not as high, but is sometimes more conspicuous due to its sandy appearance. The two hills are a good guide to the locality of this part of the coast, which otherwise lack distinctive features.

The coast from Flaxman Hill to the Bay of Islands, about 4 miles SE, is known as the Bold Projection due to its bold, in-

dented and rugged nature. The Bay of Islands may be identified by its white cliffy appearance, varied by numerous islets, all of the same character, presenting a striking appearance.

A bay, in which there are many rocky islets, lies between the Bay of Islands and Curdie Inlet, about 4 miles ESE. The sea breaks heavily 0.5 mile offshore, and it is probable that sunken rocks fringe all of this stretch of coast.

Curdie Inlet is conspicuous due to the sandy nature of its entrance, which is often closed. There are many drying reefs in its mouth. A conspicuous patch of sand is at the W point of the inlet, on the highest part of the coast, and E there are other sandhills or patches; these are more conspicuous from their contrast with the cliffy coast on either side. Limestone rocks lie off the W and E entrance point of Curdie Inlet, those off the E entrance point are about 0.3 mile from it and are joined to it by a narrow neck of sand. A conspicuous silo stands on the W entrance point of the inlet. Schomburg Rock, 5.2m high, is the highest of the E rocks, and a ledge extends NW and SE. The sea breaks heavily E and S, and across the mouth of the inlet from the ledge to the rocks off the W entrance point.

The village of Peterborough, a popular beach resort, stands on the W entrance point of Curdie Inlet. A road bridge spans the entrance of the inlet.

The coast from Curdie Inlet to Hesse Point, about 3 miles ESE, then to the entrance to Port Campbell, about 2 miles farther E, is irregular and cliffy. At Curdie Inlet the appearance of the coast begins to change due to the cliffs being backed by high land.

1.11 Port Campbell (38°37'S., 142°59'E.) (World Port Index No. 54110) is only suitable for small craft with local knowledge, and is directly open SW. It is entered between two headlands, and is easily identified by Hesse Point, also by a remarkable rock, 72m high, lying about 1.5 miles E and about 0.2 mile offshore.

A reef, over which the sea breaks heavily, extends about 0.8 mile SW of the E headland, and a reef, over which the sea breaks occasionally, extends about 0.2 mile SW of the W headland. The entrance channel, between the reefs, has a least depth of 5.5m for a width of 61m.

The channel leading to the jetty at Port Campbell is marked by beacons; the T-head jetty has a depth of 2.7m alongside its head. The anchorage has depths of 1.8 to 6m, sand, with patches of limestone rock. In heavy weather, there is a great backwash off the beach, causing vessels to surge considerably at their anchors, necessitating a spring being run out to the shore. In the summer months (December to March), there is smooth water at the anchorage.

The current sets principally SE, or outward across the E breakers, but is much influenced by the wind.

The Sherbrook River, closed in the dry season, lies about 3 miles ESE of Port Campbell. Sow and Pigs, consisting of a few islets and rocks, lie between 1 and 2 miles ESE of the mouth of the Sherbrook River. A rock, 64m high, lies about 0.7 mile farther ESE.

1.12 Point Ronald (38°43'S., 143°09'E.) is a bluff, 78m high, made conspicuous by a large body of drift sand on its E side. Oliver Hill, 141m high, rises near the coast midway between Point Ronald and Moonlight Head.

Moonlight Head is bold, rounded, and thickly wooded. The hills immediately over this part of the coast rise to elevations of about 152m, the highest being 166m high. These hills form spurs of the Otway Ranges, which rise gradually behind the coast, until from 2 to 3 miles inland they attain an elevation of over 305m, Mount Chapple, 549m high, with a rounded summit, is the highest mountain of the Otway Range NNW of Cape Otway, and rises about 10 miles NE of Moonlight Head.

Several drying ledges, skirted by a few sunken rocks, about 0.2 mile offshore, lie from 1 to 3 miles WNW of Moonlight Head. Several above-water rocks lie off Moonlight Head.

Reginald Point (38°46'S., 143°16'E.), with an islet close off it, lies about 0.3 mile NE of Moonlight Head. A radio mast, 23m high, with an elevation of 311m, lies about 2 miles NE of Reginald Point. In 1983, a shoal, with a depth of 10m, was reported 5 miles SSE of Reginald Point.

Caution.—A bank, with a depth of 10m, lies about 4.2 miles SSE of Moonlight Head. A historic wreck, with an associated restricted area, lies 10 miles WSW of Moonlight Head and can best be seen on the chart.

Lion Headland, about 3.2 miles ENE of Moonlight Head, is formed of bold high cliffs, believed to be the highest on the coast of Victoria; the Otway Ranges have the greatest elevation when near the coast.

Rotten Point, about 4 miles farther ESE, is rocky, with a rock, awash at HW, about 0.2 mile S of it. The Joanna River, with a sand islet in its mouth, enters the sea about 1 mile NW of Rotten Point; there are several conspicuous patches of sand about the mouth of the river and the point.

The coast between Rotten Point and Cape Otway is rocky, and the sea generally breaks in depths of 9.1m. Midway along this coast, a conspicuous mass of drift sand lies close E of the mouth of the Ayr River. Behind this stretch of coast are sand hills, 107m high, covered with stunted brush.

A conspicuous conical peak, 503m high, lies about 10 miles NNE of Cape Otway.

1.13 Cape Otway (38°52'S., 143°31'E.), the N point of the W entrance to Bass Strait, is a bluff, cliffy projection, 76m high, of dark-brown color, with patches of coarse sandstone, rising to sparsely wooded grassy hummocks, not exceeding 107m high.

Otway Reef, with a depth of 3m, lies on a bank, with depths of less than 9.1m, extending about 1 mile S of Cape Otway. A heavy tide rip extends about 2 miles S of the cape.

Cape Otway Light is shown at an elevation of 91m from a hut, 2m high, in front of a 19m high masonry tower. A radiobeacon mast, 21m high, and buildings are near the light structure.

Cape Otway has been reported to be a good radar target at 21 miles.

Caution.—Cape Otway should not be approached within a distance of 3 miles, nor rounded at less than that distance. A detached shoal, with a depth of 16.6m, was reported 1.7 miles SSW of Cape Otway.

Bass Strait

1.14 Bass Strait separates Australia from Tasmania. Its N side lies between Cape Otway and Wilsons Promontory, about

134 miles E; its S side lies between Cape Grim (40°41'S., 144°41'E.), the NW extremity of Tasmania, and Eddystone Point (41°00'S., 148°21'E.), the NE extremity of Tasmania.

King Island lies in the middle of the W entrance to Bass Strait; in its E entrance are numerous islands and rocks, the principal being the Furneaux Group, which lies in the SE part of the E entrance. The Furneaux Group is separated from the NE part of Tasmania by Banks Strait, which will be described in paragraph 3.4. The bottom in Bass Strait consists mostly of sand and shells in the NW and greater part, and mud, marl, and ooze in its SE part.

The best route to enter Bass Strait from the W is between King Island and Cape Otway. The best route to enter Bass Strait from the E is by means of the Traffic Separation Scheme immediately S of Wilson's Promontory. The fairway between these routes is wide and deep.

Above and below-water rocks and islands exist in other routes through Bass Strait, making navigation through more difficult.

Caution.—An IMO-adopted traffic separation scheme has been established S of Wilson's Promontory and is best seen on the chart.

An Inshore Traffic Zone is situated between the traffic lane for westbound traffic and Wilson's Promontory.

An IMO-adopted Area to be Avoided has been established N of the Traffic Separation Scheme in the Bass Strait. This area is best shown on the chart.

Vessels approaching Bass Strait from the W should make landfall off Moonlight Head or Cape Otway. In approaching the strait, due allowance should be made for winds and currents, particularly during the prevalence of SW or S gales. In thick weather a vessel should keep in depths of over 73m.

The channel between King Island and Cape Otway is clear of dangers.

Shark and crayfish fishing fleets operate in Bass Strait. Shark fishing vessels operate with long lines, the ends of which are marked by flagged buoys.

Oil exploration rigs and oil production platforms may be encountered off the Australian coast. Vessels should not approach oil platforms in Bass Strait within 2.5 miles.

A undersea gas pipeline runs between Australia and Tasmania across Bass Strait.

Bass Strait—Western Entrance

1.15 The W entrance to Bass Strait, between Cape Otway and Cape Grim, about 120 miles SSE, is divided by King Island into two channels. The NW channel is safer. The SE channel is obstructed by numerous dangers and should not be used by vessels without local knowledge except in cases of emergency.

King Island

1.16 Cape Wickham (39°35'S., 143°57'E.), the N extremity of King Island, lies about 48 miles SSE of Cape Otway. The cape is formed of granite cliffs, 61m high, behind which the ground rises slowly to a hill, about 91m high, about 1 mile S.

Cape Wickham Light is shown from a round tower, 48m high, about 0.6 mile SW of the cape. Cape Wickham has been reported to give good radar returns at 20 miles.

Navarin Reef, awash at HW, lies about 2.2 miles NE of Cape Wickham Light. A rock, awash, and a shoal, with a least depth of 12.8m, lie about 0.1 mile E and 1.2 miles ENE, respectively, of its shallowest part. The sea always breaks on Navarin Reef.

Harbinger Rocks are two groups of rocks, about 1.2 miles apart. West Harbinger, about 4.2 miles WNW of Cape Wickham Light, dries about 1.2m, and has the appearance of a flat-topped boulder, over which the sea always breaks; a sunken rock, over which the sea does not break, lies about 0.1 mile SW. East Harbinger, about 3.8 miles NW of Cape Wickham Light, is a group of rocks over which the sea generally breaks. Both groups are steep-to, with deep water between them.

Tides—Currents.—Off Cape Wickham, very strong tidal currents are occasionally encountered; they are considerably affected by the wind. With W gales the rate of the E current, which is normally about 2 knots at springs, may be increased to 5 knots close inshore. Its strength decreases as its distance offshore increases. Easterly gales have the effect of increasing the W tidal current.

The tidal currents SW of King Island are irregular and are sometimes very strong. The wind also has considerable effect on the currents S and W of King Island, and with strong or prolonged W winds, the resultant of the current and the E tidal current may produce a SE onshore set with velocities up to about 2.5 knots.

Caution.—In approaching King Island from the W, especially during thick or hazy weather, vessels should exercise caution and sound frequently. Many fatal wrecks have occurred on this island, from errors in reckoning, and in consequence of not making the land near Cape Otway.

1.17 West coast of King Island.—The W coast of King Island, from Cape Wickham to Stokes Point, about 35 miles S, is backed by densely-wooded hills, 91 to 122m high.

Phoques Bay is formed between Cape Farewell, about 1.5 miles SW of Cape Wickham, and New Year Island, about 6 miles SW. Sunken rocks, on which the sea breaks, extend about 0.7 mile offshore, about 2 miles S of Cape Farewell.

New Year Island (39°40'S., 143°50'E.) is about 27m high near its S end, with a cairn on its summit. Rocks, some of which dry, extend about 0.4 mile from its SW and S sides and a detached rock, 2m high, lies about 0.3 mile off its W side. Christmas Island, close S of New Year Island and separated from it by a narrow channel, is less than 20m high. A rock, 1.5m high, lies on a shoal, with depths of less than 5.5m, which extends about 1 mile from the E side of Christmas Island; a rock, 1.2m high, lies on the seaward end of foul ground extending about 0.3 mile from the W side of the island.

Whistler Point lies about 1.2 miles SSE of Christmas Island, from which it is separated by above-water rocks, reefs, and sunken rocks, covered with kelp, and separated by narrow channels. The land rises to an elevation of 81m about 1 mile SE of Whistler Point.

Anchorage.—Franklin Road, E of New Year Island and Christmas Island, provides anchorage for vessels with local knowledge, in a depth of about 12.8m, but the anchorage is exposed to W winds.

The coast between Whistler Point and Netherby Point, about 12 miles S, presents a uniform appearance, broken at intervals

of about 3 miles by small rivers. A conspicuous patch of sand lies about 1.5 miles S of Whistler Point, and a conspicuous long and bare sandhill, with a sandy beach at its foot, lies about 5.5 miles farther S. This coast is broken by bays with off-lying rocks, some drying and others above water; sunken rocks extend about 0.7 mile offshore, and outside them there is foul ground, which, with tidal currents and a W swell, often cause a breaking sea, leading anyone unacquainted with the coast to imagine rocks everywhere.

An 11m rocky patch, which breaks occasionally, lies on the seaward side of a bank, with depths of less than 20m, about 4 miles NNW of Netherby Point. A rock, awash, which breaks heavily, and a 5.5m rocky patch lie about 2 miles NW and 2 miles SW, respectively, of the same point.

An aviation light is shown occasionally, at a height of 79m, from a metal tower, 9m high, about 2.5 miles NE of Netherby Point.

Currie Harbor, about 1 mile S of Netherby Point, affords shelter to small craft with local knowledge. A light is shown on the S side of the harbor. Tidal signals are shown near the light structure. The entrance channels into the harbor are marked by range beacons. There is a jetty, 168m long, with depths of 1.8 to 3m alongside in the SE part of the harbor.

1.18 Waterwitch Point (39°57'S., 143°51'E.) lies about 1 mile SSE of Currie Harbor. This point is a rocky spit, with depths of less than 11m. The spit extends 1.2 miles SW of the point. In 1995, a depth of 2.7m was reported in position 39°55.7'S, 143°49.7'E. Caution should be exercised while navigating in the vicinity of Waterwitch Point

Waterwitch Reef is located on a bank of foul ground about 1 mile in extent. It lies about 4 miles NNW of Waterwitch Point. A 5.5m patch lies 0.3 mile NW of the reef. A drying rock lies between the reef and the shore.

A conspicuous long sandhill lies about 2 miles SE of Waterwitch Point. British Admiral Reef lies 2 miles SW of Waterwitch Point.

Cataraque Point, about 7 miles S of Waterwitch Point, is bold and cliffy, with a 51m hill close within it.

Anchorage.—Fitzmaurice Bay, about 1.5 miles E of Cataraque Point, affords good shelter in E winds, in about 18.3m, off a sandy beach, on which there is generally a heavy surf. As the wind usually shifts from the E through N, to NW and W, and as the W change is often very sudden, this bay should be used with caution.

The coast between Cataraque Point and Surprise Point, the NW entrance point of Surprise Bay, about 3.5 miles SSE, continues bold and cliffy. Rocks, above and below-water, extend about 0.3 mile off the N shore of the bay. Between Surprise Point and the S entrance point of the bay, there is an above-water rock with sunken rocks around it, over which the sea breaks.

Surprise Bay is used as an anchorage by small coasters and crayfish vessels with local knowledge. It affords good protection in all weather, the sea being broken on the group of rocks in the entrance. The bay should not be entered in strong W winds.

The coast between Surprise Bay and Stokes Point, about 2 miles SE, decreases in height to about 30m. Foul ground, on which the sea breaks heavily, extends up to 0.4 mile off this coast.

Stokes Point (40°10'S., 143°55'E.), the S extremity of King Island, is only a few meters high and has the appearance of a group of boulders, over and outside of which the sea constantly breaks. A hill, about 44m high, lies about 0.7 mile N of the point. A few sunken rocks extend about 0.1 mile S of the point.

Stokes Point Light is shown from a white concrete tower, 9m high, about 0.5 mile N of the point.

Caution.—A rocky bank, with a least depth of 18.3m, lies with its shallowest part about 6 miles W of Stokes Point. The sea probably breaks over it in bad weather.

In rounding Stokes Point, care should be taken to give it a good wide berth; the low point and the rocks lying off it appear more distant than they are in reality.

Stanley Rocks and Seal Rock lie on the E and W ends, respectively, of a bank, with depths of less than 20m. Stanley Rocks, about 2.7 miles E of Stokes Point, consists of several rocky patches, some with depths of less than 1.8m. Seal Rock, 3m high, lies about 1.2 miles ENE of Stokes Point. Rocks, the outermost drying and the others sunken, extend about 0.2 mile S of Seal Rock. The ground between Stanley Rocks and Seal Rock is foul, and in stormy weather the sea breaks over the entire area between them.

1.19 East coast of King Island.—Seal Bay is entered between Black Point and **Seal Point** (40°07'S., 143°58'E.), about 3 miles NW. The latter point is a black rock, about 9m high, with a hummock, 34m high over it; the coast N is backed by a higher range of conspicuous sandy hummocks. An above-water rock, with sunken rocks between it and the coast, lies about 0.5 mile E of Seal Point. A rock, with a depth of 9m, lies about 1.5 miles E of Seal Point. Rocks, which dry about 0.6m, and sunken rocks extend about 1 mile ESE of Middle Point in the center of the bay.

Anchorage.—Seal Bay is exposed to E winds; small coasting vessels never use it as they prefer the safer anchorage in Surprise Bay. The anchorage, in 12.8 to 14.6m, over coarse sand of a loose nature, lies in the SW part of the bay. The bay is obstructed with rocks, which both cover and uncover, which extend 1 mile ESE of Middle Point, lying midway along the shore of the bay. There is good shelter in the NE end of the bay for small vessels during N winds, but they should get underway at the first sign of the wind shifting SW. A swell setting into the bay, or indications of an E wind, should be the sign for a vessel to get under way.

A small point, about 2 miles NE of Seal Point, has an above-water rock about 0.2 mile SE of it. The land behind this point rises to Mount Stanley, 213m high, about 3 miles NNW, where King Island attains its greatest elevation.

Brig Rock and **South Brig Rock** (Brig Rocks) (40°06'S., 144°02'E.) lie on a shoal extending from about 0.2 to 0.7 mile SSE, from a position about 1 mile ENE of Red Hut Point. Brig Rock, 14m high, and so called for its resemblance to a brig under sail, lies on the N part of the shoal. South Brig Rock, 12m high and remarkable for its black appearance, lies in the S part of the shoal; a few detached rocks lie S of it and the sea breaks about 0.1 mile off its S side.

The coast between Brig Rock and Sandblow Point, about 1.5 miles NE, has several rocks, most above-water, lying about 0.3 mile offshore.

Little Grassy Bay (40°04'S., 144°04'E.) lies between Sandblow Point and Jetty Point, nearly 1 mile NE. Main Breakwater extends from Jetty Point to Grassy Island, 4m high, about 0.3 mile SSW; a light is shown from Grassy Island. Inner Harbor, in the NE part of the bay, is sheltered W by Inner Breakwater, which extends about 650m SSE from the shore NNW of Grassy Island.

Omagh Reef, with a least depth of 2.4m, lies in the middle of the entrance between Sandblow Point and Grassy Island. Frog Rock, above-water, lies about 0.2 mile WNW of Grassy Island.

There is turning circle, 304.8m in diameter, with a least depth of 9.1m, between Frog Rock, Grassy Island, and the entrance to Inner Harbor. There is a least depth of 10m in the entrance to Inner Harbor, shoaling rapidly within; a turning circle, with a diameter of 183m and a least depth of 6.1m, lies close within the entrance.

Little Grassy Bay can be entered on either side of Omagh Reef. Two beacons, in line bearing 310°, from which lights are shown as required, lead in a depth over 10m through the E entrance; two beacons, in line bearing 011° and from which lights are shown as required, lead through the W entrance in a depth of about 7.4m. It is reported the Grassy Island Light and both pairs of leading beacons can only be seen from about 1 mile.

1.20 **Bold Head** (40°03'S., 144°06'E.), about 2 miles ENE of Jetty Point, is backed by a coastal range, 192m high and thickly wooded. A point, about 0.7 mile SW of Bald Head, has a small detached rock off its extremity; there are a few sunken rocks within 0.1 mile of this point.

Grassy Bay is entered between the latter point and Jetty Point, about 1.5 miles WSW. A hill, 124m high, rises about 0.3 mile within the head of the bay.

Anchorage.—Small coasting vessels, with local knowledge, anchor in Grassy Bay. The village of Grassy lies at the head of the bay.

The coast from Bold Head to the S entrance point of Sea Elephant Bay, about 7 miles N, is almost steep-to. Small sandy beaches vary its rocky character and it is backed by thickly-wooded ranges, about 123m high, which trend NW at the S entrance point of Elephant Bay. A light is shown from the top of a bluff, about 4 miles NNE of Bold Head.

Sea Elephant Bay is entered between **Cowper Point** (39°50'S., 144°08'E.) and a point about 6 miles S. Councillor Island (Sea Elephant Rock), 23m high, lies about 1.5 miles E of Cowper Point, at the outer end of a bank, with depths of less than 9.1m; a light is shown from the summit of the island. Sea Elephant Reef, which dries 0.9m, extends about 1.2 miles NNE of Councillor Island.

Caution.—Elephant Shoal, about 3.5 miles long N-S, has a least depth of 5.5m near its N end, about 5.7 miles ESE of Cowper Point. The shoal should be given a wide berth, as the sea breaks heavily on it in strong winds.

A 10m unexamined shoal was reported to lie about 4.5 miles E of the S entrance point of Sea Elephant Bay; an 11m shoal lies about 4 miles ESE of the same point.

A 9.1m shoal was reported about 1 mile E of the S entrance point of Sea Elephant Bay.

1.21 A T-head pier, 223m long, is situated at Naracoopa, about 1 mile NW of the S entrance point of the bay. The head of the pier is 61m long, with depths of 4.9 to 6.7m alongside. Two aluminum-colored oil tanks are conspicuous close S of the root of the pier.

Anchorage.—Sea Elephant Bay provides anchorage during W gales; the wind generally shifts S when the weather is clearing. The bottom throughout the bay is sand, or sand and shells; there is anchorage anywhere, in a depth of about 16.5m. Take care to avoid two disused submarine cables crossing the bay; the cables land about 1 mile N of the pier. In the summer months, there is much E weather, when a swell rolls in.

The coast between Cowper Point and Lavinia Point, about 9.5 miles N, consists of low sand hummocks. Sea Elephant Hill, a double-topped hill, 103m high, and thickly wooded, lies midway along this coast, about 2 miles from the coast. The Sea Elephant River, about 1 mile NW of Cowper Point, is a small stream, accessible at HW to small craft drawing up to 0.9m.

Lavinia Point (39°40'S., 144°06'E.), the NE extremity of King Island, is low and sandy. A conspicuous patch of sand lies about 1.5 miles NW of Lavinia Point.

Boulder Point, about 3.7 miles NW of Lavinia Point, is formed from a large granite boulder. Rocks fringe the point; a spit, with a depth of 3.2m, extends about 0.7 mile N.

Anchorage.—A bank has been formed in the vicinity of Boulder Point by the heaping up of sand caused by the meeting of the tidal currents. Coastal vessels often anchor, in about 16.5m, on this bank in W gales. If the gale settles into a W direction, this anchorage is as safe as Sea Elephant Bay, and it is handier for proceeding W when the weather clears.

A conspicuous sand patch lies about 1 mile W of Boulder Point; it is more conspicuous than the one NW of Lavinia Point.

The point, about 2.7 miles NW of Boulder Point, is fringed with rocks, and a hill, 40m high, rises about 0.5 mile SSW of it.

The Doughboy (39°35'S., 143°58'E.) lies about 1.7 miles farther NW and about 1 mile E of Cape Wickham, the N extremity of King Island. It is an above-water rock on the outer end of a drying reef extending about 0.3 mile offshore. The passage between The Doughboy and Navarin Reef, about 1.5 miles N, has irregular depths of 20 to 30m and is not recommended, as the tidal currents are often strong and cause a race.

Channel between King Island and Tasmania

1.22 The channel between King Island and the Fleurieu Group, about 38 miles ESE, should not be used by vessels without local knowledge except in cases of emergency. The Fleurieu Group is a group of islands, islets, and rocks fronting the NW coast of Tasmania. Only the aspect of Hunter Island and Three Hummock Island, together with the lights on them and the outer dangers off the W side of Hunter Island, will be described.

Tides—Currents.—The tidal currents set NE with the flood and SW with the ebb in mid-channel between King Island and the Fleurieu Group at velocities of 1 to 3 knots. Rates of 5 knots at springs have been reported.

Hunter Island, with **Cape Keraudren** (40°24'S., 144°47'E.) at its N extremity, is moderately elevated. Chase Hill, 91m high, its highest point, lies about 3.5 miles S of Cape Keraudren. Its S coast is backed by wooded hills, but the N part of the island has a barren appearance.

Hunter Island Light is shown from a 62m hill, about 6 miles SSW of Cape Keraudren.

Three Hummock Island, with its W extremity about 3.5 miles SE of Cape Keraudren, has a coastal ridge of partially bare and moderately elevated land extending from Hummock Head, its S extremity, to Cape Rochon, its NE extremity. Three hills, from which this island derives its name, rise gradually from this ridge. The S hill, about 1 mile N of Hummock Head, is a conical peak, 236m high, with a conspicuous tower on its summit, and is the most elevated part of the island. The N hill, 168m high and thickly wooded, lies about 1 mile SSW of Cape Rochon, and the third hill, 115m high, lies about 1 mile farther S.

A light is shown about 0.4 mile S of Cape Rochon.

Reid Rocks (40°15'S., 144°10'E.) lie on a bank of foul ground, with its center about 12.5 miles ESE of Stokes Point. Reid Rock, the NW and highest rock, is a small dark mass, 12m high, with a drying rock about 0.5 mile E of it. South Reid Rock, 2m high, lies on a patch near the S end of the bank, about 1.7 miles S of Reid Rock.

Bell Reef (40°23'S., 144°05'E.), with a depth of about 14m, lies about 15 miles SE of Stokes Point. Bell Reef lies in the way of vessels using the passage S of King Island, and is the more dangerous as the sea only breaks at intervals on it, even with a heavy swell. A shoal, with a depth of 25m, is reported (1983) to lie 7.5 miles SE of Bell Reef.

Black Pyramid, bearing 098°, leads about 3 miles S of Bell Reef, and Reid Rock, bearing 008°, leads about 2 miles E of Bell Reef.

1.23 Black Pyramid (40°29'S., 144°21'E.), a dark-looking islet with a rounded summit, 73m high, lies about 17 miles W of Hunter Island Light. It is the most prominent of the smaller islets of the Fleurieu Group, and is the first seen by a vessel approaching from the W. Black Pyramid appears to have no offlying dangers, being steep-to within 1 mile S, E, and N of it.

Albatross Islet, about 6 miles WNW of Cape Keraudren, is the NW of the Fleurieu Group; it is 38m high and is visible at a distance of about 16 miles in clear weather. The E side is almost a vertical cliff; both sides are steep-to, but a rock with a depth of less than 1.8m, and a rocky patch, with a depth of 4.1m, lie 0.2 mile W and 0.2 mile SSE, respectively, of its S end. Viewed from the NE or SW, a deep notch in the middle of the islet appears to divide it. There are strong tide rips over both ends of the islet during the strength of the tidal currents.

North Black Rock, 10m high and steep-to, lies about 3.5 miles W of Hunter Island Light. The sea breaks over this rock in heavy weather.

South Black Rock, about 5.5 miles SSW of North Black Rock, is a round mass, 39m high, with a rock, which dries 2.1m, lying about 0.5 mile SW of it; South Black Rock is steep-to except for this rock.

Directions.—The channel between King Island and the Fleurieu Group is not recommended, as there may be undiscovered dangers in it, and the safer passage between King Island and Cape Otway should be preferred. Numerous unexamined detached shoals have been reported in this channel. The sea bed between King Island and the Fleurieu Group is so uniformly level that soundings give no indication of the approach to the dangers, so that at night or in thick weather, the channel between should be approached with extreme caution.

Should it be necessary to enter Bass Strait by this channel, a vessel should keep well S of Bell Reef, observing the clearing marks, and should pass close to Black Pyramid.

Cape Otway to Port Phillip

1.24 The coast from Cape Otway (38°52'S., 143°31'E.), previously described in paragraph 1.13, to Franklin Point, about 2 miles E, is low and sandy, with some rocks close off it.

The coast from Franklin Point to Addis Point, about 43 miles NE, consists of high dark-colored cliffs backed by thickly-wooded hills extending to within 5 miles of Addis Point. The conspicuous conical peak about 10 miles NE of Cape Otway was previously described in paragraph 1.12. Mount Crowley, about 640m high and surmounted by a radio mast with an elevation of 688m, lies about 25 miles NE of Cape Otway, and is the highest point on this stretch of coast.

Hayley Point, about 7 miles NE of Franklin Point, lies midway between Storm Point and Point Bunbury. Hayley Point is a conspicuous green hill, 36m high, on which are the white houses of a town. Little Henty Reef extends about 0.4 mile E of Hayley Point. Rocks, each 2.7m high, lie on both the NW and SE ends of the reef.

Caution.—Henty Reef, with a depth of 5.8m and steep-to, lies about 1.7 miles ESE of Hayley Point. The sea breaks heavily over it in moderate weather.

The position of the reef is indicated by the intersection of the alignment of two pairs of beacons. The SW pair, about 0.3 mile SW of Hayley Point, are in line bearing 277°; the NE pair, on Point Bunbury, are in line bearing 325°.

1.25 Apollo Bay (38°45'S., 143°41'E.) lies N of Point Bunbury, under a high part of the Otway Range, and extends to the entrance of Skenes Creek, about 2.7 miles NE of Point Bunbury. The bay may be identified by the red buildings of the town of Apollo Bay in its SW part. Point Bunbury, 16m high, is a sandstone formation; reefs extend about 0.3 mile E of the point. A small boat harbor, formed by two breakwaters, lies on the N side of Point Bunbury.

Lights, in line bearing 016.5°, situated about 0.5 mile W of the entrance to Skenes Creek, lead W of Henty Reef and E of the dangers off Hayley Point and Point Bunbury.

The limits of the port of Apollo Bay are bounded on the S by the alignment of the Hayley Point beacons extended about 1.5 miles from the coast and on the E by a line drawn 016.5° from the offshore end of the S limit to the entrance of Skenes Creek.

Anchorage.—There is anchorage, during W or SW gales, in Apollo Bay, in about 11m, from 0.6 to 0.8 mile offshore, with good holding ground of shale with holes filled with sand. There is usually a swell in the bay, which is especially heavy during E or S winds. Vessels must be prepared for a change of wind to the S or SE.

Exercise caution when anchoring in the N portion of the bay, as a disused submarine cable lies here.

An explosives anchorage is established within a circle with a radius of 300m, centered 202°, 1.7 miles from the front approach leading light.

1.26 Cape Patton (38°42'S., 143°50'E.), about 8.5 miles ENE of Point Bunbury, is bold, dark-looking, and wooded, ex-

cept on its W side. Mount Sabine, 583m high, about 6.5 miles NW of Cape Patton, is the second highest peak on this coast. A tower, 38m high, stands on a summit about 3 miles S of Mount Sabine.

Point Grey, a low, grassy projection, lies about 11 miles NE of Cape Patton. A radio tower, 30m high, with an elevation of 152m, lies about 0.7 mile W of Point Grey. Mount St. George, a prominent conical hill, 200m high, lies about 1 mile SW of Point Grey.

A drying reef extends about 0.2 mile E of Grey Point; Loutit Bank, with a least depth of 11m, extends about 1 mile farther E.

Loutit Bay lies N of Point Gray; the town of Lorne borders the shore of the bay. Lorne Pier, marked by a light at its head, extends NE from the shore on the NE side of Point Grey.

The port of **Lorne** (38°33'S., 143°59'E.) (World Port Index No. 54090) is bounded by a circle of 1 mile radius, centered on the head of the pier.

Depths of less than 5.5m extend up to 0.3 mile off the shore of the bay.

Anchorage.—Anchorage, during SW or W gales, may be obtained in Loutit Bay, NW of Loutit Bank, in 9.1m, about 0.6 mile offshore. The anchorage in this bay is preferable to that in Apollo Bay, as there is less swell due to the protection afforded by Loutit Bank. During W gales, vessels should be prepared for a change of wind, as it often backs to a S direction.

An explosives anchorage is established within a circle with a radius of 300m, centered 015°, 1,500m from Lorne Pier Light.

1.27 Split Point (38°28'S., 144°06'E.), about 7.5 miles NE of Point Grey, is of a reddish-brown color and appears like three cliffs close together, divided by dark ravines. A light is shown from Split Point. A depth of 18m lies 1.2 miles SW of Split Point.

Eagle Nest Reef, awash, extends about 0.5 mile offshore, about 0.6 mile NE of Split Point.

The coast between Split Point and Addis Point, about 8.5 miles ENE, consists of two bights separated by Roadknight Point, which is low. Mount Inglesby, 121m high, lies about 1.5 miles NW of Roadknight Point; a radio tower, 30m high, lies 0.2 mile ESE of Mount Inglesby. A chimney, with an elevation of 118m, is conspicuous about 2.5 miles N of Roadknight Point. Addis Point lies at the E end of a conspicuous yellow bluff, about 30m high.

Ingoldsby Reefs, between Roadknight Point and Addis Point, are two drying reefs surrounded by sunken rocks, over which the sea breaks heavily. These reefs are steep-to on their seaward side, and lie about 0.7 mile offshore. Black Rock, which dries, lies about 0.6 mile SW of Addis Point, and is steep-to on its seaward side.

The coast for about 2 miles NE of Addis Point is fronted by cliffs, about 61m high, then for about 1.2 miles farther NE by cliffs, about 30m high.

Point Danger, about 5 miles NE of Addis Point, has a reef, with depths of less than 1.8m, extending about 0.3 mile E and S of it. The town of Torquay, its houses are visible from seaward, lies close N of Danger Point.

The coast between Danger Point and Barwon Head, about 9 miles ENE, consists of low sand hills, backed by undulating hills. This coast is fronted by reefs over which the sea breaks heavily, and by a shoal extending up to 1 mile offshore.

Victoria Reef, with a depth of 4.6m, lies about 1.2 miles ESE of Point Danger.

Ant Spit, with a depth of 4.6m, lies about 2.5 miles W of Barwon Head.

Claremont Reef, a detached 2.7m patch, lies about one mile SW of Barwon Head. The sea breaks heavily over the above shoals.

An area of foul ground, due to sunken vessels, is centered about 5 miles SW of Barwon Head. The area is 3 miles in diameter and is known locally as The Graveyard.

Barwon Head (38°18'S., 144°30'E.) is a saddle-shaped summit, 37m high, scrub-covered, with a metal beacon, 4.6m high, on its summit. The town of Barwon Head lies close NW of the headland, and on the W bank of the Barwon River. The town and headland appear as an island from seaward due to the low land in the vicinity. The river, accessible to boats, has rocky ground extending across its entrance, from which a spit, with a depth of 2.7m, extends about 0.7 mile E. A conspicuous tower, visible at a distance of 15 miles, lies about 2 miles NE of Barwon Head.

An overhead power cable, with a vertical clearance of 22m, spans the river near Barwon Jetty, and a submarine cable crosses the river close N of a bridge. The bridge is situated about 0.5 mile N of Barwon Head.

The coast from Barwon Head to Point Lonsdale, about 5.5 miles E, forms a bight, known locally as Abrahams Bosom, where vessels standing off Port Phillip seek shelter during W gales. The bight is fronted by sand dunes, 26m high, and a continuous rocky bank extends up to 0.5 mile offshore. From the outer edge of the latter bank, the depths increase gradually to depths of 20m about 1 mile offshore. A reef, with rocks above and below water, extends about 0.5 mile offshore from a point about 1.7 miles WNW of Point Lonsdale.

Port Phillip

1.28 Port Phillip (38°18'S., 144°38'E.) is an extensive bay, with a length of 31 miles to its N end, where it contracts, forming Hobsons Bay, in which is located the important port of. On the W side of Port Phillip is Western Arm, in which is the port of Geelong. The outer part of the entrance to Port Phillip, or The Heads, is bounded by Point Lonsdale and Shortland Bluff, about 2.5 miles ENE, on the NW side, and by Point Nepean, about 2 miles ESE of Port Lonsdale, on the SE side.

Port Phillip is bounded seaward by a circle, with a radius of 3 miles, centered on Point Lonsdale, and within The Port Phillip Heads and by the navigable rivers and creeks flowing into Port Phillip. The limits of the ports of and Geelong are excluded from Port Phillip and described separately.

Within Point Nepean, the entrance to Port Phillip is deep and free from dangers for about 2 miles, then widens and is filled with numerous sand banks and shoals extending about 7 miles NE and 11 miles ESE. Five navigable channels lead between the banks and shoals; in order of importance they are Great Ship Channel, Western Ship Channel, Outer Western Channel, Eastern Channel, and Outer Eastern Channel.

Vessels with a draft of 11.6m can be navigated through The Heads and Great Ship Channel at all stages of the tide.

Vessels with a maximum draft of 11.6m may be navigated

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Port Phillip Heads

through The Heads when tide and weather conditions are suitable to insure a minimum underkeel clearance of 2.4m. Caution is necessary during periods of high and long period swells from S, as these swells may considerably reduce a vessel's underkeel clearance when passing over Rip Bank and Nepean Bank.

Vessels with a maximum draft of 12.1m may be navigated through Great Ship Channel when the tidal rise is sufficient to provide the vessel with an underkeel clearance of 1.5m.

Tides—Currents.—The tidal rise at The Heads is 1.1m at MHHW and 0.7m at MLHW.

Due to the narrow entrance and the large area of Port Phillip, the range of tides within The Heads is small in comparison with that at the entrance; water level within the port is affected by winds blowing for a long period in one direction, and may remain above mean level continuously for some time after S gales, or below mean level continuously for some time after N gales.

The tidal currents in the entrance depend on the relative water levels inside and outside Port Phillip. The greatest difference in water levels occurs at about the time of HW and LW in the entrance, and the tidal current therefore runs at its strongest, 5 to 8 knots, at these times. Slack water occurs at about 3 hours before and after HW in the entrance when there is no difference in the levels; the tidal current runs, as follows:

1. Flood—From about 3 hours before until 3 hours after HW.
2. Ebb—All other times.

However, as the levels depend partly on wind, the times of slack water and the velocity of the tidal current are also affected by the wind; freshets may also affect the tidal current. On an average, it is HW at The Heads about 3.3 hours before that at Williamstown, but due to weather conditions this interval may vary from 3 to 4 hours. It will therefore be approximately slack water following the flood current at The Heads when it is HW at Williamstown.

The flood current from the S and E increases in strength as it nears The Heads; it sets right into the entrance, across and through the reefs, with great force, and spreads towards Shortland Bluff and Point King.

The ebb current sets toward Victory Bight between Point Lonsdale and Shortland Bluff, and then out the entrance at a great rate. The body of this current sets athwart the entrance towards Point Nepean, and away SE along the land and into the shore between Point Nepean and **Cape Schanck** (38°30'S., 144°53'E.).

In South Channel, the flood current sets through at a rate of from 1 to 1.2 knots, and strongly over the N banks; the outgoing current sets through at a rate of from 0.7 to 2 knots, and strongly over the S banks. In the dredged area, the tidal currents follow the direction of its axis, but immediately outside its ends they set obliquely to the direction of its axis.

Aspect.—Flinders Peak (37°57'S., 144°25'E.), 335m high, about 22.5 miles NNW of Point Lonsdale, is the most conspicuous feature on the W side of Port Phillip. The peak, cone shaped and of granite formation, is the highest of four peaks of The You Yangs, a range overlooking the port of Geelong; an obstruction light is shown from its summit. From SW, the peak may be seen after passing Split Point and with **Arthurs Seat** (38°21'S., 144°57'E.), about 15 miles ESE of Point Nepean, forms a good guide for identifying the entrance to Port Phillip. Arthurs Seat, 319m high, with a tower on its summit, is a conspicuous mountain which shows up for a considerable distance outside The Heads.

Point Lonsdale (38°18'S., 144°37'E.), the W entrance point of Port Phillip, is a dark, rocky point, 12m high. A light is shown from the point. The signal station at the light is equipped with radiotelephone. Point Lonsdale has been reported to give good radar returns at 14 miles. A Port Information Service is maintained at Point Lonsdale.

Lonsdale Reef, drying in places, extends about 0.3 mile SE of Point Lonsdale. Lonsdale Rock, with a least depth of 6.7m, lies about 0.6 mile SE of the same point; the position of the rock is discernible by the oily appearance of the water due to kelp growing on it.

Shortland Bluff, about 2.5 miles ENE of Point Lonsdale, is formed of yellow sandstone and is 20m high; it can be recognized by the lighthouses and towers on it, and by the buildings of the town of Queenscliff. A drying reef extends about 0.1 mile SE of the bluff, and is marked at its outer end by Ball Beacon, 1.8m high.

Victory Shoal, with a least depth of 3m, lies in the middle of the bight between Point Lonsdale and Shortland Bluff. There are other dangers in the bight that should be avoided.

Point Nepean (38°18'S., 144°39'E.), nearly 2 miles ESE of Point Lonsdale, is 33m high, and the W termination of a peninsula extending WNW from Arthurs Seat. It may be recognized by the buildings on it and by a white triangular beacon with a red top, 6.1m high, on its W fall. Point Nepean has been reported to give good radar returns at 19 miles.

Monash Light is shown at an elevation of 48m, about 1.5 miles SE of Point Nepean.

Monash Light

A drying reef, marked near its outer end by Nepean Rock Beacon, extends about 0.2 mile WNW of Point Nepean. Nepean Reef, with Big Rock, a drying rock, at its extremity, extends about 0.2 mile farther WNW.

Corsair Rock, with a depth of 2.4m, lies about 0.3 mile W of Nepean Rock Beacon. Corsair Rock is marked by an eddy on the flood current, and by a short breaking sea on the ebb, from which a tide spume extends about 1 mile SE.

Depths of less than 10m extend about 0.6 mile WNW of Point Nepean.

Two shoals, known as Five Fathom Banks, with depths of 9.1 and 10.6m, on which the sea breaks heavily, lie about 0.7 mile and 1.7 miles SSE, respectively, of Corsair Rock.

Pilotage.—Pilotage is compulsory for merchant vessels, except those specially exempted.

All pilotage within Port Phillip is supplied by the Port Phillip Sea Pilot Service. A pilot station, equipped with radar, is situated at Queenscliff (close to Port Phillip Heads) and pilots board vessels direct from fast launches, 3 to 5 miles SW of Point Lonsdale.

Vessels exempt from pilotage, on reaching pilotage waters, display a large white flag at the mainmast head.

Low-powered vessels and vessels with a draft exceeding 10.4m should radio the pilot vessel as to a suitable time to arrive at the boarding ground as passage through the entrance is governed by the tidal currents.

Vessels requiring pratique or quarantine service should radio the quarantine officer not more than 24 hours and not less than 12 hours before arrival, with the following information: Name of vessel, ETA, number of passengers and crew, passengers disembarking, port of departure and date, and any disease on board.

The Health Department will clear vessels between 0600 and 2200. The appropriate signal should be displayed.

The quarantine station extends along the S shore of Port Phillip between Observatory Point and Police Point, about 1.2 and 2.2 miles ESE, respectively, of Point Nepean, with its boundaries marked at each end by a flagstaff.

Signals.—The "Port Closed" signal, described in Pub. 120, Sailing Directions (Planning Guide) Pacific Ocean and Southeast Asia, is displayed by day from the masthead of the flagstaff at Point Lonsdale, and is shown at night from Point Lonsdale Light below the main light.

The following additional signals are used, when required, to indicate that entrance to Port Phillip is temporarily closed.:

1. By day—A red pennant above a black ball at the masthead of the Point Lonsdale Signal Station
2. At night—Three green lights, vertically disposed, at Point Lonsdale Light.

The following are extracts from the port rules:

1. To avoid risk of collision and danger at The Heads, traffic will be regulated in certain circumstances by means of the following signals shown from the Point Lonsdale Signal Station:
   a. By day—Three drums at the yardarm of the mast, vertically disposed, means the entrance is closed to inbound traffic and to outbound traffic from the West Channel.
   b. At night—Green flashing light on tower of lighthouse means the entrance is closed to inbound traffic and to outbound traffic from the West Channel.
   c. By day—Fourteen drums at the yardarm of the mast, vertically disposed, means the entrance is closed to outbound traffic.
   d. At night—Red flashing light on tower of lighthouse means the entrance is closed to outbound traffic.
2. During the display of the first day-night signal, no vessel shall enter the port from sea, and no outbound vessel from the West Channel shall proceed S of a line bearing 109° from Shortland Bluff Low Light.
3. An inbound vessel shall not shape a course for South Channel dredged cut while an inbound tanker is navigating between Lighted Buoy No. 5 and Buoy No. 16.
4. An inbound vessel shall not shape a course for South Channel dredged cut while an outbound tanker is navigating between Hovell Pile Light and Lighted Beacon No. 10.

Tidal current signals are shown at night from Point Lonsdale Light, as follows:

Signal	Meaning
Green light	Flood current from end of slack water to HW
Two green lights, vertically disposed	Flood current continuing after HW to beginning of slack water
Red light	Ebb current from end of HW slack to LW
Two red lights, vertically disposed	Ebb current continuing after LW to beginning of LW slack

Regulations.—The Victorian Channels Authority (VCA) is responsible for the provision and management of channels for commercial shipping in the waters of Port Phillip, including the channels of Melbourne and Geelong, and the ports of Portland and Hastings. It is also responsible for ensuring the safe

and efficient passage of vessels through its harbor control function. Mariners should consult the VCA Port Operations Handbook and Harbor Master's Directions publications, which can be found online, for the very latest information.

Victorian Channels Authority

http://www.regionalchannels.vic.gov.au

The following regulations are in effect for the navigation of outbound deep-draft vessels:

1. Outbound deep-draft vessels (vessels with a draft over 8.8m) shall:
   a. Prior to, or upon departure from the berth or anchorage, advise Point Lonsdale Radio Station by VHF or other suitable means of the vessel's ETA at The Heads, and, during the course of the voyage, advise of any changes to the estimated ETA.
   b. Upon arrival at South Channel Lighted Buoy No. 5, display, by day, a black cylinder, not less than 0.6m in diameter and not less than 1.1m high where it can best be seen, and at night, three red lights, vertically disposed, and 1.8m apart, where they can best be seen, visible all round the horizon at a distance of at least 5 miles.
2. The Point Lonsdale Signal Station, as soon as circumstances permit, will exhibit the "Port Closed" signal meaning, the entrance is closed to inbound traffic and to outbound traffic from West Channel.
3. Outbound deep-draft vessels shall not proceed beyond the West Entrance range line until the signal in 2 is displayed from the Point Lonsdale Signal Station.
4. Any vessel proceeding into Port Phillip, and which has reached a position within The Heads, at a time when the signal in 2 is shown at the Point Lonsdale Signal Station, shall not proceed beyond West Channel Range Line until such time as any outbound deep-draft vessel, showing the signal prescribed in 1b, has reached a position W of Lighted Buoy No. 1.
5. Outbound deep-draft vessels, having cleared The Heads, shall cease to exhibit the signal prescribed in 1b, and the Point Lonsdale Signal Station shall cease to exhibit the signal prescribed in 2 as soon as the passage of outbound deep-draft vessels permit.

To avoid the risk of collision and other dangers due to the necessity of passing close to oil tankers in confined waters, vessels shall not attempt the navigation of The Heads while an oil tanker is passing through. To aid in the observation of this rule, the precautions represented by the following signals must be strictly adhered to:

1. Oil tankers inbound through The Heads by day or at night, before shaping a course for the fairway through The Heads shall:
   a. Advise the Point Lonsdale Signal Station that it is ready to proceed and shall not proceed until the station, by day, displays a signal of four drums, vertically disposed, or at night, exhibits a red flashing light; these signals indicate the entrance is closed to outbound traffic.
   b. Display, by day, flag "B" of the International Code, and at night, exhibit a red light, not less than 6.1m above the deck and visible all round the horizon at a distance of at least 5 miles.
2. Oil tankers outbound through The Heads by day or at night shall:
   a. Prior to, or upon departure from the anchorage or berth, advise Point Lonsdale by VHF or other suitable means of the vessel's ETA at The Heads, and, during the course of the voyage, advise of any change to such ETA.
   b. While in the waters of the port of Port Phillip, display the signal described in paragraph 1b. Upon arrival at South Channel Lighted Buoy No. 5, the vessel shall advise the Point Lonsdale Signal Station of its readiness to proceed, and shall not proceed W of West Channel range line until the station, by day, displays a signal of three drums, vertically disposed, or at night exhibits a green flashing light; these signals indicate the entrance to the port is closed to inbound traffic, and to outbound traffic from West Channel.
3. The entrance is open to normal traffic when the Point Lonsdale Signal Station ceases to display the signals mentioned above.

Mariners are cautioned to avoid vessels employed in blasting and sweeping operations that are deepening the fairway at the entrance to Port Phillip. The following flags of the International Code of Signals will be displayed at the masthead of the attendant vessel:

1. B—On blasting work.
2. HF—On sweeping and survey work.
3. OW—Approaching vessels should stop for a few minutes until the charge has been exploded and watch for instructions.

If the above flag signals are not clearly visible, the attendant vessel will make the following by signal lamp:

1. WAIT—the equivalent of the flag signal OW.
2. PROCEED—the equivalent of lowering of all flag signals.

No vessel shall approach the attendant or blasting vessels nearer than 1 mile.

The speed of navigating the dredged portion of South Channel must not exceed the minimum to preserve steerageway.

Port Phillip—Entrance Channel and Ranges

1.29 The entrance channel at The Heads is nearly 2 miles wide, but reefs and shoals reduce the navigable width to about 0.6 mile.

Vessels with a draft of less then 11.6m can navigate through The Heads and South Channel at all stages of the tide. Vessels with drafts between 11.6 and 12.1m may navigate through The Heads and South Channel, which are described in paragraph 1.31, when the tide, swell, and weather conditions are such to provide the necessary underkeel clearance of 0.9m.

Caution.—A provisional limiting depth of 10.3m was declared in 1992 for Port Phillip for favorable entry and departure. For latest details on depths, vessels should contact the port authority.

Rip Bank, a rocky flat with depths of 8.8 to 18m, extends across the entrance close outside The Heads. The depths increase outside the bank, and on the inner side of the Rip is Entrance Deep, a trench that runs across has depths of 47 to 94m and extends onto the range line of Great Ship Channel, about

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Port Phillip Bay

0.9 mile WNW of Point Nepean. This inequality of depth, combined with tidal currents, which at times have a rate of 5 to 8 knots, cause a race, known as The Rip, which, during or immediately after a SW gale, breaks so heavily as to be dangerous to small vessels.

There are five channels into Port Phillip, between The Heads, and a channel, known locally as Clarkes Channel, which leads from the SE, as follows:

1. **Great Ship Channel**, the main channel, has a declared depth of 17m. Vessels of maximum drafts up to 11.6m may navigate the Great Ship Channel at all stages of the tide and up to 12.1m with sufficient tide. Shortland Bluff Low Light, in line bearing 042.5° with Shortland Bluff High Light, leads through Great Ship Channel. A conspicuous green water tower lies close N of Shortland Bluff High Light.
2. **Western Channel** has a declared depth of 11.4m. The W limit is marked by Hume Tower Light, in line with Shortland Bluff High Light, bearing 046°. A flagstaff, in line with Shortland Bluff High Light, bearing 044°, marks the E limit of the channel.
3. **Outer Western Channel** has a declared depth of 10.3m. Its W limit is marked by the alignment of Hume Tower Light in line with the Queenscliff High Light, bearing 046°. The W limit is marked by Hume Tower Light in line with Shortland Bluff High Light.
4. **Eastern Channel**, with a declared depth of 11.9m, is located on the E side of Great Ship Channel. Its W limit is marked by the alignment of Shortland Bluff High Light with a beacon standing close S of Shortland Bluff Low Light, bearing 041°.
5. **Outer Eastern Channel**, has a declared depth of 10.1m in 1999. The port authorities should be consulted for the latest details on channel depths. The W limit is marked by Murray Tower Light and Shortland Bluff High Light, in line bearing about 039°. Its E limit is marked by Murray Tower, in line with Lookout House, bearing about 035°; Lookout House lies close W of Shortland Bluff High Light. Shoal depths of 10m exist on Nepean Bank, W of this transit. These shoals can be cleared, by day, by keeping the W edges of Low Light in transit with the E edge of Queenscliff water tower, bearing 036.2°. There is no night time demarcation of the W edge of the shoal area.

Clarkes Channel, marked by Clarkes Beacon and Marcus Hill Beacon, in line bearing about 339.5°, has a least depth of 12.8m, but leads close W of Five Fathom Banks. Clarkes Beacon lies about 1.2 miles NNE of Point Lonsdale. Marcus Hill Beacon stands about 2 miles NNW of Clarkes Beacon. A radio mast stands about 0.2 mile WSW of Clarkes Beacon.

Clarkes Channel should only be used when the fairway between The Heads is clear of traffic. Inbound vessel on a flood will experience an onshore set. An outbound deep draft vessel should not use Clarkes Channel but the Great Ship Channel.

Directions.—A vessel should not attempt to enter The Heads at night without a pilot or against the outgoing current, which sets across the entrance and at springs attains a velocity of 7 to 8 knots, causing a high, short, confused sea. In S or W gales, the sea breaks right across the entrance between The Heads.

A vessel may scend or dip below the ordinary water level during high seas, and great caution should be used by outbound deep-draft vessels; under these conditions it is recommended to leave only on the last quarter of the incoming current or at the SW following.

From the SW, vessels usually make the high, bold land of Cape Otway, which it is desirable to round at a distance of not less than 3 miles. Then course may be set for Port Phillip Heads, passing about 3.5 miles outside Henty Reef. All other dangers are cleared by giving the coast a berth of not less than 3 miles.

If Cape Otway should be rounded early in the evening with a fresh S wind, beware of overrunning the distance, as a strong current after a prevalence of S gales often sets NE along the coast. Bearings of Split Point give a good check.

After passing Split Point, if the weather is at all clear, Arthurs Seat will be seen rising inland before the lower and

nearer land in that direction becomes visible; this mountain, in conjunction with Flinders Peak, should enable the vessel to identify the entrance to Port Phillip. Proceeding onward, the land about Cape Schanck will be seen E, appearing at first like a long low island trending SE. On nearing the entrance, Barwon Head will open out on the port bow. This headland is a good mark for making Port Phillip, but in poor visibility care should be taken not to mistake it for The Heads, vessels doing so have gone aground.

When the lighthouses on Shortland Bluff are sighted, a deep-draft vessel should shape course for the entrance of Great Ship Channel and enter on the previously-described range line. When the beacon on Point Nepean bears about 140°; or when Barwon Head is just open of Point Lonsdale, bearing 271°, course may be altered for South Channel or West Channel.

From the S and E, vessels usually make the land about Cape Schanck, which cannot be mistaken due to its bold character and the lighthouse on its summit. It is recommended to sight Cape Schanck before getting far into the bight of Port Phillip, and should the wind blow strong from the S, it is not safe to proceed without sighting the cape. Having passed, a good offing should be given in approaching The Heads until Shortland Bluff lighthouses open out, the intervening land near Point Nepean preventing their being seen before Shortland Bluff High Light bears 014°, and Shortland Bluff Low Light bears 011°. Then enter Great Ship Channel, as previously directed.

A vessel from the E may enter through Clarkes Channel, with Clarke Beacon in line with Marcus Hill Beacon, bearing 339.5°. This alignment leads very close W of Five Fathom Banks. This channel may only be used when the fairway between The Heads is clear of traffic. A vessel of deep-draft should not leave by Clarkes Channel, but should proceed through Great Ship Channel. A vessel entering Clarkes Channel on the flood should guard against the onshore set.

At night, having passed 3 to 4 miles off Cape Schanck Light, a vessel should steer to make the white sector of Point Lonsdale Light, and keep in that sector until Shortland Bluff range lights are sighted. The vessel then should proceed through Great Ship Channel as previously directed.

Port Phillip—South Shore

1.30 Two shoals, with depths of 4.2m and 7.6m, lie about 0.3 mile and 0.7 mile ENE, respectively, of **Point Nepean** (38°18'S., 144°39'E.).

Observatory Point, about 1.2 miles E of Point Nepean, is marked close SE by a white beacon, 10.7m high. A radar tower stands at the head of Nepean Bay. Cheviot Hill, about 0.7 mile SW of Observatory Point, consists of bare limestone.

The coast between Observatory Point and Police Point, about 1.2 miles ESE, is steep-to. The quarantine station is situated about midway along this section of coast. A red brick chimney, 24.4m high, and a light are situated close E of the quarantine buildings.

A conspicuous flagstaff, with a group of green-roofed buildings E, stands on Point Franklin, about 0.7 mile ESE of Police Point. Point Macarthur, about 0.7 mile farther ESE, is sheer and 24m high. Point King, about 0.2 mile farther ESE, is fringed by rocks, and a white beacon, 5m high, stands on it.

The Sisters, about 1.7 miles SE of Point King, is a conspicuous double point of limestone, 18.3m high, with a sandy beach between. The town of Sorrento lies midway along this coast.

White Cliffs (38°22'S., 144°49'E.), about 2.5 miles ESE of The Sisters, is a white cliff, 24m high, and the most remarkable feature on this coast.

Sorrento Channel forms the approach to the jetty at Sorrento, and lies between the S shore and South Sand, the extensive bank E of Point King. The passage is marked by a range light and by pile beacons. Its NW entrance is obstructed by a bar, with a depth of 2.4 to 3m, and a vessel approaching the entrance should pass between two beacons moored 275m E and 450m ESE, respectively, of Point King.

A disused light, 34m high, stands in McCrae (38°21'S., 144°56'E.), at the foot of Arthurs Seat.

Eastern Light (38°21'S., 144°56'E.), about 5.5 miles ENE of White Cliffs and now disused, is a white metal tower, 34m high, standing at the foot of Arthurs Seat.

The shore bank, from about 1.5 miles W of White Cliffs to about 1.5 miles ENE of Eastern Light, is marked by numerous white beacons lying between 0.2m and 0.4 mile offshore.

Martha Point (38°18'S., 144°59'E.) lies about 5 miles NE of Eastern Light. Mount Martha, 159m high, about 1 mile E of the point, is the highest summit of a wooded flat-topped ridge extending about 3 miles NE of the point.

South Channel

1.31 South Channel, a continuation of Great Ship Channel, lies between Great Sand and Middle Ground, on the N side, and South Sand, on the S side. The channel is marked by lights, lighted buoys, and unlighted buoys. Work was in progress on dredging and realigning the South Channel. Buoys will be removed from within the new channel alignment as works progress. Until the lights have been established, the pile will be marked by temporary lights.

Popes Eye Bank, with a least depth of 2.4m, lies about 2 miles E of Shortland Bluff. Wedge Light is shown from the center of the shoal. A spit, with depths of less than 10m, extends about 0.7 mile SW of Popes Eye Bank; Popes Eye Buoy is moored at the SW end of the spit.

A wreck, with a depth of 13.4m, lies about 1.1 miles SSW of Lighted Beacon No. 2; a second wreck, with a depth of 18.3m, lies about 1.6 miles ESE of the same light.

Nicholson Shoal, with a least depth of 6.1m, extends to about 1 mile N of Police Point. It is marked NE by Lighted Buoy No. 1.

Great Sand lies with its SW extremity about 1 mile SE of Wedge Light; from this position it extends about 9 miles ESE and 5.5 miles NE. The Mud Islands, 1.8m high, are a group of three islands lying near the middle of the NW side of Great Sands. The middle island of the three is a bird sanctuary, a breeding ground where petrels are matured. Caisson M, a conspicuous concrete structure, on which is a wooden hut, stands about 0.4 mile E of the SW end of Great Sands.

Depths of less than 10m extend about 0.7 mile SSW and 1 mile SE of Caisson M. Dredging takes place periodically over these shoals.

A dredged channel, with a depth of 12.5m, is entered between Lighted Beacon No. 1 and Lighted Beacon No. 2.

Middle Ground is the E part of Great Sand, E of Pinnace

Channel. South Channel Fort, with an elevation of 7m, lies about 3.7 miles ESE of Caisson M.

South Channel Pile (38°20'S., 144°51'E.) is a white round house on piles, 8.2m high, on the S side of South Channel, about 0.5 mile E of the E end of South Sand. A 5.2m patch lies about 0.1 mile NNE.

A dredged channel, with a depth of 12.5m, is entered between Lighted Beacon No. 15 and Lighted Beacon No. 16 and extends E to Lighted Beacon No. 18.

Hovell Pile Light, situated about 2.2 miles E of South Channel Pile Light, marks the E end of Middle Ground. The new light is shown from a structure situated about 275m E of the old structure.

Anchorage.—Anchorage may be obtained off Queenscliff outside the prohibited area described below, and as close as possible to the NW side of the channel in order to keep the fairway to West Channel clear. The best berth is in about 10.6m, about 0.5 mile E of Shortland Bluff High Light and within the red sector of Low Light.

When compelled to anchor off the quarantine station due to quarantine regulations, S gales, or other causes, a vessel drawing more than 6.1m should anchor N of the station, in 12 to 15m, from about 0.3 to 0.6 mile N of the Quarantine Station Light. At night, a vessel should anchor in the white sector of the Quarantine Station Light, preferably with that light bearing 180°.

Good anchorage, clear of the fairway, may be obtained, in 7m, at the S end of Symonds Channel, about 0.5 mile SE of Wedge Light.

It is not advisable in bad weather to anchor in either South Channel or West Channel, due to the strength of the tidal currents and the loose nature of the bottom.

Capel Sound, S of the E end of South Channel, affords safe anchorage, about 0.7 mile SSE of South Channel Pile Light, and clear of the prohibited area. The anchorage offers a depth of 12m, sand, and is covered by the green sector of South Channel Pile Light.

A charted prohibited anchorage area, excluding the anchorage of small boats, encompasses the E terminus of S channel; the area is marked by buoys. A mussel bed lies 3.6 miles ENE of Hovell Pile Light.

Caution.—The speed of a vessel through the dredged cut must not exceed the minimum for safe steerageway. Caution is necessary here as the tidal currents immediately W of the dredged area set obliquely to its axis. Dredges may frequently be found at the E end of the dredged cut.

Port Phillip—West Shore

1.32 Drapers Reef, with a least depth of 0.6m, extends about 0.4 mile NE of Shortland Bluff (38°17'S., 144°39'E.), and is marked by a buoy. About 0.5 mile farther NE, a dredged channel leads to a boat haven N of Queenscliff. The boat haven is bounded on its W side by a bridge connecting Queenscliff to Rabbit Island, and then by another bridge to the SW end of Swan Island.

Swan Island (38°15'S., 144°41'E.) is low and marshy in its central part, with wooded ridges about 12.2m high, E and W. Depths of less than 5m extend up to 0.7 mile off the SE side of the island. Swan Spit, with depths of less than 1.8m, extends about 0.7 mile S of Swan Point, the NE extremity of Swan Island. Swan Bank, with depths of less than 5m, extends about 0.3 mile E of Swan Spit; the edge of this bank is subject to frequent change. Swan Beacon stands about 0.7 mile SW of Swan Point.

A charted area encompassing Swan Island has been designated as Naval Waters by the Commonwealth of Australia.

Swan Bay, NW of Swan Island, is mainly filled with mud flats.

From Edwards Point, the N entrance point of Swan Bay, to South Red Bluff, about 2.2 miles NNE, the shore is wooded, with lagoons close within it.

South Red Bluff, about 12.2m high, is conspicuous because of its reddish color; a beacon is shown from the summit.

A jetty, fronting the town of St. Leonards, about 1 mile farther NNE, has a berth, 119m long, with a depth of 3m at the outer end on its N side. A curved breakwater extends S from the head of the jetty and affords shelter for small craft.

Indented Head, about 1.5 miles N of St. Leonards, is a wooded point, 3m high. Governor Reef, which dries, lies about 0.5 mile SE of Indented Head.

The coast between Indented Head and Point George, about 1.2 miles NW, is low and wooded, above which the roofs of houses may be seen.

Point George (38°08'S., 144°42'E.) is low and grass-covered; it may be recognized by a solitary beacon on its summit. White Woman Rock, a basalt boulder, 1.2m high, lies close off the point.

Prince George Bank, with depths of less than 1.5m, fronts the coast from St. Leonards to Point George, and extends about 2 miles NE of the latter point. A light is shown from the NE extremity of the bank; a racon is situated at the light.

Caution.—An area of unexploded ordnance exists in an area centered on position 38°15'S, 144°41'E. This area, which can best be seen upon the chart, lies approximately 6 miles E of Indented Head and outside the entrance to the West Channel. This area is not safe for anchoring or fishing.

West Channel

1.33 West Channel had a least depth of 5m, sand and shells, in 1998, but during spells of E or N winds the depths may be less. The banks and shoals in West Channel are subject to frequent change, and the latest information should be obtained from the Department of Ports and Harbors before proceeding through this channel.

West Channel is marked by odd-numbered lights and buoys on its SE side and by even-numbered lights, beacons, and buoys on its NW side.

West Channel is entered in an ENE direction, passing N of Popes Eye Bank, and passing either N or S of **Royal George Shoal** (38°16'S., 144°42'E.). The latter shoal, with a least depth of 4m, lies about 1 mile SSE of Swan Beacon. The channel then continues in the same direction until Wedge Light, on Popes Eye Bank, bears 204.5° astern, and in line with Monash Light. This range leads W of the SW end of West Middle Sand, which is marked by a buoy, and leads E of a 4m shoal located nearly 1 mile SE of Swan Beacon. The range then leads between William Sand and West Sand. No. 9 Light and No.11 Light are situated on the NW side of William Sand, about 1.4

miles NE and 2.2 miles NNE, respectively, of Swan Point. Grimes No. 10 Light, about 2.9 miles NE of Swan Point is located on the E side of West Sand. Keep Swan Point, in line with a beacon about 0.3 mile SW, and with Shortland Bluff High Light bearing 226° astern; this range leads through the N part of West Channel. West Channel Pile Light lies at the NE end of West Sand, on the W side of the N entrance to the channel.

Inbound vessels are recommended to enter West Channel S of Royal George Shoal, and outbound vessels N of the shoal.

Attention must be paid to the tidal currents which do not set evenly through the channel, particularly off Swan Bank and the N end of the channel.

Coles Channel

1.34 Coles Channel lies between West Sand and the shore between Swan Point (38°15'S., 144°42'E.) and The Bluff, about 3.5 miles NNE. The channel has a least depth of 3.4m on the range line, and is used by coasters.

Coles Channel is approached from West Channel in a NW direction. When Coles Light, about 0.3 mile NNE of Swan Point, bears 195° astern, and in line with Monash Light, the vessel should alter course N with these lights in range astern, passing W of the beacons on the E side of the channel. It should be noted that the range line passes close W of the S part of West Sand, with a least depth of 0.3m. When abreast of St. Leonards, course should be altered NE to pass SE of Prince George Bank.

Port Phillip—East Shore

1.35 The coast between **Martha Point** (38°18'S., 144°59'E.) and Davey Point, about 9.5 miles NE, is wooded, with numerous buildings amongst the trees; then to Ricketts Point, about 10.5 miles farther N, it is low, fringed with trees, behind which there are numerous buildings and cultivated ground.

The shore between Martha Point and Fisherman Point, about 3 miles NNE Martha Cliff, about 2 miles NNE, is cliffy; behind it the land rises to a flat-topped ridge, with Mount Martha at its SW extremity.

Balcombe Bay, between Martha Cliff and Fisherman Point, about 3 miles NNE, is fronted by rocks and backed by a red granite rocky coast. Shag Rock, which is conspicuous, lies close offshore, at the head of the bay, close S of a cement works. Fishermans Bay Reef, extending about 0.3 mile N from Fisherman Point, is marked by a beacon.

Schnapper Point, about 1 mile NNE of Fisherman Point, is a narrow projection about 15.2m high, and is fronted by red granite boulders on its W side. A jetty, extending about 198m NE from the point, has depths of 7.6m at its head, decreasing to 4.9m at 106m in from its head.

The coast between Schnapper Point and Davey Point, about 4 miles NE, is strikingly bold, being formed by hills; the highest and most conspicuous hill is Mount Eliza, 160m high, lying about 1.5 miles inland and 3 miles E of Schnapper Point. Wooley Reef, with a depth of 1.4m, lies about 0.6 mile NNE of Davey Point, at the outer end of a spit of sand and rock. It is marked by a beacon. A dangerous wreck lies 1 mile NW.

A T-head jetty at Frankston, about 1.5 miles NE of Davey Point, has a depth of 4.3m alongside its outer face.

The E shore N of Frankston is built over. A light, marking the S bank of the Patterson River, lies about 4 miles N of the jetty at Frankston. A gasometer is conspicuous about 2 miles farther N. The suburb of Mordialloc, where there is a jetty, lies about 8 miles N of Frankston.

Beaumaris Bay lies between Mordialloc and Table Rock Point, about 2.5 miles WNW. The latter point is formed of yellow cliffs, 12m high. A marine farm used for mussel cultivation lies on the W side of the bay.

1.36 **Ricketts Poin**t (38°00'S., 145°02'E.), about 0.4 mile WNW of Table Rock Point, is flat and 9.1m high. A drying rock lies midway along a spit, with depths of less than 5m, extending about 0.4 mile S of Ricketts Point. A beacon stands on the SW side of the rock.

The coast from Ricketts Point to Half Moon Bay, about 2 miles NW, is bordered by rocks and foul ground extending up to 0.5 mile offshore. Quiet Corner, a cliffy point, about 15m high, lies midway between the points. Black Rock, detached and awash, lies about 0.2 mile off Quiet Corner.

The S entrance point of Half Moon Bay is 12m high, and a reef, with a depth of 1.5m over its outer end, extends about 0.4 mile NW of the point. Black Rock Breakwater lies about 275m NW of the same point and is composed partly of timber and partly of a hulk. Red Bluff, at the N end of Half Moon Bay, is 34m high, reddish in color, and conspicuous; it is the only bare cliff in the vicinity. A conspicuous concrete building, 73m high, stands 1.2 miles ENE of Red Bluff.

Picnic Point, nearly 1.5 miles NW of Red Bluff, is a well-defined grassy point with a green-roofed building on it. Depths of less than 5m extend about 0.5 mile SW of the point. A breakwater extends about 0.2 mile NNW of the point and shelters Sandringham anchorage.

Anonyma Shoal, about 0.8 mile SW of Picnic Point, has a least depth of 1.2m and is steep-to on its SW side; a black can buoy is moored close W of its least depth. Yorkies Rock, with a depth of 0.6m, and a 7m depth lie about 0.4 mile S and 1.3 miles W, respectively, of Picnic Point.

The shore from about 0.3 mile NE of Picnic Point to Green Point, about 1.2 miles NW, is formed by yellow bluffs, 12 to 15m high. A Dumping Area is established 0.6 mile SW of Green Point and is marked by buoys. Shoaling is to be expected within this area. Green Point may be recognized by the yellow memorial on it, and by Middle Brighton Pier, about 0.2 mile SE.

Depths of less than 5m extend up to 0.5 mile offshore between Green Point and Point Cole, about 1.3 miles N. Middle Brighton Pier lies about 1 mile N of Green Point. Bonnet Rock, which dries 0.6m, lies about 0.2 mile S of Middle Brighton Pier and about 0.2 mile offshore; a beacon is moored W of the rock. A rock, with a depth of 0.6m, lies about 0.3 mile S of Bonnet Rock. Point Cole is low, with a conspicuous yellow building on it. Schnapper Rocks, with a depth of 3.3m, lies about 0.4 mile WNW of Point Cole.

Point Ormond (37°52'S., 144°58'E.), about 1.2 miles NNW of Point Cole, is a round grassy point, about 12.2m high, with a white beacon on it. Pile beacons mark rocks lying about 0.2 mile offshore for about 0.4 mile N of Point Ormond.

St. Kilda Pier lies about 1 mile NNW of Point Ormond; and

Melbourne Harbor

provides berthing for small craft; the pier extends about 0.2 mile offshore, then a rubble breakwater extends about 0.3 mile NNW.

Melbourne (37°50'S., 144°56'E.)

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1.37 The port of Melbourne, at the N end of Port Phillip, is one of Australia's principal ports and one of the world's major container ports in volume of cargo handled. Melbourne Channel, entered about 4 miles SSE of **Point Gellibrand** (37°52'S., 144°54'E.), leads to the port; this dredged channel leads between the shoal banks on either side of Hobsons Bay. The latter bay is entered between Point Gellibrand and Point Ormond, about 3.5 miles WSW. Melbourne Channel leads N to Princes Pier (ruined 2010) and Station Pier; the latter pier is double-decked and the main overseas passenger terminal.

About 1 mile E of Point Gellibrand, a channel branches NW from Melbourne Channel and leads to Gellibrand Swinging Basin off the piers at Williamstown. Then this channel leads about 0.4 mile farther NW to the approach to Webb Dock and the channel leading to the entrance of the River Yarra.

The River Yarra enters the NW part of Hobsons Bay between breakwaters on each side of its entrance. The river then extends about 1 mile NW and 1 mile NNE to where the Maribyrnong River enters on its N side. From this junction the river leads E to Swanson Dock, Appleton Dock, and Victoria Dock. Construction of the Bolte Bridge was completed in 2002. The vertical clearance of the Bolte Bridge is 25m. The bridge is situated at the entrance to Victoria Dock. The river continues on to the Charles Grimes Bridge, which crosses the river about 0.7 mile ESE of the entrance to Victoria Dock. Navigation ends at the Charles Grimes Bridge, which has a vertical clearance of 3.2m.

The city of **Melbourne** (37°50'S., 144°58'E.) lies on either side of the River Yarra, surrounded by numerous suburbs. The city rises gradually from the River Yarra, and does not exceed an elevation of 91m. Its secure port and central position, with a network of railways and roads connecting with a large portion of Australia, command export and import trade.

Melbourne Port Corporation

http://www.portofmelbourne.com

Tides.—Currents.—The tidal rise at Melbourne is 1.0m at MHHW and 0.6m at MLHW.

The tidal currents in Hobsons Bay are weak and their direc-

tion is mostly dominated by the prevailing winds.

The waters of the River Yarra are almost continually running outward. Even during the incoming tidal current, the water, from the surface to a depth of about 3.7m, is running out. Under the influence of strong S to W winds, however, an upstream current is caused. The normal rate of outflow is from 0.2 to 0.5 knot, but this is accelerated during heavy rains when its rate may attain 4 knots. The river has, on occasions during severe floods, overflowed its banks and caused damage to property.

Depths—Limitations.—A submarine pipeline, containing flammable gas under high pressure, is laid in the N part of Port Phillip, and in the approach to Melbourne Channel. The pipeline extends from Mordialloc (38°01'S., 145°05'E.) to the vicinity of Kororoit Creek (37°52'S., 144°52'E.), and is marked in its NW part by lighted special buoys, painted yellow. Any vessel damaging the pipeline would face an immediate fire hazard. Vessels are cautioned not to anchor within 155m of the pipeline.

Channels.—There is a dredged depth of 13.1m in the approach channel to the port, 10m in the channel to Princes Pier and Station Pier, and 13.1m to the River Yarra, including Gellibrand Swinging Basin.

Melbourne Berthing Facilities

Berth	Length	Depth	Maximum vessel		Remarks
			Length	Draft	
South Wharf					
No. 26	266m	11.0m	215m	10.4m	Bulk cement.
No. 27	146m	9.4m	215m	8.8m	General cargo.
No. 28	146m	9.4m	215m	8.8m	Lay-up berth/general cargo.
No. 29	146m	9.4m	215m	8.8m	Lay-up berth/general cargo.
No. 33	210m	11.6m	185m	11.0m	Bulk cement.
Appleton Dock					
Berth B	192m	10.7m	Vessels with a maximum length of 250m can be handled.	10.1m	Containers, general cargo, and vehicles.
Berth C	192m	10.7m		10.1m	Containers, general cargo, and vehicles.
Berth D	200m	10.7m		10.1m	Steel products and bulk cargo.
Berth E	137m	10.7m	126m	10.1m	Bulk cargo.
Berth F	263m	11.4m	228m	10.8m	Bulk cargo.
Swanson Dock					
No. 1W	Total berthing length of 944m.	14.6m	Vessels with a maximum length of 320m can be handled in the basin.	14.0m	Containers.
No. 2W		14.6m		14.0m	Containers.
No. 3W		14.6m		14.0m	Containers.
No. 4W		14.6m		14.0m	Containers.
No. 1E	Total berthing length of 884m.	14.6m		14.0m	Containers.
No. 2E		14.6m		14.0m	Containers.
No. 3E		14.6m		14.0m	Containers.
No. 4E		14.6m		14.0m	Containers.
Victoria Dock					
No. 22	261m	9.4m	250m	8.8m	General cargo.
No. 24	200m	9.4m	250m	8.8m	General and bulk cargo.
Yarraville					
No. 5	148m	9.4m	180m	8.8m	Dry bulk.

Melbourne Berthing Facilities					
Berth	Length	Depth	Maximum vessel		Remarks
			Length	Draft	
No. 6	235m	10.2m	190m	9.6m	Dry bulk.
Station Pier					
Outer East	220m	10.9m	240m	10.3m	Passenger vessels.
Outer West	400m	10.9m	305m	10.3m	Passenger vessels.
Inner West	95m	8.8m	105m	8.2m	Passenger vessels.
Inner East	220m	10.9m	195m	10.3m	Passenger vessels.
Webb Dock					
East No. 1	210m	7.0m	185m	6.4m	General cargo.
East No. 2	150m	7.0m	150m	6.4m	General cargo.
East No. 3	210m	10.0m	185m	9.4m	Containers, general cargo, and vehicles.
East No. 4	530m	12.5m	250m	11.9m	Containers, general cargo, and vehicles.
East No. 5	530m	12.5m	250m	11.9m	Containers, general cargo, and vehicles.
West No. 2	240m	9.1m	200m	8.5m	Ro-ro.
Tanker Berths					
Holder Dock	—	13.1m	200m	12.1m	Oil terminal. Vessels with an loa of 185 to 200m can be accommodated. The ship/shore manifolds must be aligned.
Gellibrand Pier	289m	12.1m	290m	11.2m	Bulk liquids. Vessels with a length of over 250m may berth during daylight hours only, but may sail at any time, subject to weather conditions.
Maribyrnong No. 1	185m	10.0m	180m	9.4m	Bulk liquids.
Holden Oil Dock	200m	13.1m	185m	12.1m	Bulk liquids.

There is a dredged depth of 13.1m from the entrance of the River Yarra to Swanson Dock; then 10.3 to 11m to Victoria Basin, including the swinging basin in Victoria Basin.

Note.—Maintenance dredging is continuous in Port Melbourne.

All vessels are required to have an underkeel clearance of at least 0.6m at all times. Vessels over 183m in length, proceeding to Webb Dock or navigating the River Yarra, must have an underkeel clearance of 10 per cent of their draft.

Berthing limitations in Melbourne are given in the accompanying table titled **Melbourne Berthing Facilities**.

Bridges.—The Westgate Bridge, about 1.3 miles above the entrance to the River Yarra, has a vertical clearance of 50m.

The Bolte Bridge, with a vertical clearance of 25m, runs across the River Yarra close E of the overhead cable mentioned below. There is no commercial shipping E of the bridge.

Overhead power cables.—An overhead power cable, with a vertical clearance of 59m, crosses the River Yarra between two towers on opposite sides of the river, close W of the Bolte Bridge.

Precautionary area.—A precautionary area has been established in the waters encompassing the Port Melbourne Channel, and is best seen on the appropriate chart. See Signals and Regulations for further details.

Spoil area.—A spoil area, in which there are depths of 12m, lies between 6.5 and 10 miles S of Point Gellibrand. Less water than charted, with depths of 12m, were reported close N of the spoil area.

Aspect.—The E approach to Melbourne lies between Martha Point (38°18'S., 144°59'E.) and Point Ormond, about 25 miles N; this coast was previously described in paragraph 1.35 and paragraph 1.36. Flinders Peak (37°57'S., 144°25'E.), of

The You Yangs, on the W side of Port Phillip, was previously described in paragraph 1.28, and is a good landmark.

In the near approach to Melbourne, the following marks are conspicuous:

1. Red Bluff (37°58'S., 145°01'E.), a bare cliff, with conspicuous tanks about 1.7 miles ENE
2. A refinery tower, marked by red obstruction lights, about 3 miles WNW of Point Gellibrand
3. Government House (37°50'S., 144°59'E.), a white stone building, with a tall, square tower, on rising ground, about 4.5 miles NE of Point Gellibrand

Other conspicuous landmarks include Timeball Tower, constructed of white stone and bricks, 30m high, about 0.5 mile NE of Point Gellibrand; oil tanks, close NE of Timeball Tower; a conspicuous building, 46m high, about 0.7 mile N of Point Gellibrand; A.P.A. yellow dome, floodlit at night, and one of the highest buildings in Melbourne, about 4.5 miles NE of Point Gellibrand; and Point Cook, about 6 miles SW of Point Gellibrand, a low and rocky point, with a conspicuous pine plantation on it, and marked by a beacon on its SW end.

The entrance to Melbourne Channel is marked on its E side by Fawkner Light, shown from a pile structure about 4.5 miles SSE of Point Gellibrand. The channel is then marked by lighted beacons numbered from seaward.

Gellibrand Shoal, with a least depth of 2.3m, is the remains of a demolished light, and lies about 0.5 mile ESE of Gellibrand.

Port Melbourne Channel Direction Light is shown from a white concrete tower about 0.3 mile NW of the base of Station Pier. The light is visible over a narrow tri-color sector. A vessel is on the leading line when in the white sector. The red sector indicates W of the line; the green sector indicates E of the line.

The dredged channel, which leads from Melbourne Channel to the piers at Williamstown, the approach to Webb Dock, and the entrance to the River Yarra, is marked by a directional light shown from the W side of the entrance to Webb Dock.

Lighted beacons mark the E side of Gellibrand Swinging Basin, the E side of the approach to Webb Dock, and the E and S sides of the River Yarra. Lighted beacons also mark the W side of the approach to Webb Dock, and W and N sides of the River Yarra.

Two lighted beacons stand on the W arm of Webb Dock. These lights, in line bearing 321°, have been set up for container ships with high bridge structures.

Two pair of range lights are shown at the E entrance and the head of Swanson Dock to assist the navigation of container vessels. The first pair is in line bearing 064.8°, and the range lights at the head are in line bearing 001.8°.

Pilotage.—Pilotage is compulsory. See Port Phillip, in paragraph 1.28, for pilotage information.

Signal Station—Signal Control Center.—Signal stations, from which traffic signals are shown, are situated on the head of Breakwater Pier, at Williamstown, and at the Shipping Control Center, on the S entrance point of Victoria Dock.

The Shipping Control Center is a two-story structure supported on a rectangular tower, with an overall height of 40m. The control center is equipped with radar and radiotelephone. All shipping entering or leaving the harbor is under the control of the center, which also dispatches tugs, docking pilots, mooring crews, and customs agents to the vessel involved. Contact can be made on VHF channel 16 (call sign: Harbor Control).

Radio reporting points.—Both inbound and outbound vessels are required to communicate with Harbor Control at specific radio reporting points, best seen on the appropriate chart.

A Port Information Service is provided at Melbourne. See Pub. 120, Sailing Directions (Planning Guide) Pacific Ocean and Southeast Asia for general signals in use at all Australian Ports. All movements are controlled on a 24-hour basis. No vessel (except for small craft under 20m in length not engaged in towing or licensed to carry passengers) should enter the port or proceed from her berth or anchorage without permission from Harbor Control.

Radio Calling Points are established in the harbor and vessels should check the chart for details.

Regulations.—The following information is derived from the Port of Melbourne Authority regulations, a copy of which should be obtained on arrival.

Vessels approaching or leaving the River Yarra when passing Williamstown must proceed at the lowest speed consistent with safe navigation.

Vessels navigating the port must not exceed a speed of 7 knots, from the entrance to the River Yarra to the W end to the junction with the Maribyrnong River; 5 knots then to the W side of the entrance to Appleton Dock; 4 knots then to Johnson St. Bridge; 8 knots, within any other part of the port. When passing works in progress on the banks of the river, sunken vessels, vessels aground or at anchor, tugs with train in tow, or vessels moored at any wharf, speed must not exceed 4 knots.

A vessel approaching another proceeding in the opposite direction shall, at a distance of not less than 100m, reduce speed and keep on that side of the fairway which lies on the starboard side of such vessel.

Vessels proceeding up the rivers within the port shall give way to vessels proceeding down such rivers.

A vessel shall, at least 0.2 mile from any dredging machine, diving punt, or rock-breaking machine, go dead slow; and prior to passing over or along the mooring chains of such dredging or rock-breaking machine or punt, the engine of such vessel shall be stopped until the vessel has passed clear of the mooring chains.

In the Precautionary Area, it is recommended that when entering, transiting, and leaving the Precautionary Area, vessels at all times should keep to the E when inbound, and to the W when outbound. Any inbound vessel shall not hinder any vessel using the Port Melbourne Channel or the Williamstown Channel or any vessel which is outbound, which is within or which is about to enter, the Precautionary Area. It is essential for vessels navigating within the port to maintain radio contact with Harbor Control and directly with one another. Vessels when inbound may use the area to the E of the Port Melbourne Channel. Yachts and other pleasure craft should keep to the E of the Port Melbourne Channel as far as possible and avoid at all times hindering the movement of larger vessels, particularly those constrained by size and draft to the shipping channels.

No oil or refuse of any kind may be discharged from any vessel while in the port, and all steam pipes must be effectively screened. No ballast may be discharged in the port except at such places as may be approved by the Commissioners.

Quarantine.—Vessels subject to quarantine must not proceed N of a line drawn about 085° from a point close S of

Timeball Tower Light to St. Kilda Pier.

Vessel Traffic Service.—The port of Melbourne VTS Authority area is the port waters of Melbourne. The waters are bound to seaward by the arc of a circle with a radius of 3 miles centered on position 38°17'31.2"S, 144°36'50.4"E (Point Lonsdale Signal Station) and encompasses the waters of Port Phillip Heads, South Channel, and the waters of Port Phillip Bay bounded by lines joining the following positions:

a. 38°19'42.0"S, 144°53'48.6"E.
b. 38°13'42.6"S, 144°50'46.2"E.
c. 38°06'21.6"S, 144°44'13.2"E.
d. 38°05'37.8"S, 144°40'04.8"E.
e. 38°03'37.8"S, 144°40'04.8"E.
f. 37°55'25.2"S, 144°49'48.6"E.
g. 37°52'40.8"S, 144°54'51.6"E.
h. North to the shore line
i. From Boyd Jetty NE to
j. 37°51'23.4"S, 144°54'40.8"E.
k. 37°50'49.8"S, 144°55'01.2"E.
l. NE to Princes Pier
m. 37°50'29.4"S, 144°55'37.8"E.
n. East to Station Pier
o. 37°50'37.2"S, 144°56'00.6"E.
p. 37°50'51.6"S, 144°55'59.4"E.
q. 37°53'49.2"S, 144°55'53.4"E.
r. 38°04'27.6"S, 144°52'18.6"E.
s. 38°18'26.4"S, 144°57'07.8"E.
t. 38°20'00.6"S, 144°55'12.6"E.
u. The River Yarra downstream of the Bolte Bridge including Williamstown Channel and the Maribyrnong River downstream of the Shepherd Bridge.

The port of Melbourne VTS area is divided into two sections at latitude 38°05'00"S, as follows:

1. **Northern Sector.—**Melbourne VTS, located at the Shipping Management Center, Fisherman's Bend, monitors and controls vessel traffic movement N of latitude 38°05'00"S, as well as coordinating the delivery of essential services provided by the private sector to port users.
2. **Southern Sector.—**Lonsdale VTS, located at Point Lonsdale Signal Station, monitors and controls vessel traffic movement in Port Phillip S of latitude 38°05'00"S, including movements at Port Phillip Heads and South Channel.

Traffic Procedures.—General traffic procedures are, as follows:

1. The master of every vessel to which these rules apply, bound to or from Melbourne or Geelong, and every vessel in transit through the Port of Melbourne VTS area must comply with the following procedures:
   a. The procedures are mandatory for all commercial vessels.
   b. Pilotage is compulsory for all vessels over 35m in length unless exempt.
   c. All times should be given in local time.
   d. Vessels in the port should maintain contact with the Port of Melbourne VTS whether underway or at anchor and keep continuous listening watch on VHF channel 12. In addition, vessels at anchor must maintain a continuous listening watch on VHF channel 16.
2. Clearance to navigate:
   a. Clearance to navigate given by Melbourne VTS or Lonsdale VTS for a vessel to leave a berth, mooring or navigate within the port of Melbourne VTS area is clearance to commence navigation only. It does not relieve the master from the responsibility for the conduct and safe navigation of the vessel.
   b. Expiry of Clearance—Where a vessel, for which clearance has been given, does not start navigating within 15 minutes of the clearance time, the master of the vessel must obtain further clearance before the vessel starts to navigate within the Port of Melbourne VTS area.
   c. Any vessel not ready to shift or depart within 15 minutes of its ordered time may lose its priority and the attending resources and services may be directed to another vessel that is ready.

Traffic procedures for **Lonsdale VTS—Southern Sector** are, as follows:

1. Inbound vessels should report to Lonsdale VTS at least 2 hours prior to arriving at the fairway through Port Phillip Heads or, if taking a pilot at the Pilot Boarding Ground, advising:
   a. ETA at the port limits or at the Pilot Boarding Ground.
   b. Vessel type and maximum draft.
   c. Any defects or circumstances that may affect the vessels ability to maneuver.
   d. If the vessel is constrained by draft.
   e. If navigating under the control of Pilot Exempt Master, give the name of the master.
2. When 3 miles from the entrance, vessels should:
   a. Advise Lonsdale VTS by which channel within the fairway through Port Phillip Heads it is intended to navigate.
   b. Seek clearance from Lonsdale VTS to enter fairway.
   c. Not allow the vessel to proceed until Lonsdale VTS has given clearance to do so.
3. On arrival at Port Phillip Heads, advise Lonsdale VTS of the ETA at:
   a. Hovell Pile.
   b. Fawkner Beacon or Point Richards Channel Entrance Beacon (if proceeding to Geelong).
4. Vessels bound for Geelong, advise Lonsdale VTS when passing Point Richards Channel Entrance Beacon.
5. Advise, during the course of the passage, of any changes to the ETA at Hovell Pile and Fawkner Beacon or Point Richards Channel Entrance Beacon.
6. Not allow the vessel to shape a course for the South Channel Dredged Cut (i.e. that section of the South Channel between Beacon 12 and Beacon 14) while an outbound hampered vessel is navigating between Hovell Pile and Beacon 10.
7. Inbound vessels must report to Lonsdale VTS when departing from Geelong on passing Point Richards Channel Entrance Beacon advising ETA at:
   a. Hovell Pile.
   b. Port Phillip Heads, advising if the vessel intends to transit the Great Ship Channel.
8. Advise Lonsdale VTS during the course for the South Channel Dredged Cut (i.e. that section of the South Channel between Beacon 12 and Beacon 14) while an inbound ham-

pered vessel is navigating between Beacon 8 and Beacon 16.

9. When passing Beacon 6 in the South Channel, report to Lonsdale VTS advising which channel within the fairway through Port Phillip Heads it is intended to navigate. Tankers and hampered vessels must advise Point Lonsdale VTS on arrival at Beacon 6 that the vessel is ready to proceed, and must not allow the vessel to proceed W of the imaginary line joining Popes Eye Beacon and South Channel Entrance Beacon until Lonsdale VTS has granted clearance to do so.

10. Advise Lonsdale VTS on leaving the Lonsdale VTS sector to sea.

Traffic procedures for **Melbourne VTS—Northern Sector** are, as follows:

1. Inbound vessels should send ETA 48 hours in advance.

2. Thirty (30) minutes prior to arrival at Fawkner Beacon or, if arriving from Geelong when passing Point Richards Channel Entrance Beacon, obtain clearance from Melbourne VTS to pass N of Fawkner Beacon or proceed to anchor.

3. Obtain clearance from Melbourne VTS before getting underway from anchorage

4. Vessels proceeding in accordance with 1 and 2 above, must advise Melbourne VTS whether it is intended to use the Port Melbourne Channel, the Eastern By-Pass Channel, or proceed to the W of the Port Melbourne Channel. Vessels proceeding in accordance with 3 above must advise all shipping when departing the anchorage on VHF channel 12.

5. Vessels should report when passing:

a. Position 38°05'00.0"S, 144°55'15.0"E.

b. Fawkner Beacon (37°57'09.0"S, 144°55'28.8"E).

c. Breakwater Pier (37°51'54.0"S, 144°55'06.0"E) or, if proceeding to Station Pier, Beacon No. 70 (37°52'04.2"S, 144°55'39.6"E).

d. West Gate Bridge (37°49'49.8"S, 144°53'54.6"E).

e. If proceeding to anchorage report when anchored advising position and time of anchoring.

6. Outbound vessels (prior to departing from a berth) should:

a. Advise Melbourne VTS of the vessels maximum draft and whether it is intended to use the Port Melbourne Channel, the Eastern By-Pass Channel or proceed to the W of the Port Melbourne Channel.

b. Not depart until Melbourne VTS has granted clearance.

c. Advise all shipping when departing the berth on VHF channel 12.

7. Vessels should report when passing:

a. West Gate Bridge (37°49'49.8"S, 144°53'54.6"E).

b. Breakwater Pier (37°51'54.0"S, 144°55'06.0"E) or, if proceeding to Station Pier, Beacon No. 70 (37°52'04.2"S, 144°55'39.6"E).

c. Fawkner Beacon (37°57'09.0"S, 144°55'28.8"E), advising ETA at Hovell Pile and Port Phillip Heads and if the vessel intends to transit the Great Ship Channel or, if on passage to Geelong, ETA at Point Richards Channel entrance beacon.

d. If bound for Geelong, when passing Point Richards Channel entrance beacon.

e. Advise Lonsdale VTS during the course of the passage, of any changes to the ETAs provided in 7c above.

8. Outbound vessels (prior to departing from anchorage) should:

a. Advise Melbourne VTS of the vessel's maximum draft.

b. Not depart until Melbourne VTS has granted clearance.

c. Advise all shipping when departing the anchorage on VHF channel 12.

9. Vessels should report when passing:

a. Fawkner Beacon (37°57'09.0"S, 144°55'28.8"E), advising ETA at Hovell Pile and Port Phillip Heads and if the vessel intends to transit the Great Ship Channel or, if on a passage to Geelong, ETA at Point Richards Channel Entrance Beacon.

b. If bound for Geelong, when passing Point Richards Channel Entrance Beacon.

c. Advise Lonsdale VTS during the course of the passage, of any changes to the ETA's provided in 9a above.

10. The master of all barges (bunker barge, dumb towage, pontoon barge) must obtain clearance from Melbourne VTS before proceeding anywhere within port areas.

Anchorage.—Anchorage in convenient depths, over a bottom of mud and shells, may be taken anywhere along the routes leading to the port of Melbourne from the E end of South Channel, the N ends of Coles Channel and West Channel, or from Geelong, remaining clear of the spoil area and gas pipeline, in the approach to Melbourne Channel.

Hobsons Bay is open to S gales which send in short, choppy and treacherous seas. Vessels must select anchorage according to draft and where they can swing well clear of channels and fairways. Small vessels whose draft permits can find shelter NW of Nelson Pier, at Williamstown. Vessels intending to remain at anchor in Hobsons Bay for over 48 hours must moor.

Prohibited Anchorage.— A transit only zone is established that encompasses Port Melbourne Channel, Eastern By-pass Channel and Western By-pass Channel. Anchorage is prohibited in this zone which extends as far N as Breakwaer Pier Light (37°51.9'S., 144°55.1'E.) and into the shipping channel from South Channel as far S as T1/T2 special purpose Light Beacons (38°00'S., 144°55.9'E.). The zone is marked by light buoys and special purpose light beacons and can best be seen on the chart.

Vessels should not anchor in any fairway, channel or river. Anchorage is prohibited on the Yarra River S of the West Gate Bridge abeam of the BP Jetty, the Shell Jetty, and the Caltex Jetty as shown on the chart.

Anchoring and fishing are prohibited within an area 4 miles SSE of **Point Gillibrand** (37°52'S., 144°54'E.), in the approaches to Port Melbourne Channel, as shown on the chart.

Anchorage is prohibited in any fairway or channel or near the middle of any river.

For the Explosive Anchorage, see the description of the N shore of Port Phillip in paragraph 1.38.

Directions.—From the E end of South Channel, a course of 002° for about 25 miles leads to the entrance of Melbourne Channel.

From the N end of West Channel, a course of 025° for about 18.5 miles leads to the entrance of Melbourne Channel.

With the exception of the spoil area and the gas pipeline,

there are no dangers in the approach to Melbourne from South Channel and West Channel.

Port Phillip—North Shore

1.38 Altona Bay, between **Point Gellibrand** (37°52'S., 144°54'E.) and Point Cook, about 6 miles SW, is backed by low land and swampy ground, and is largely filled by a bank with depths of less than 5m, extending up to 1.2 miles offshore.

The mouth of Kororoit Creek lies about 2 miles WNW of Point Gellibrand. A refinery tower, marked by a red obstruction light, is conspicuous about 1 mile WNW of the river mouth.

Laverton Jetty, with a depth of 3m at its head, lies about 2 miles WSW of the mouth of Kororoit Creek; submerged piles extend about 150m S of the jetty. Altona Reef, with depths of less than 5m, extends about 1.2 miles SE from a position about 0.8 mile E of Laverton Jetty. Four lighted beacons mark the limits of a firing danger area E of Altona Reef.

Truganina Jetty, in ruins, lies about 1 mile SW of Laverton Jetty, and the entrance to Skeleton Creek lies about 1 mile farther SSW. Close N of the entrance to Skeleton Creek, and extending for about 1 mile the shore is backed by the state powder magazines, which can be recognized by the regular rows of buildings on it, and the high fence surrounding it.

Point Cook (37°56'S., 144°48'E.), about 1.7 miles S of the mouth of Skeleton Creek, is low and rocky, a beacon, 5m high, stands 300m NW, and a conspicuous pine plantation, about 600m SW of Point Cook. A rocky spit, with a least depth of 0.9m, extends about 1 mile E of Point Cook. Dumb Joe Buoy is moored close SE of the end of the spit.

The Explosives Anchorage, the center of which is marked by a lighted buoy, lies 2.5 miles ESE of Point Cook.

The coast from Point Cook to the entrance of the Werribee River, about 6 miles SW, is low and backed by Werribee Plain, and has depths of less than 5m extending about 1 mile offshore.

A target buoy area, where buoys are moored when required, is centered about 1.5 miles SW of Point Cook.

Two red lights, for the use of aircraft, vertically disposed, are shown at an elevation of 31m, about 2.5 miles W of Point Cook. A firing area, the limits of which are best seen on the chart, lies 0.7 mile SW of the lights.

Western Arm of Port Phillip and the Port of Geelong

1.39 The Western Arm of Port Phillip, which includes the port of Geelong, is entered between Point George (38°08'S., 144°42'E.), on the S side, and the mouth of Werribee River, about 9 miles N, on the N side. The arm then extends about 16 miles WSW to the port of Geelong at its head.

West of Point Wilson (38°06'S., 144°30'E.), on the N shore, the port of Geelong is divided into an outer harbor and an inner harbor by two shallow banks. The outer harbor is enclosed by the bank and Wilson Spit, extending about 3 miles S of Point Wilson, and the bank which crosses the port from Point Lillias, about 3 miles W of Point Wilson, to Point Henry, about 2.5 miles WSW. The latter bank encloses Corio Bay, the inner harbor. Spacious and secure anchorage may be obtained in the outer harbor, in depths of 7.3 to 9.1m.

The main route to Corio Bay leads through Point Richards Channel, Wilson Spit Channel and Hopetoun Channel, dredged through the banks which obstruct the port.

Western Arm—North Shore

1.40 The entrance of the **Werribee River** (37°59'S., 144°41'E.) may be recognized by the tower of Corpus Christi College on the E side of the river, about 3 miles NNW of the entrance, and by a prominent water tower standing at an elevation of 37m on the N side of the river entrance. The river entrance is fronted by a shallow bar; a light is shown on the NE side. Depths along the range line into the river may be shoaler then 1m.

The coast between Werribee River entrance and Point Lillias, about 13.5 miles SW, is low, flat, and dominated inland by Flinders Peak (37°57'S., 144°25'E.).

Plantations of cypress trees border the shore from Werribee River entrance to Wedge Point, about 2.5 miles SW. Wedge Spit, with depths of less than 1.8m, extends about 1 mile S of Wedge Point. A pile beacon marks the 5m curve about 1 mile SSW of the outer end of Wedge Spit. An artificial reef, with a depth of 6.4m, lies about 1 mile SSW of the pile beacon.

Beacon Point lies about 3.5 miles WSW of Wedge Point. Long Reef, with a rock awash and a rock, with a depth of 0.3m, near its outer end, extends about 1 mile SE of Beacon Point. A pile beacon lies close N of the 0.3m rock.

Kirk Point, marked by a beacon, lies about 1.2 miles SW of Beacon Point. Between Kirk Point and Point Wilson, about 4 miles SSW, there is a mangrove-fringed lagoon, separated from the sea by The Sand Hummocks, two narrow sandy promontories. Arthur the Great Spit, with a depth of 4.9m near its outer end, extends about 2.3 miles SE from The Sand Hummocks. A buoy is moored near the outer end of the spit.

1.41 **Point Wilson** (38°06'S., 144°30'E.) is marked by a beacon; a tank lies about 0.3 mile NNW of the point. Avalon Air Control Tower, 35m high, with hangars and buildings, is conspicuous about 3 miles NNW of Point Wilson. Point Wilson Bank, with depths of less than 5m, extends about 1.3 miles SSE of Point Wilson and is marked close within its seaward end by Steamboat Beacon, a pile beacon with a triangular topmark. Wilson Spit, a continuation of Point Wilson Bank, with depths of 3.6 to 5.5m, extends about 2 miles SSW of Steamboat Beacon to within 1.2 miles of the S shore of Western Arm. Wilson Spit Beacon, a pile beacon, 7.9m high, marks the S end of Wilson Spit.

Commonwealth Explosives Pier extends about 1.5 miles ESE from a position about 0.3 mile N of Point Wilson. Berths, 168m long, on each side of the head of the pier, have depths of 9.1m alongside, with a maximum permissible draft of 8.4m. The area around the head of the pier is dredged to 9.1m. A rocky patch, with a depth of 8.2m, and marked S by a buoy, lies about 0.1 mile NNE of the head of the pier. The channel, extending from Point Richards Channel to the pier, has a depth of 9.1m.

Lights, in line bearing 273.5°, on the outer end of the pier, lead through the approach channel to the pier. Two lighted beacons mark the N limit of the dredged channel in the pier approach.

Explosives anchorage.—Vessels carrying explosives, when

required to anchor, may anchor in the explosives anchorage centered about 0.7 mile NNE of the head of Commonwealth Explosives Pier. This small anchorage is limited to the use of vessels carrying less than 300 tons of explosives.

Snake Island (38°05'S., 144°28'E.) lies midway along the coast between Point Wilson and Point Lillias, about 3 miles W. The island, connected to the mainland by salt flats, separates two shallow bays. **Snipe Hill**, a grassy hummock, 18.3m high, lies about 0.2 mile inland at the head of the E bay. A rocky spit, with a depth of 1.5m over its outer end, and an exposed wreck extends about 0.5 mile S of the S end of Snake Island.

Point Lillias (38°06'S., 144°27'E.), the N entrance point of Corio Bay, is a grassy point, 6.1m high, and fringed with rocks. A white beacon stands about 0.2 mile NW of the point. Bird Rock, 1.5m high and marked by a beacon, stands on a reef extending about 0.5 mile SSE of Point Lillias.

Between Point Lillias and Point Henry, about 2.3 miles SSW, Corio Bay is fronted by a bar, with depths of 5m, and which dries 0.3m in places. A beacon stands on the E side of the bar, about 0.7 mile SE of Point Lillias.

Western Arm—South Shore

1.42 Point George (38°08'S., 144°42'E.) and Prince George Bank have been previously described in paragraph 1.32.

The coast between Point George and Harding Reach, about 2 miles NW, is low; then to Portarlington, about 0.7 mile W, it is formed by yellow bluffs, 18m high. Grassy Point Beacon, 4.9m high, and a similar beacon, stand about 1 mile NW of Point George and on Harding Reach, respectively. A jetty fronts the town of Portarlington, and the white tower of a hotel, about 0.2 mile S of the root of the jetty, is visible for about 15 miles from the NE.

From Portarlington, a low and bare shore extends about 1 mile WNW to Point Richards; a white beacon, 4.9m high, lies about 0.1 mile SW of Point Richards. Point Richards Bank, with depths of less than 5m, extends about 0.5 mile NW and 1.2 miles W of Point Richards; two piles mark the outer part of the bank W of the point.

The coast for about 1.5 miles SW of Point Richards is low, and then for about 5 miles WSW it is formed by bold yellow bluffs, 27m high. Spray Farm Beacon, white and 5m high, stands about 2 miles SW of Point Richards, with a conspicuous farm standing in a grove of trees about 0.2 mile SW. The town of Clifton Springs, about 2.5 miles farther SW, is fronted by three jetties in ruins. Curlewis Beacon marks the W end of the yellow bluffs. Bellarine Beacon, 4.9 high, lies about 1 mile farther W. Depths of less than 5m extend about 0.5 mile offshore along this coast, and a spoil ground extends about 1 mile offshore abreast of Curlewis Beacon.

The bay between Bellarine Beacon and Point Henry, about 4 miles WNW, is mostly occupied by a spoil ground.

1.43 Point Henry (38°08'S., 144°25'E.), the N entrance of Corio Bay, is the N end of a promontory which rises as a steep ridge, 9m high, along its axis. A beacon, 5m high, stands close within the point. The water tower of the Alcoa Aluminum Works is conspicuous about 0.3 mile SSW of the beacon. A bank, which dries 0.3m, extends about 0.3 mile NNW of Point Henry.

Point Henry Operations Control Center.—About 0.2 mile SSW of Point Henry is a cream-colored tower, 11m high, surmounted by a white mast. The signal station is equipped with VHF radiotelephone and is connected to the telephone system. All traffic entering and leaving the port of Geelong is controlled from this post.

Point Henry Pier, for the unloading of alumina, extends about 0.6 mile ENE from a position about 0.3 mile SSE of Point Henry. The berth on the N side of the outer end of the pier and Point Henry Channel, which leads from the W end of Wilson Spit Channel, were dredged to 12m. A turning basin, dredged to 8.2m, lies E of the head of the pier. The berth can accommodate vessels up to a maximum length of 183m.

Lights, in line bearing about 233.8°, lead through Point Henry Channel. Lighted beacons mark the SE sides of Point Henry Channel and the turning basin.

Geelong (38°09'S., 144°22'E.)

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1.44 The port of Geelong is situated in Corio Bay, the inner harbor of the Western Arm of Port Phillip. The major portion of the trade of the port is of a bulk nature, both dry and liquid. The city of Geelong is situated on the SW and W sides of Corio Bay.

Tides—Currents.—The tidal rise at Geelong is 1.1m at MHHW and 0.7m at MLHW.

The tidal currents in Western Arm are at all times weak and irregular, except between Lighted Beacon No. 5 and Lighted Beacon No. 6 in Hopetoun Channel, where it crosses the bar between Point Henry and Point Lillias; the outgoing current here has a rate, during its second quarter, of 1 knot. At the E end of Wilson Spit Channel, a slight cross set of the tidal current is perceptible.

Depths—Limitations.—The main approach to Corio Bay leads through Point Richards Channel, Wilson Spit Channel, and Hopetoun Channel. Each of the above channels are marked by lighted beacons, numbered from seaward in accordance with IALA Maritime Buoyage System A. The channels are 122m wide and are maintained to a depth of 12.3m.

Point Richards Channel is entered about 1.5 miles NNE of Point Richards (38°07'S., 144°38'E.), and extends in a WSW direction for about 6 miles to its junction with Wilson Spit Channel.

Wilson Spit Channel, with its entrance about 2.5 miles SSE of Point Wilson, extends in a WNW direction for about 4 miles to its junction with Hopetoun Channel, about 1.5 miles ENE of Point Henry.

Hopetoun Channel extends in a WSW direction for about 4 miles, passing across the bar which encloses Corio Bay, and passing about 0.3 mile N of Point Henry.

From the W end of Hopetoun Channel, City Channel leads S to Cunningham Pier, and Corio Channel leads N to Bulk Grain Pier, Corio Quay, Lascelles Wharf, and Refinery Pier. City Channel was dredged to 9.7m in 1990, and lighted beacons mark its N entrance.

The maximum draft permissible in the approach channels and to the berths at Bulk Wheat Pier, Lascelles Wharf, and Re-

finery Pier is 10.5m; to Corio Quay and Cunningham Pier, 9.3m.

Vessels drawing less than 8.4m may proceed direct to and from their berth W of Lighted Beacon No. 14 of Hopetoun Channel.

The Bulk Grain Piers have alongside lengths and dredged depths, as follows:

Berth	Length	Depth
Berth No. 1	201m	10.5m
Berth No. 2	201m	12.3m
Berth No. 3	168m	12.3m

Corio Quay contains five berths, as follows:

1. South Wharf Berth No. 1, in the SW corner, contains ro-ro facilities. It has an alongside dredged depth of 11m.
2. North Wharf, with Berth No. 1, Berth No. 2, and Berth No. 3, handles general cargo. All berths have an alongside dredged depth of 11m.
3. Berth No. 4, on the N side, handles wood chips. It has an alongside dredged depth of 11m.

Lascelles Wharf, a dry bulk cargo berth, has an alongside dredged depth of 12.3m.

Refinery Pier has a dredged depth of 12.3m alongside all berths. The largest berth will accommodate vessels up to 265m in length.

Cunningham Pier, with a depth of 8.5m alongside, is used by naval and cruise vessels.

Aspect.—Stingaree Bay, between Point Henry and **Limeburners Point** (38°09'S., 144°23'E.), about 2.3 miles SW, is shallow; the shore is low and backed by salt flats, except in the vicinity of Limeburners Point, where there are low cliffs. The red building of a salt works is situated 2.5 miles SSW of Point Henry. A tower, 64m high, stands about 0.4 mile SE of Limeburner's Point.

Rippleside Pier, about 1.5 miles NW of Limeburners Point, is the berth and depot of the Geelong Harbor Trust.

The most conspicuous objects in Corio Bay are the wheat silos, close W of the root of Bulk Grain Pier, about 1 mile N of Rippleside Pier. About 1 mile NNW of the silos, the conspicuous chimney of a freezing works lies close S of Corio Quay.

Refinery Pier lies about 1.5 miles NE of Corio Quay. Refinery tanks and a conspicuous chimney, painted in orange and white bands, lie about 0.4 mile N of the root of Refinery Pier.

Lights, in line bearing 315°, close off the NE side of Refinery Pier, are occasionally shown for the approach to Berth No. 1.

The N shore of Corio Bay lies between Point Lillias and **Point Abeona** (38°05'S., 144°24'E.), about 2 miles WNW; the E part of this stretch of coast is backed by salt flats. The shore for about 0.5 mile SE of Point Abeona is fronted by trees. The conspicuous red brick clock tower of Geelong Grammar School is situated about 0.5 mile NW of Point Abeona.

Pilotage.—Pilotage is compulsory. See Port Phillip, in paragraph 1.28, for pilotage information.

Point Henry Operations Control Center, on Point Henry, is manned continuously, equipped with VHF radiotelephone, and connected to the telephone system. All traffic entering and leaving the port is controlled from the center.

The following signals are made from the center for the control of traffic through Point Richards Channel, Wilson Spit Channel, and Hopetoun Channel:

1. N—Stop, or word STOP in Morse Code.
2. V—Proceed, or word PROCEED in Morse Code.
3. SW—I wish to proceed through the channels, by outbound vessels. If at a pier or wharf, permission can be obtained by telephone; if at anchor, by displaying flags SW by day, by lamp at night, or by radiotelephone.

All instructions from the signal station must be strictly and promptly obeyed.

Regulations.—The master of a vessel navigating any channel within the port shall cause such vessel to be navigated at the lowest speed consistent with safety; provided that in respect of any portion of the port W of Beacon No. 14, Hopetoun Channel, the maximum speed over the ground shall not exceed 7 knots or such lower speed as is necessary to prevent damage to any other vessel or to the property of the Commissioners.

The master of a vessel shall not permit his vessel to enter any channel within the port, and if inbound, shall not permit the vessel to approach within 1 mile of the entrance to Point Richards Channel unless special permission has been granted by the harbormaster or from Point Henry Operations Control Center.

The master of any oil tanker inbound, by day or at night, before shaping a course for Point Richards Channel, shall use every endeavor to notify Point Henry Operations Control Center by signal that such vessel is ready to proceed and shall show the following signals:

1. By day—Flag B of the International Code of Signals over a black ball.
2. At night—A red light at the masthead or where it can best be seen, but not less than 6.1m above the deck, and of such character as to be visible all round the horizon.

The master, owner, or agent of any oil tanker which is intended to put to sea (by day or at night) shall:

1. Notify Point Henry Operations Control Center of such intention before the departure of such vessel from berth or anchorage.
2. Immediately on departure show the day or night signal prescribed above.

No vessel in which there has been a fire on board within 24 hours previously or being in an unseaworthy condition as may in the opinion of the harbormaster endanger the safety or navigation of the port, shall enter any channel within the port without the special permission in writing of the harbormaster. On arrival in the port, the master shall notify the harbormaster through the signal station of such fire or unseaworthy condition.

Quarantine.—Geelong is a first port of entry. The quarantine line is a line drawn from Limeburners Point to the mouth of **Limeburners Creek** (38°05'S., 144°24'E.).

Anchorage.—Vessels over 9.1m draft anchor, in a least depth of 12.5m, outside the entrance to Point Richards Channel, and S of its prolongation.

Vessels over 8.4m draft anchor, in a least depth of 9.4m, E of and within 1 mile of Lighted Beacon No. 17, Point Richards Channel.

In Corio Bay, the bottom is soft mud and the holding ground is not good. Main engines may not be immobilized without the permission of the harbormaster. Anchorage is only permitted in

the following positions; distances and bearings from the light structure on the head of Bulk Grain Pier (38°07'S., 144°22'E.):

1. In 8.8m, 067°, distant about 0.9 mile.
2. In 8.8m, 092°, distant about 0.8 mile.
3. In 8.8m, 117°, distant about 0.9 mile.
4. In 7.9m, 133°, distant about 1.4 miles.
5. In 7.9m, 147°, distant about 1.4 miles.

Vessels in quarantine should anchor as required by the harbormaster.

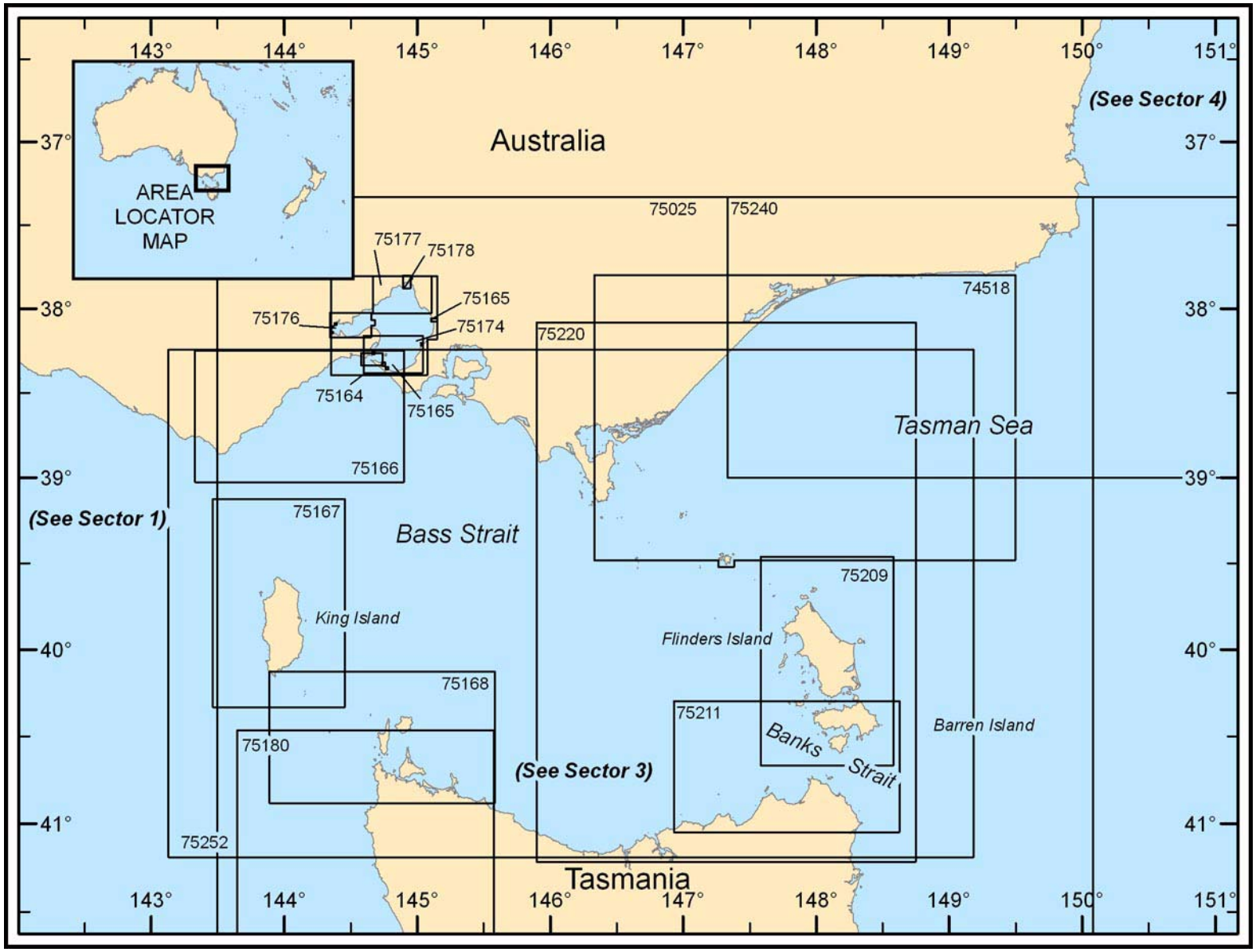
For explosives anchorage, see Commonwealth Explosives Pier off Point Wilson in paragraph 1.41. Vessels with explosives aboard, while within the port, must anchor only as and where the harbormaster shall direct.

Directions.—After clearing South Channel or West Channel, steer to pass a safe distance E of Prince George Light, at the NE end of Prince George Bank.

Note.—At night, keep in the white sector of Eastern Light, at the E end of South Channel, or in the white sector of West Channel Pile Light, at the N end of West Channel, to clear Prince George Bank.

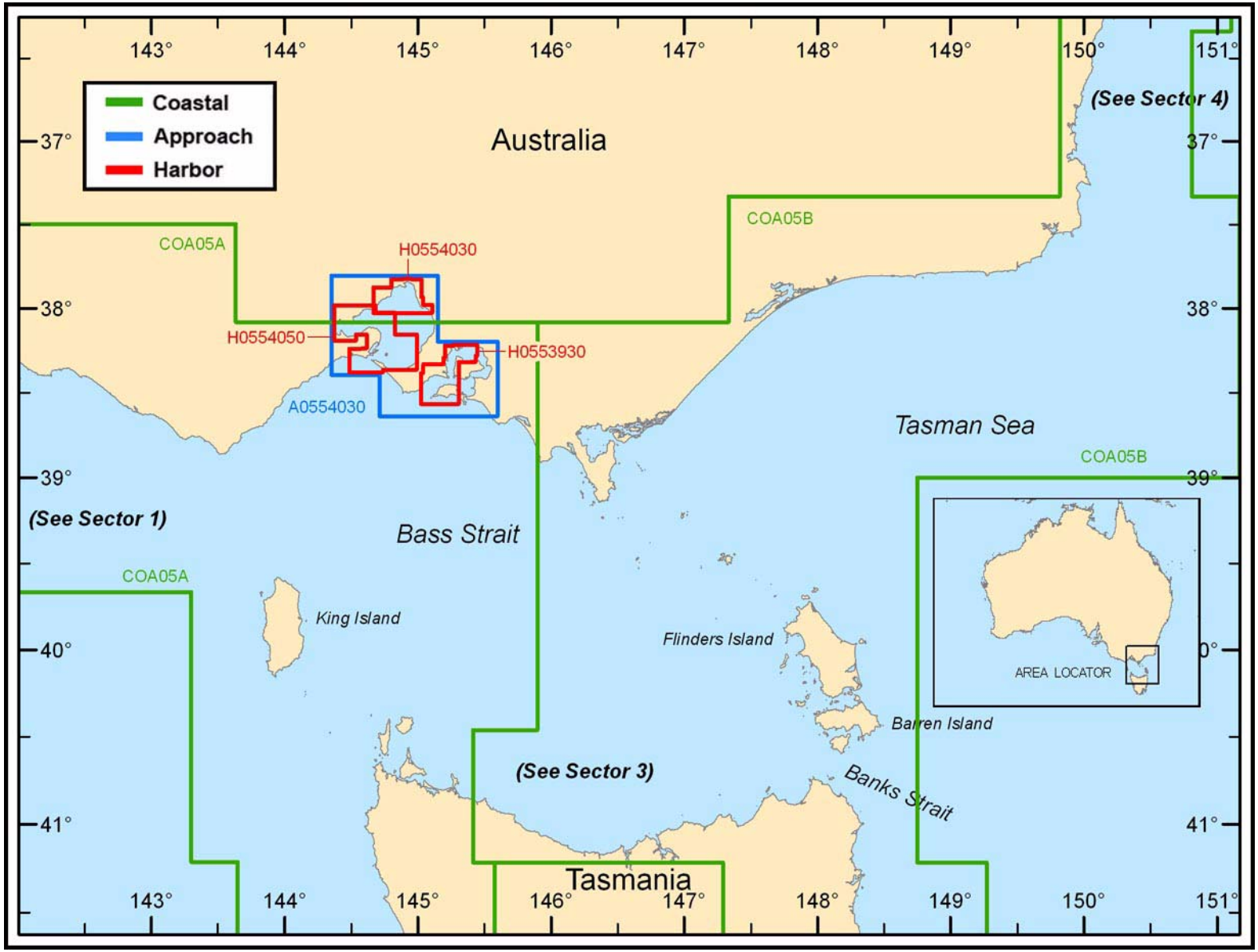
When clear of Prince George Bank, use the safe water lighted buoy, moored about 3.2 miles N of Point George as a guide, and approach and enter Point Richards Channel entrance on a course of about 260°. Then steer a mid-channel course through Point Richards Channel, Wilson Spit Channel and Hopetoun Channel to Corio Bay. Careful steering is necessary when the tidal influence is felt, especially in the E approach to Wilson Spit Channel, and between Lighted Beacon No. 5 and Lighted Beacon No. 6 of Hopetoun Channel.

Having passed Lighted Beacon No. 16 at the W end of Hopetoun Channel, course may be shaped as convenient for one of the anchorage berths or for any of the wharves or piers in Corio Bay. A vessel of deep draft should continue in the dredged channel as far as Lighted Beacon No. 15 or Lighted Beacon No. 18; the vessel then may proceed by Corio Channel or City Channel to the desired berth.



Additional chart coverage may be found in NGA/DLIS Catalog of Maps, Charts, and Related Products (Unlimited Distribution).

SECTOR **2** — CHART INFORMATION



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SECTOR 2 — DNC LIBRARY INFORMATION

SECTOR 2

AUSTRALIA—PORT PHILLIP TO CAPE HOWE, INCLUDING THE EASTERN ENTRANCE OF BASS STRAIT

Plan.—This sector first describes the S coast of Australia from Port Phillip to Wilsons Promontory, followed by a description of the E entrance of Bass Strait and the islands in the entrance, including the Furneaux Group; Banks Strait is described in paragraph 3.4. The SE coast of Australia, from Wilsons Promontory to Cape Howe, is then described. The arrangement of the sector is from W to E for the coastal description, and from NW to SE for the description of the islands.

General Remarks

2.1 Winds—Weather.—In Bass Strait, the strongest gales are frequently from the S and SE, accompanied by thick weather and often by heavy rain. Northerly winds are common both in summer and winter, and predominate over all others winds in frequency and force, particularly during the winter months; these winds, being off the land, are not especially remarkable or destructive.

In good weather, a light N wind is frequently encountered near the shore, and a light S wind is experienced offshore. The N wind of the coast of Victoria is generally a NW wind in the vicinity of Cape Howe. In January, February and March, E winds with good weather are not uncommon; however, these conditions can not be depended upon in any other season. On the E sides of the strait and of Tasmania, NE winds are prevalent, though they are seldom forceful.

As the W part of Ninety Mile Beach is approached, E gales are common; Wilsons Promontory appears to mark the dividing line.

January and February are the best months for making a passage to the W through Bass Strait. The gales that prevail in the strait begin in the NNW and gradually veer to the W and SW, at which point the wind generally subsides. Thick weather accompanying a breeze from the SE, particularly from May to September, is generally the precursor of a gale.

Within 100 miles of the S coast of Australia the most stable weather prevails during January, February, March, and April. The wind is generally SE and of the nature of land and sea breezes, being more E during the night and early morning and more S during the day and afternoon. The E wind in this season is light after sunrise, freshening in the morning from the SSE to a force of 5 or 6, and often developing a haze if the morning has been hot; the sea breeze attains its greatest force during the afternoon, becoming lighter nearer sunset as its direction changes toward the land.

Should the barometer fall, the winds, instead of shifting to the S in the morning, may turn to the N, resulting in a very hot, dry wind for one to three days. When the N wind is light, a moderate gale from the W to SW usually springs up, seldom lasting more than 24 hours, after which a period of good weather again ensues with SE winds.

At the end of April, the SE winds cease almost entirely, though they may resume at intervals during the month of May; at this time there are occasionally fresh NE winds. From the middle of May until the end of October, W winds prevail, the gales from that direction quickly raising a heavy sea and equally forceful near the land as farther seaward.

Port Phillip to Western Port

2.2 Point Nepean (38°18'S., 144°39'E.) was previously described with Port Phillip in paragraph 1.28.

The coast between Cape Nepean and Cape Schanck, about 16 miles SE, has depths of not less 20m within 1 mile of the coast, with the exception of Five Fathom Banks, which were described with the entrance to Port Phillip in paragraph 1.28. The highest hill along this coast is 154m high and lies about 2.2 miles NNE of Cape Schanck.

Cape Schanck (38°30'S., 144°53'E.) is a cliffy headland, 84m high, with conspicuous Pulpit Rock, 12m high, close S, and smaller rock, 1.2m high, about 0.2 mile S of the cape. Cape Schanck has been reported to give good radar returns at 19 miles.

Cape Schanck Light is shown from the summit of Cape Schanck, about 0.5 mile NNW of the cape. During brush fires, which occur during the summer months, the smoke has been observed to give the light a red appearance. The lighthouse is connected by telephone with **Dromana** (38°20'S., 143°57'E.).

Picnic Point, about 1.5 miles E of Cape Schanck, is a bold, sheer bluff, 75m high. The coast from Picnic Point to West Head, about 5.5 miles E, is closely bordered by rocks.

West Head (38°29'S., 145°02'E.), the W entrance point of Western Port, is a cliffy projection, 34m high, fringed by reefs and sunken rocks. Bismark Reef extends about 0.7 mile offshore from a position about 0.7 mile W of West Head. A spit, with a depth of 0.6m near its outer end, extends about 0.5 mile SE of West Head; Flinders Rock, with a depth of 3m, lies about 0.2 mile S of the outer end of the spit.

Western Port (Hastings) (38°21'S., 145°4'E.)

World Port Index No. 53930

2.3 Western Port is an extensive bay fronted by Phillip Island; its two entrances lie W and E of Phillip Island. The W and main entrance, between West Head and **Point Grant** (38°31'S., 145°07'E.), about 4.5 miles ESE, is easy of access and available to vessels of deep draft. The eastern entrance, between **Cape Woolamai** (38°34'S., 145°21'E.), the SE extremity of Phillip Island, and Griffith Point, nearly 2 miles NNE, on the mainland, is a narrow channel available only to small vessels.

French Island, in the middle of the bay, N of Phillip Island, divides Western Port into two arms; East Arm lies S and E of French Island, and North Arm lies W and N of the same island.

The dredged Western Channel extends in a NE direction off

the NW side of Phillip Island; then a dredged channel leads in a N direction to the berthing facilities on the W side of North Arm. Crib Point Oil Terminal Jetty can accommodate tankers up to 165,000 gt.

Port limits.—The port of Western Port includes all inlets, rivers, bays, harbors and navigable waters bounded W by a line joining West Head and Point Grant, then along the N shoreline of Phillip Island E to a line drawn 045° from Cape Woolamai to the opposite shore.

Tides—Currents

The tidal rise at Stony Point is 2.8m at MHHW and 2.3m at MLHW.

The tidal currents attain a rate of about 3.7 knots in the western entrance to Western Port, between Middle Bank and Grossard Point; a rate of about 2 knots in North and East Arms; rates of from 2 to 3 knots usually in the Eastern Entrance; and rates of from 5 to 6 knots in The Narrows.

Depths—Limitations

Western Entrance.—Western Channel is dredged to 14.9m from its seaward end to about 1.5 miles SSW of Sandy Point. Then a channel dredged to 14.3m extends to abreast Sandy Point. A channel dredged to 14.1m extends between the drying mud flats on the W and E sides of North Arm to abreast Long Island Point.

Crib Point Jetty is an oil terminal with two berths, as follows

1. No. 1 Berth, the N berth, is 366m long and can accommodate vessels of 100,000 dwt in a dredged depth of 15.8m alongside. A swinging basin has a diameter of 610m in a depth of 14.3m. The berthing head is 38m long and the maximum permissible length of a vessel berthing is 280m.
2. No. 2 Berth, the S berth, is 274m long with a dredged depth of 12.8m alongside. The berthing head is 38m long and the maximum permissible length of a vessel berthing is 216m. This berth has been decommissioned but has been used for repairs.

Steel Industry Wharf is approached by a channel, dredged to 9.1m, leading from the swinging area off Long Island Point Liquids Pier. No. 1 Berth, the S berth, is a ro-ro berth and has an alongside depth of 12.1m. No. 2 Berth, with alongside depths of 10 to 12.1m, is 152m long and can accommodate a vessel up to 200m in length.

Caution.—Due to shoaling, a least depth of 14m exists in the channel between Buoy No. 19 and Buoy No. 21, just E of Stony Point.

Eastern Entrance.—The Eastern Entrance to Western Port lies between **Cape Woolamai** (38°34'S., 145°21'E.) and Griffith Point, nearly 2 miles NNE. The entrance is narrow and tortuous, and the tidal currents run with great force through The Narrows, attaining a velocity of 5 to 6 knots at times.

The Eastern Channel entrance is available at HW for a vessel drawing less than 3.7m as far as San Remo, and for a vessel drawing less than 3m through the inner passage to Western Port. The inner passage, N of Daxis Point and Woody Point, extends about 1.2 miles NNE through shoal banks, parts of which dry, to East Arm.

The Eastern Entrance Bridge spans The Narrows, between Woody Point and San Remo. The center span is 61m wide, with a vertical clearance of 12.2m, and is marked by lights on its up and downstream sides. The pylons of the center span are illuminated by floodlights. Overhead power cables, with a vertical clearance of 18m, span The Narrows, close SW of the bridge.

An L-shaped jetty, off San Remo, has a head 25.3m long, outside of which there is a depth of 9.1m.

Off Woody Point is a jetty, with an alongside depth of 3m.

Aspect

Western Entrance.—Point Grant (38°31'S., 145°07'E.), the W extremity of West Entrance is a craggy headland, 34m high, from which a reef extends about 0.5 mile WSW. The Nobbies, consisting of two islets, lie on this reef; Round Islet, 42m high and sheer on all sides, is marked by a light, while the other islet is 6m high. Black Rock, 10m high, about 0.7 mile SW of Round Islet and close S of Seal Rocks, lies on a reef on which the sea breaks heavily in a S swell. Point Grant has been reported to give good radar returns at 18 miles.

Quoion Hill, 68m high, lies on the W side of Phillip Island, about 3.5 miles ENE of Point Grant. **Pyramid Rock**, high, needle-shaped, and steep-to on its seaward side, lies about 5 miles SE of Point Grant; behind the point the ground slopes gradually to McGregor Hill, about 1.2 miles N.

A shoal, with a depth of 13.7m, lies about 1 mile WNW of Black Rock. Flinders Bank, with a depth of 22m, lies about 2 miles SSW of Black Rock.

The S coast of Phillip Island, from Point Grant to Cape Woolamai, about 12 miles ESE, has depths of over 20m from 0.5 to 0.7 mile offshore.

Caution.—A framework observation tower, 26m high, on the summit of the largest of the Seal Rocks, should not be confused in poor visibility with the light structure on Point Grant.

Cape Woolamai, a remarkable helmet-shaped granite headland of reddish color and marked by a light, rises abruptly from the sea; the cape, 109m high, is the SE extremity of Phillip Island and is its highest point. The cape is fringed by drying and sunken rocks which extend more than 0.2 mile offshore.

Cape Woolamai has been reported to give good radar returns at 19 miles.

Northwest side of the entrance.—Flinders Breakwater Jetty lies about 0.7 mile N of West Head (38°29'S., 145°02'E.), which was previously described in paragraph 2.2.

The NE and greater part of the bight between West Head and Sandy Point, about 11 miles ENE, is filled with shallows and foul ground. Middle Bank, with depths of less than 10m, and which dries in places, extends about 7 miles SW from the coast W of Sandy Point. The outer part of Middle Bank, over which the sea breaks in a heavy swell, has depths of 2.8 to 8.2m.

Western Hill, 47m high, and conspicuous Coolant Tower lie about 3 and 4.5 miles WNW, respectively, of **Sandy Point** (38°25'S., 145°14'E.). The land from Western Hill to Sandy Point is low and marshy. A beacon, 1.2m high, stands on Sandy Point.

Phillip Island—Southeast side of the entrance and N coast.—The coast between Point Grant and the SW entrance

point of Cat Bay, about 1 mile NE, is fronted by reefs and a shoal bank which extends up to 1 mile offshore.

McHaffie Point (38°28'S., 145°10'E.), about 4 miles NE of Point Grant, may be recognized by the red-colored razor-backed ridge, 9 to 12m high, close SW. A light is shown on the point. McHaffie Reef, with a depth of 4.6m over its outer end, extends about 0.3 mile NW of McHaffie Point. Hen and Chickens Reef, which dries, lies about 0.2 mile W of McHaffie Point.

Red Rocks Point, marked by a white triangular beacon, 4.3m high, lies about 2 miles ENE of McHaffie Point. Penguin Rock and a remarkable red cliff, 12m high, lie close SW of Red Rocks Point.

There is an L-shaped jetty at Cowes, about 2 miles E of Red Rock Point; the head of the jetty is 105m long, with a depth of 6.4m alongside its outer face.

The coast between Cowes and Observation Point, about 2.7 miles E, is formed by a steep sandy beach, backed by tall dense trees. Observation Point is a low, narrow sand spit, wooded at its inner end.

Tortoise Head (38°25'S., 145°16'E.), the SW extremity of French Island, is a low flat-topped promontory. A white beacon is shown from the summit of Tortoise Head, which is 35m high. A reef extends about 0.2 mile from Tortoise Head and from a low point projecting from the W side of the promontory. A spit, with depths of 4m, extends about 0.7 mile SW from Tortoise Head. The W end of a shallow bank, parts of which dry, lies about 1 mile SW of Tortoise Head. Channels, available to small vessels with local knowledge, separate the above bank from the SW side of French Island.

East Arm, between the N side of Phillip Island and the bank off the SW side of French Island, is about 1 mile wide, with depths of 9.7 to 20m, but E of Phillip Island it is filled by Eastern Flat, which terminates in a narrow spit, about 1 mile NNE of Observation Point. A channel, between Eastern Flat and the S and SE sides of French Island to Stockyard Point, about 5.5 miles E of Tortoise Head, has a least depth of 7.3m in the fairway.

North Arm—West side.—The coast from **Sandy Point** (38°25'S., 145°14'E.) to the entrance of Watson Inlet, about 9 miles NNE, is low, marshy, and fronted by mud banks.

Hanns Inlet, entered between Sandy Point and Stony Point, about 2.2 miles N, is filled by a drying flat; a red beacon, about 0.6 mile N of Stony Point, marks the edge of the flat. A tortuous channel, with a least depth of 2.1m over a least width of about 51.8m, winds through the flat to Flinders Naval Depot, at the head of the inlet. The N and S entrance points of the channel are marked by lights.

There is a wooden naval wharf, 241m long, at the head of the inlet; it is available for vessels drawing less than 4.6m.

Caution.—Navigation of the inlet presents some difficulty due to a right-angled bend in the channel, where the assistance of a tug for a single screw vessel is essential. Navigation should only be attempted within 1 hour of HW, when the tidal currents, which attain a considerable rate in the inlet, no longer set across the channel over the mud banks. Favorable weather conditions are also essential. A set across the entrance to the channel should be guarded against. The mud banks on the sides of the channel are steep-to.

Stony Point, marked by a beacon, 4.6m high, is a railway terminus. An L-shaped jetty, extending NE from the point, has a head, 134m long, with depths of 6.2m alongside its NW 61m front, and 2.1m alongside the remaining length.

Lights, in line bearing 288°, lead to the jetty. A shoal, with depths of 1.5 to 2.7m, and marked SW by pile beacons, lies close NE of the jetty.

Crib Point (38°21'S., 145°13'E.), the site of a large oil refinery, lies about 1.5 miles N of Stony Point. A chimney, 91m high, lies about 0.2 mile NW of the point. Crib Point Oil Terminal Jetty extend E from the point. Lights, in line bearing about 320.5°, lead to the N berth.

Hastings Bight, between Crib Point and Long Island Point, about 2.5 miles N, is mainly filled with a mud flat, with Sandstone Island in its S part. Hastings Channel, with a least depth of 1.8m and marked by beacons, leads to a jetty at the town of Hastings in the NW part of the bight.

Long Island Liquids Pier lies close E of Long Island Point. Flare chimneys of a large refinery lie about 0.4 mile W of the pier. Two sets of range lights, sharing a common rear range light, are shown from the pier and mark the limits of the swinging basin.

Steel Industry Wharf lies close offshore about 1 mile N of Long Island Point.

North Arm—East side.—The coast from Tortoise Head (38°25'S., 145°16'E.), previously described above, to Scrub Point, about 7.5 miles N, is fronted by a drying mud bank extending up to 1 mile offshore.

A drying mud bank, between Tea Tree Point and Scrub Point, lies parallel with the coast and separated from it by a passage, through which a depth of about 6.1m can be carried, but it is encumbered with shallow patches. Middle Spit, marked on its E side by two beacons, is separated from the N part by a narrow channel. Two shoals known locally as Middle Bank, with depths of 0.6m and 0.3m, respectively, lie about 0.2 mile W of the above drying mud bank. The S part of Middle Bank is marked at each end by a pile beacon, and a beacon marks the N end of the N part.

North Arm—North part.—Scrub Point (38°17'S., 145°17'E.) is wooded, 6.1m high, with a beacon, 3m high, on it. Quail Island, about 2 miles N of Scrub Point, is low, wooded, and bordered by thick mangroves on its W side.

Bagge Harbor lies between the mud flats fronting Scrub Point and Quail Island. Bagge Harbor has depths of 10m in mid-channel, but in it are two rocks; Eagle Rock, awash, and Crawfish Rock, which dries about 3m, lie about 1.2 miles NNW and 1 mile NNE, respectively, of Scrub Point. Lights are shown from Eagle Rock and Crawfish Rock. There is a least depth of 10.6m in the fairway from Long Island Liquids Pier to Bagge Harbor.

The N part of North Arm extends about 9 miles E from Bagge Harbors and is filled with drying mud flats, intersected by several channels, some of which lead to the creeks and inlets on the N coast, and others wind E and terminate about 1 mile off the E coast.

Eastern Entrance.—West side.—The coast from Cape Woolamai to **Red Point** (38°33'S., 145°22'E.), about 1 mile N, is faced with cliffs. Red Point is formed by red granite boulders, 15.2m high; a white beacon stands on the point.

A bight between Red Point and Woody Point, about 2 miles N, is formed of rocky points and sandy beaches, and is bor-

dered by a bank, with depths of less than 5.5m, extending from 0.1 to 0.5 mile offshore. A red beacon marks the N end of Black Reef, on the SW side of the entrance channel, about 0.6 mile NW of Red Point. Woody Point, on the NW side of The Narrows, is low and fringed with reefs; a red beacon stands on the outer rock. The town of Newhaven stands on Woody Point. Lights, in line bearing about 306°, situated about 1.5 miles NW of Red Point, lead through the outer part of the channel entrance.

A light is shown on the N shore, about 0.4 mile WSW of Woody Point.

A red beacon, about 0.3 mile SSW of Woody Point, marks the W side of the channel.

Eastern Entrance.—East side.—Griffith Point, about 1 mile NE of Red Point, is a bold sandstone bluff, 21m high, bare of trees for some distance inland, and fringed by reefs. A range of sparsely-wooded hills, with prominent plantations around homesteads on its slopes, extends E and NE. Bass Hill, 284m high, one of the summits of the range, lies about 10 miles ENE of Cape Woolamai.

Between Griffith Point and Davis Point, about 1.2 miles NNW, Middle Sand, on which are patches of sand and rock which dry, extend about 1 mile offshore, almost completely obstructing the Eastern Entrance; in bad weather, especially during the outgoing current, the sea breaks over the edge of this bank. Davis Point, low and sandy, lies on the SE side of The Narrows. San Remo lies just inside Davis Point.

Pilotage

Pilotage is compulsory in Western Port except for vessels specially exempted. Vessels requiring a pilot should notify "Seapilots Melbourne" of their ETA at Western Port 24 hours in advance. Changes in the ETA of more than 1 hour should be notified immediately, and the time should be confirmed 4 hours before arrival or, if the vessel is delayed, 4 hours before the original ETA. The pilot boarding place is 3.5 miles S of West Head (38°29'S., 145°02'E.). If the pilot launch is unable to maintain its position due to the weather, vessels drawing up to 9.7m may embark a pilot about 2 miles E of Flinders Breakwater Jetty.

Anchorage

Western Port Harbor Control, established at Stony Point, directs all port operations and can be contacted on VHF radio.

Anchorage may be obtained, in a depth of 15m, in East Arm, from 0.5 to 1 mile E of Cowes Jetty, and about 0.5 mile offshore. There is also good anchorage, in a depth of 14.6m, sand and shells, about 0.5 mile offshore, abreast Observation Point.

Vessels carrying explosives must anchor at a distance exceeding 0.2 mile from any jetty or wharf in Western Port.

An anchorage area, with a least depth of 8.5m, lies about 0.5 mile NE of Long Island Liquids Pier.

Good anchorage for small vessels may be obtained, in 5m, off the head of Flinders Breakwater Jetty (38°29'S., 145°02'E.).

Anchorage may be obtained, in 7.3 to 14.6m, about 1 mile NE of Pyramid Rock (38°32'S., 145°13'E.), sheltered from N and NW winds. Care must be taken to avoid a wreck, with a depth of 5m, about 1.2 miles NE of Pyramid Rock; this wreck is a scuttled dredge providing an artificial fishing reef.

A small vessel drawing 4.6m can obtain anchorage, sheltered from all winds except SE gales, about 0.2 mile NE of Red Point (38°33'S., 145°22'E.), off Eastern Entrance.

Directions

Crib Point is a first port of entry. Vessels subject to quarantine must not proceed N of a line joining Sandy Point, Tortoise Head, and Cobb Bluff (38°27'S., 145°26'E.); vessels awaiting pratique can anchor 1.2 miles off of Sandy Point.

Western Entrance.—Vessels entering should pass about 1.5 miles NW of Seal Rocks, steering for McHaffies Point Light bearing 057°. When Fairway Lighted Buoy is abeam to port, the buoyed channel should be followed to the berthing facilities in North Arm. Vessels bound for the anchorage in East Arm can leave the buoyed channel N of Red Rock Point. The spit extending from Eastern Flat can be avoided by keeping 0.5 mile off the N side of Phillip Island until the anchorage N of Observation Point has been reached. Caution should be exercised when off the N side of Phillip Island, as the tidal currents set strongly along that shore.

At night, approaching from the W, after having rounded Cape Schanck, keep Point Grant bearing less than 090° until the white sector of McHaffie Point Light is entered, when course should be altered to 057° with that light ahead. When Fairway Lighted Buoy is abeam to port and McHaffies Point Light changes from white to red, alter course NE to pass through the buoyed channel.

Approaching from the E by day, a vessel should pass about 3.2 miles SW of Point Grant, steering about 304°. When Seal Rocks are in line with Point Grant, bearing 059°, the vessel should alter course to 000°. When Point Gossard Light bears 057°, course should be altered NE and the light structure steered for on that bearing. Then the directions given above should be followed.

Approaching from the E at night, a vessel should proceed as above. When McHaffies Light changes from red to green, alter course to 000°. Then the directions given above should be followed.

Eastern Entrance.—A vessel may enter Western Port by the Eastern Entrance on the top of HW, drawing less than 3m with an ordinary rise of tide, and drawing less than 3.7m on a good spring tide. It should be remembered that the tidal currents are very strong in The Narrows, and a vessel drawing nearly 3.7m should wait at the inner anchorage about 0.5 mile ENE of the front light of the entrance range, N of the lighted buoy at the W end of Middle Sand, until nearly slack high water. Local knowledge is necessary.

A vessel should pass through the outer part of the Eastern Entrance, with the entrance range lights in line bearing about 306°. If desired, anchorage may be taken between Red Point and the beacon marking Black Reef.

From this outer anchorage a vessel should pass N of the beacon marking Black Reef, where the channel is only about 50m wide, then steer to keep the lighted buoy marking the W end of Middle Sand on the starboard bow, giving it a berth of about 100m. Then, if the vessel does not intend to anchor N of the latter lighted buoy, proceed N and NE, passing W of the lighted buoy off the NW end of Middle Sand, then pass E of the

beacon about 0.3 mile SSW of Woody Point, and NW of Davis Point, into The Narrows.

Western Port to Wilsons Promontory

2.4 The coast from the E entrance point of Western Port to **Black Head** (38°33'S., 145°28'E.), about 4.2 miles E, is fronted by cliffs, with depths of over 11m about 0.2 mile offshore. Anderson Hill, 153m high and grassy-topped, lies about 1.7 miles N of Black Head, with the small town of Anderson conspicuous on its W fall.

From Black Head to Coal Point, about 8 miles SE, the coast is a succession of sandy hillocks, 30 to 43m high. Numerous rocks, one of which dries, extend about 1 mile S of Coal Point; the sea breaking heavily on these rocks shows this point to be dangerous on approach.

Cape Patterson (38°41'S., 145°36'E.), about 2.2 miles SE of Coal Point, is low, ill-defined, and the least conspicuous point along this part of the coast. A conspicuous tower, which is also radar conspicuous, stands nearly 1 mile NNE of the cape. Eagles Nest, a conspicuous rock, 18m high, about 3 miles E of the cape and about 100m offshore, is a useful mark for identifying the cape; the coast in the vicinity of the rock is cliffy.

The highest land within 2 miles of the cape is Honeysuckle Hill, 43m high, about 2 miles E of the cape, and this elevation scarcely increases until it joins the range of hills, over 274m high, which extends E and NE of **Bass Hill** (38°29'S., 145°33'E.). The cape has been reported to give good radar returns up to 14 miles.

A reef, steep-to on its seaward side, extends about 0.3 mile S of Cape Patterson. Depths of 9.1 to 11m lie up to 1 mile SE of Eagles Nest.

Cody Bank, with a least depth of 22m, lies about 8 miles SSW of Cape Patterson.

Petril Rock, 0.6m high, lies about 0.4 mile offshore on a bank with depths of less than 9.1m, extending about 1 mile offshore between Eagles Nest and **Point Smythe** (38°39'S., 145°44'E.), the W entrance point of Anderson Inlet.

Anderson Inlet is mostly filled by drying mud flats, intersected by shallow channels. It is only available for small vessels of about 1.5 to 1.8m draft, according to the condition of the bar and the state of the tide.

The coast from Point Smythe to Ten Whites Creek (Ten Mile Creek) (Watercross Creek), about 13.5 miles SE, is formed of bare sandhills, 30m high. A small sandstone rock, 4.6m high, lies close offshore, about 0.7 mile NNW of the creek entrance; sunken rocks extend about 0.4 mile seaward of the rock.

The coast for about 2 miles S of Ten Whites Creek consists of overhanging sandstone cliffs with above-water and sunken rocks extending up to 0.5 mile offshore. Arch Rock, 25m high, with a natural arch on its E side, lies midway along this part of the coast and about 0.2 mile offshore; a rock, which dries, lies about 100m WSW.

The coast trends about 3 miles SSE to a conspicuous islet, 19m high, close offshore nearly 1 mile NNW of Cape Liptrap. Sunken rocks extend up to 0.3 mile offshore between the islet and the cape.

2.5 **Cape Liptrap** (38°55'S., 145°55'E.), 90m high and nearly vertical, forms the SW extremity of a table-topped promontory which attains an elevation of 168m at Liptrap Hill, about 2.5 miles NE of the cape. A light is shown from the cape. Cape Liptrap has been reported to give good radar returns at 18 miles.

The coast between Cape Liptrap and Grinder Point, about 2 miles ENE, forms a bight; then to Bell Point, about 2.5 miles farther ENE, the land is lower and fronted by rocks from 1.5 to 9.1m high, none of which extending more than 0.2 mile offshore. Bell Point may be identified by a large broad-topped rock, 12.2m high, lying about 0.1 mile E of it.

Caution.—The coast between Cape Liptrap and Bell Point is fringed by drying and sunken rocks, and the sea breaks heavily for 0.5 mile offshore. Vessels are cautioned to keep at least 1 mile off this part of the coast where shoal water was reported in 1964.

Waratah Bay, formed between **Bell Point** (38°53'S., 146°00'E.) and Shallow Inlet, about 8 miles E, affords good anchorage except during S and SE gales.

An islet, 18m high, lies close off the W shore of the bay, about 0.3 mile N of Bell Point. Bird Rock, 12m high, and the highest of a group of rocks within 0.2 mile of the shore, lies about 0.6 mile farther N, E of the village of Walkerville. A light is shown about 0.2 mile SW of Bird Rock.

From Bird Rock the coast is faced with cliffs and fringed with rocks for about 3 miles NE; then the land decreases in elevation to about 30m and the ordinary feature of sandhills recurs until the entrance of Shallow Inlet.

Anchorage may be taken in the white or green sectors of the light SW of Bird Rock, with good shelter from SW gales, but a good lookout should be kept for a sudden change of the wind from the E. A good berth is in 11m, sand, about 0.7 mile NE of the light structure near Bird Rock, or about 1 mile off the head of the bay in a depth of about 13m.

Wilsons Promontory

2.6 Wilsons Promontory is a lofty promontory, with South Point, its S extremity, about 25 miles SE of Cape Liptrap. The promontory is connected with the mainland NW by a low, sandy neck, which separates Waratah Bay from Corner Basin to the NE.

Rugged mountain ranges on Wilsons Promontory are wooded on the upper and less exposed parts, but are nearly destitute of vegetation and descend abruptly to the sea towards the sides of the promontory. The principal mountains are **Mount Vereker** (38°58'S., 146°22'E.), 637m high, the NW mountain, with a spur extending NNW of it. From the summit of this spur, 504m high, there is a gradual slope WNW to the NW termination of the high and of the promontory. In the central part of Wilsons Promontory, Mount Latrobe, 758m high, and Mount Ramsay, 683m high, recognized easily by its flat top. Mount Wilson stands about 2 miles SSE of Mount Ramsay, with an elevation of 708m. The mountain ranges are of granite with immense boulders; these boulders are particularly noticeable in the Boulder Range, which lies at the SE end of Wilsons Promontory, and is separated from the Wilson Range by a low valley extending E-W across the promontory.

2.7 Wilsons Promontory—West side.—The coast between the entrance of Shallow Creek and Black Rock, 9m high, about 6 miles SSE, is formed of sand dunes.

Shellback Island (38°58'S., 146°14'E.), about 1.5 miles SW of Black Rock, is 109m high, steep-to, and conspicuous over the land from Corner Basin. It is the N island of the group on the W coast of Wilsons Promontory.

Tongue Point, about 1.7 miles SE of Shellback Island, is 51m high, with a conspicuous conical rock, 9.1m high, close W of it, and projects about 1 mile from the coast. The land inland of the point is high, rising to the Latrobe Range.

Norman Island, about 1.5 miles SSW of Tongue Point, can be recognized by its two peaks, the N and higher of which is 96m high.

Anchorage, during SW winds, may be taken, in 16.4 to 20m, from 0.1 to 0.2 mile off the E side of the island. Coastal vessel of low power bound W and meeting a SW gale, after rounding Wilsons Promontory, might find it convenient to anchor here in preference to running back and anchoring in Waterloo Bay, E of the promontory.

Four bays, separated by Leonard Point, Pillar Point, and Norman Point, lie SE of Tongue Point. Oberon Bay is entered between **Oberon Point** (39°05'S., 146°19'E.) and Norman Point, about 1.5 miles N, and affords the best anchorage; it lies at the W end of the valley between Wilson Range and Boulder Range. None of the bays can be recommended due to the prevalence of SW winds, and a SW gale may spring up suddenly. Oberon Bay has a broad sandy beach upon which the sea breaks heavily.

Anchorage.—Good shelter has been found in Oberon Bay during E gales, about 0.7 mile NNE of Oberon Point.

The coast between Oberon Point and Southwest Point, about 3 miles SSE, is steep-to, bold, and cliffy, the cliffs being several hundred meters high in places. Mount Norgate, 417m high, the W summit of the Boulder Range, lies about 1.2 miles SE of Oberon Point.

The Glennie Group, consisting of four islands, lie about 4 miles W of Oberon Point, and are steep-to on the W side. Great Glennie Island, the largest island, is saddle-shaped and 138m high near its S end; it is composed of granite, large blocks of which are strewn over it, giving it a castellated appearance. Ramsbotham Rocks, 1m high, over which the sea generally breaks heavily, and another somewhat larger rock, 4.6m high, lie about 0.2 mile N and 0.2 mile E, respectively, of the N end of Great Glennie Island. Dannevig Island, 76m high, lies close S of Great Glennie Island. Citadel Island, 109.4m high, lies close S of Dannevig Island, and is so-named due to its resemblance to an ancient fortress. McHugh Island, 65m high, lies close SE of Citadel Island.

Citadel Island has been reported to give good returns at 17 miles.

Citadel Island Light is shown from the summit of Citadel Island. A tank stands close N of the light structure, and a monolith stands near the N end of the island. The light is obscured from 270° to 360°.

Anchorage can be taken, in 18.3m, off the E side of Citadel Island, about 0.2 mile E of the monolith.

2.8 Wilsons Promontory—South side.—The S coast of Wilsons Promontory, from Southwest Point to **South East Point** (39°08'S., 146°25'E.), about 3.7 miles E, rises abruptly to an elevation of about 300m.

South Point, about 1.5 miles ESE of Southwest Point, is a low, projecting, and stony point; it is also the S point of Australia. A rock, 4.6m high, lies about 0.1 mile WSW of South Point.

Wilsons Promontory Light is shown from South East Point. The lighthouse is connected by radiotelephone with the lighthouses on **Cliffy Island** (38°55'S., 146°42'E.), **Deal Island** (38°30'S., 147°19'E.), and Swan Island (40°44'S., 148°06'E.).

Wattle Island, 82m high, lies with its E extremity about 0.4 mile WSW of South Point; the island, being so close offshore, from the S appears to be connected to Wilsons Promontory. A rock, awash, lies about 0.1 mile SW of the W end of the island, and a rock, with a depth of less than 1.8m, lies about 0.1 mile SE of the E end of the island.

Wilsons Promontory has been reported to give good radar returns at 24 miles.

2.9 Off-lying islands and dangers.—The Anser Group lies from 1 to 3 miles SW of Southwest Point. Anser Island, the NE island of the group, rises to a nipple-pointed summit, 152m high; it is cliffy in all directions, but least so on its N side.

Cleft Island (39°10'S., 146°18'E.), the SW and most remarkable of the group, is 113m high, sheer, and may be identified by its white appearance, also by its having a large slice out of its NW side, which gives it a cavern-like appearance.

Cleft Island from NW

Kanowna Island, 95m high, lies in the middle of the group. Anderson Islets, three in number and rocky, lie between the NW end of Kanowna Island and the NE end of Cleft Island; the two S islets are 12.2 to 15.2m high, with the N islet not as high.

Carpentaria Rock, with a depth of 1.8m, lies about 0.7 mile N of Cleft Island. The Anser Group has been reported to give good radar returns at 16 miles.

Forty Foot Rocks, about 4 miles S of Wilsons Promontory Light, consists of three separate and distinct islets of granite. The W and largest is 6.1m high, with a granite boulder, 6.1m high, on its S extremity, making this islet 12.2m high; when the sea is breaking over these rocks, this boulder is probably the only part visible. Forty Foot Rocks are steep-to. They are reported to give good radar returns at 13 miles.

2.10 Rodondo Island (39°14'S., 146°23'E.), about 6 miles SSW of Wilsons Promontory Light, is a conspicuous conical mass of granite, rising to a distinct peak, 350m high; the peak is visible in clear weather for 30 miles, and is reported to give good radar returns at 19 miles. The island is steep-to and has high cliffs on all sides.

As the tidal currents about Rodondo Island are strong, sometimes having a velocity of from 4 to 5 knots, the neighborhood should be avoided.

West Moncoeur Island, 97m high, and East Moncoeur Island, 101m high, lie about 5 and 6.5 miles E, respectively, of Rodondo Island. The islands are almost bare, steep-to and apparently free of dangers; islets lie close N and S of West Moncoeur Island.

Traffic Separation Scheme.—A Traffic Separation Scheme has been established S of Wilsons Promontory and is best seen on the chart.

An Inshore Traffic Zone for westbound traffic is situated between the traffic lane and the Wilsons Promontory.

Tides—Currents.—Off the S side of Wilsons Promontory the tidal currents set E and W, but their direction is influenced by the wind. The tidal currents normally turn at about HW and LW.

Heavy E or W weather sets up an opposite current which continues after the storm has ceased. Near the promontory, after an E gale, the E current, which has been checked during this gale, continues to set E when the W current should have begun; and the W current, at its strength, sets N, except inshore, where the tidal currents are little influenced by the wind. A SW gale has the opposite effect.

The velocity of the tidal currents off the S side of the promontory, where they are strongest, does not exceed 2.5 knots.

Caution.—Off the S side of Wilsons Promontory the soundings afford no guide, as there is deep water close to the coast, between it and the off-lying islands, and between the groups of islands.

Approaching the promontory at night from the W, the Anser Group does not show up against the higher land of the mainland.

The E entrance to Bass Strait lies between Wilsons Promontory and the NE end of Tasmania, about 120 miles SE, and is obstructed by numerous islands and dangers. The Furneaux Group of islands lies across the SE part of the entrance and is separated from Tasmania by Banks Strait.

Banks Strait will be described beginning in paragraph 3.4.

Tides—Currents.—In the E entrance to Bass Strait, the flood sets SW and the ebb current sets NE.

The Curtis Group

2.11 Curtis Island (39°28'S., 146°39'E.), about 18.5 miles SE of Rodondo Island, is the largest of the Curtis Group, and the most remarkable feature of Bass Strait. It rises in two peaks; the S peak is square-shaped and 335m high, and the N peak is 224m high, with a bare granite summit. The sides of the island are precipitous, especially at the S end. Clarendon Rock, with a depth of less than 2m and steep-to, lies about 0.7 mile ESE of the N end of Curtis Island; the sea breaks over it in heavy weather, but it is generally difficult to distinguish.

Caution.—This area is subject to continued volcanic uplift and shallower depths than charted may be encountered.

Cone Island, rocky and 112m high, lies about 1.2 miles SE of the S end of Curtis Island. Two rocks, close together, lie about 0.2 mile N of Cone Island; Passage Rock, the inner rock, is 2m high and the outer rock dries. A remarkable leaning pinnacle rock, 25m high, lies among other rocks close off the S side of Cone Island.

Sugarloaf Rock, the S of the group, is 94m high and lies about 1.5 miles S of Cone Island.

Crocodile Rock, about 9 miles NW of Curtis Island, is a large smooth granite boulder, 0.6m high and one of a small group of rocks. It lies almost in mid-channel between Rodondo Island and the Moncoeur Islands to the N and Curtis Island to the S. The sea almost continuously sweeps over it, so that the rock itself is seldom visible; as a general rule, it is well-marked by breakers.

Cutter Rock, about 1.5 miles NE of Crocodile Rock, has a depth of 7.3m and is steep-to. The sea does not often break over the rock, but in rough weather there is a lumpy sea in its vicinity.

Devils Tower, a rugged islet, 111m high, lies about 6.5 miles NE of the NE end of Curtis Island. It is steep-to except for a few detached rocks close off its SW side. Viewed from the NW or SE, Devils Tower shows a double summit, the NE being the higher.

The Hogan Group

2.12 Hogan Island (39°13'S., 146°59'E.), the largest of the group, is 130m high and lies about 21 miles NE of Curtis Island; its S and W sides are sheer. A light is shown close NW of the summit of the island.

Hogan Island has been reported to give good radar returns at 23 miles.

The Twin Islands, 46m and 33m high, respectively, lie about 0.3 and 0.4 mile N of Hogan Island. Long Island, 66m high and sheer, lies close off the NE end of Hogan Island. North East Islet, 20m high, and Seal Rock, 4m high, lie nearly 1 mile and 1.5 miles ENE, respectively, of Long Island. East Island, 50m high, lies about 1 mile E of Long Island. Round Island, 47m high, lies close off the SE side of Hogan Island.

A rock, with a depth of 10.2m and which breaks occasionally, lies nearly 0.75 mile E of Round Island.

A shoal, with a depth of 6.1m., lies 2 miles S of Round Island.

A depth of 16.4m was reported (1969) about 4 miles SE of Round Island. A depth of 18.3m, position approximate, lies about 2 miles NE of the latter depth.

Anchorage.—Sheltered anchorage in strong S winds may be obtained on the NE side of Hogan Island, in 18.3 to 37m, good holding ground, between the Twin Islands and Long Island.

With W gales better anchorage may be obtained in a bay on the E side of Hogan Island, S of Long Island, in 11 to 28m, sand, stones, and rock; shoals and submerged rock extend about 0.1 mile offshore in the bay.

Directions.—At night or in hazy weather, it is prudent for a vessel, without local knowledge, and desirous of clearing the strait, to sight Curtis Island and pass S of Sugarloaf Rock and

The Hogan Group from NW

the Hogan Group. The summit of Curtis Island, Cone Island, and Sugarloaf Rock are remarkable features whose identity cannot be mistaken.

Having cleared the Traffic Separation Scheme S of Wilsons Promontory, a course should be set to pass N of the Hogan Group and SE of the Area to be Avoided SE of Lakes Entrance. This should be done by way of the Traffic Separation Scheme that has been established S of the Area to be Avoided.

The Kent Group

2.13 The Kent Group, consisting of four islands and several above-water rocks, lies about 18 miles SE of the Hogan Group.

Erith Island (39°27'S., 147°18'E.), the N island, rises to an elevation of 142m on its N side.

North Rock, 8m high, lies about 0.5 mile NNE of the NW end of the island; two smaller rocks lie about 100m S of North Rock.

Dover Island lies close S of Erith Island, to which it is connected at LW. Dover Island rises abruptly to an elevation of 237m on its S side.

Deal Island, the largest of the Kent Group, is separated from Erith Island and Dover Island by Murray Pass, which is about 0.5 mile wide, with a least depth of 31m. Deal Island rises to conical granite hills, some of which are clothed to their summits with an impervious scrub. The coast is generally precipitous, especially on its S side.

Deal Island Light is shown near the summit of Deal Island, which rises from South Bluff, the S end of the island, to an elevation of 288m. There is a radiotelephone at this lighthouse which can communicate with Wilsons Promontory.

North East Island, 104m high lies about 1 mile NNE of the E end of Deal Island. A light is shown from the NW extremity of North East Island. Anise Rock a remarkable rock, 6m high, lies about 0.2 mile NW of the N end of the island. A 2.4m patch was reported (1959) about 0.7 mile NE of the island. A 9.7m shoal lies about 0.5 mile SE of the island, and a steep-to coral shoal, with a depth of 10.9m, lies about 2 miles farther SE.

Tides—Currents.—The tidal currents in Murray Pass attain a velocity of 2 to 5 knots, frequently causing a turbulent sea. In bad weather there are heavy tide rips off the salient points of the Kent Group, and especially at the entrances to Murray Pass.

Anchorage.—Of the numerous bays indenting the coasts of the Kent Group, there are only two in which it is at all safe to anchor, and both of these are in Murray Pass.

East Cove, on the W coast of Deal Island, about 2 miles NNW of South Bluff, affords good shelter in E and S winds, but is dangerous in a SW gale; the bottom is uneven, the holding ground not good, and during the strength of the tidal currents the swirls and eddies come well into the cove. At the head of the cove there is a sandy beach and a jetty, with a depth of 3.7m at its head.

West Cove, on the SE side of Erith Island, gives protection from all but NE gales, and as an anchorage is preferred to East Cove.

Judgement Rocks, the N and largest of which is Big Rock, 32m high, lies about 9 miles W of South Bluff of Deal Island.

South West Island (39°32'S., 147°08'E.), 98m high, lies about 0.7 mile S of Big Rock. A light is shown from the S side of the Island. Depths of less than 10m or less extend nearly 0.4 mile S of South West Island.

The passage between Judgement Rocks and South West Island should not be used.

Islets and Dangers between the Kent Group and the Furneaux Group

2.14 **Bass Pyramid** (39°49'S., 147°15'E.), about 19 miles S of South Bluff (Deal Island), is a bare square-topped mass of granite, 72m high; it has frequently been mistaken for a vessel under sail. Shoal water extends about 0.5 mile SW, and an 18.3m patch lies about 1.5 miles SW of the rock. Depths of 20 to 37m lie about 0.5 mile from its E side. Bass Pyramid is usually surrounded by tide rips, except when there is no wind.

Bass Pyramid from E

Warrego Rock, about 13 miles SE of Bass Pyramid, has a least depth of 2.4m, and is steep-to. A rock, with a depth of 9.8m, lies about 1.5 miles SSW of Warrego Rock.

Wright Rock (39°36'S., 147°32'E.), 40m high, about 11.2 miles ESE of the S extremity of Deal Island, is a remarkable granite rock resembling a huge head and shoulders. It should be given a berth of at least 1 mile, as the depths are irregular within that distance. Rocks lie close N and S of Wright Rock, and a depth of 10m lies about 1 mile NNW of it. Tide rips mark the vicinity of the rock.

Endeavor Reef, about 2.5 miles ESE of Wright Rock, dries 0.6m, and is usually marked by heavy breakers.

Beagle Rock, about 5.5 miles ESE of Wright Rock, is 2m

Wright Rock from S

high and steep-to.

Craggy Island (39°41'S., 147°41'E.), bare and rocky, lies about 4 miles SSE of Beagle Rock. It rises to an elevation of 113m at its W end. Rocks extend about 0.2 mile from the W end of the island, and depths of 20 to 37m extend about 3 miles SW of the same point. An above-water rock lies on the N side of a shoal, with a depth of 3.9m, about 0.2 mile E of the E end of the island; an 8.5m patch lies about 1 mile NE of the same end.

Craggy Island from S

Rocks, with depths of less than 1.8m, and **Craggy Rock**, with a depth of 5.2m, lie about 1 mile E and 2.5 miles SE, respectively, of Craggy Island. The depths are irregular between these two dangers.

The dangers in this vicinity break heavily in bad weather; Craggy Island and the two dangers are surrounded by tide rips.

Tides—Currents.—The tidal currents attain a velocity of about 2 knots in the channels between Endeavor Reef and Beagle Rock, Craggy Island, and Craggy Rock. In strong breezes there are generally heavy tide rips in the vicinity of the reefs.

The Furneaux Group

2.15 The Furneaux Group consists of Flinders Island, Cape Barren Island, Clarke Island, and some smaller islands, rocks, and shoals. The group extends from The Sisters, off North Point, the N end of Flinders Island, for about 60 miles SSE to the dangers off Moriarty Point, the SE end of Clark Island.

The Sisters have rather uneven surfaces, with small patches of light scrub, and are heavily grassed. The depths are very irregular around The Sisters and the N part of Flinders Island.

The Sisters are visible from 30 miles in clear weather.

Inner Sister Island (39°42'S., 147°55'E.) is almost divided in the middle by a deep valley; the W part is 165m high, while the E part is 197m high. An 8.2m depth lies about 1 mile NW of the NE end of the island, to which it is connected by a shallow sandy spit. A 5.5m shoal lies about 0.7 mile N of the E end of the island.

Outer Sister Island, about 2.5 miles NE of Inner Sister Island, is 192m high on its SW side. A rock, 0.6m high, lies close off the N end of the island; a 5.9m rocky ridge, over which there is a confused sea caused by the tide race, and a depth of 16.1m, lie about 1.2 miles W and 2.7 miles WNW, respectively, of the rock. A rock, 3m high, lies about 0.5 mile S of the middle of the S side of Outer Sister Island; a spit, with a depth of 2.7m, extends about 1.5 miles E of the rock.

Flinders Island

2.16 Flinders Island is mountainous on its W side, with the range extending from Mount Killiecranke, 317m high, about 7 miles SSW of North Point (39°43'S., 148°56'E.), to Strzelecki Peaks, 777m high, about 5 miles NW of Pigs Head Point, the S end of the island. The mountains are bold and abrupt on their W side, but slope gradually to the lowland on the E side of the island, which is fronted by a sandy beach. The W side of Flinders Island is fronted by several islands and islets, under the E side of which vessels may find shelter from W winds.

Flinders Island—West coast.—Bligh Point (39°45'S., 147°51'E.), about 5 miles WSW of North Point, is bordered by rocks. A shoal, with a least depth of 8.5m, lies about 1.5 miles SSW of Bligh Point.

Killiecrankie Bay, about 4.5 miles S of Bligh Point and SW of Mount Killiecrankie, is exposed NW, but it affords protection from SW gales, the violence of the sea being broken by Sentinel Island, 22m high, and the surrounding rocks, about 3 miles W of the bay. Only a moderate swell enters the bay, and although the bottom is sand, the holding ground is good. When entering and leaving this bay, a vessel should pass NE of the rocky islet, 7m high, in the middle of the entrance to the bay, in order to avoid a sunken rock lying about 0.3 mile SW of the islet.

Cape Frankland (39°52'S., 147°45'E.), the W extremity of a hilly peninsula extending from the W coast of Flinders Island, is fringed by a reef and an islet lies about 0.5 mile N of it. North West Peak, about 2.5 miles E of the cape, rises to an elevation of 332m, with a conspicuous radio mast on its summit.

Frankland Rock, about 4 miles W of Cape Frankland, is a double rock which dries 1.5m, and is steep-to except on its E side, where a bank with a depth of 12.8m, extends about 0.5 mile E.

Roydon Island and Pasco Islands, mostly connected by rocks above and below-water, extend about 4 miles from the shore, about 2 miles SE of Cape Frankland. Roydon Island is 74m high, and South Pasco Island is 11m high. The channel between North Pasco Island and Mid Pasco Island is about 0.5 mile wide, with a depth of 15.5m in the fairway.

Marshall Bay, entered between the S extremity of Cape Frankland and Settlement Point, about 6.5 miles SSE, has depths of 11 to 18.3m, but affords no shelter in W winds. Marriot Reef extends about 1.2 miles SW from the NE corner of the bay.

Settlement Point (40°01'S., 147°52'E.) is hilly, abrupt, and bordered by rocks. Wybalena Island and an islet close SW lie on the NW side of a bank, with depths of less than 5m, about 0.7 mile SW of Settlement Point.

2.17 Prime Seal Island lies with **Prime Seal Point** (40°02'S., 147°46'E.), its N extremity, about 3.7 miles W of Settlement Point. Its two higher hills, at the N and S ends, respectively, of the island, are 147m and 154m high. A reef, on

which rocks dry 2.4m, extends about 0.7 mile N of Prime Seal Point; the reef was reported to have extended about 0.2 mile NE. Depths of less than 5.5m extend up to 0.5 mile off the NE side of the island.

Koh-i-noor Rock, about 2.5 miles SSW of the NE extremity of Prime Seal Island and about 0.2 mile offshore, is nearly awash at the SE end of a reef; an above-water rock lies at the NW end of the reef.

Anchorage.—There is good anchorage, in 11m, on the E side of Prime Seal Island, about 0.7 mile N of Koh-i-noor Rock and 0.5 mile offshore. Care should be taken to avoid Koh-i-noor Rock when approaching the anchorage from the S.

The reef bordering the E side of the S end of Prime Seal Island was reported to have extended about 0.3 mile SE.

Low Islets consist of three islets which lie on a reef extending from 0.7 mile to 2 miles S of the S extremity of Prime Seal Island. The N islet is 9.1m high, and the S islet is 12.5m high. An 11m patch lies about 0.7 mile SE of the S islet.

Safe passage, about 0.5 mile wide, with depths of 24 to 28m in the fairway, lies between the S end of Prime Seal Island and the N end of Low Islets.

Swires Patch, with a depth of 9.1m, lies about 1.7 miles NW of the S end of Prime Seal Island.

Myrmidon Rock, with a depth of 2.7m, lies about 1.7 miles W of Prime Seal Point.

A clear channel, with a depth of not less than 11.9m, lies between Prime Seal Island and the islets off the W side of Flinders Island. A 10.9m patch lies about 1 mile SW of Wybalena Island.

Arthur Bay is entered between a point about 2 miles ESE of Settlement Point and Blue Rocks Point (40°06'S., 147°57'E.), a low peninsula, about 4.5 miles farther SSE. Brougham Sugarloaf, 451m high, is the summit of a range of hills backing the bay.

Chalky Island, 24m high, lies about 3 miles W of Blue Rocks Point. Islands and rocks, above and below-water, extend to about 3 miles S of Chalky Island. Isabella Island, 9.8m high, lies about 2.5 miles SE of Chalky Island. Chalky Island and the above islands and rocks lie on or near the edge of the coastal bank, with depths of less than 5m.

Between Blue Rocks Point and **Trousers Point** (40°13'S., 148°01'E.), about 8 miles SSE, are Parrys Bay and Fotheringate Bay, separated by a drying sandspit on the outer end of which is Big Green Island, about 2 miles offshore. Parrys Bay is fronted by a drying sandbank extending up to 1 mile offshore in its N part. An airfield lies about 2 miles E of Blue Rocks Point. Parrys Rock lies near the N end of a reef extending about 1 mile N of Big Green Island.

Anchorage.—There is anchorage, in 7.3m, about 0.3 mile off the SE side of Big Green Island.

East Kangaroo Island (Kangaroo Island), 30m high, lies about 2.5 miles W of Big Green Island. It is steep-to on its W side, except for a rock, which dries 2.4m, about 275m off its NW end. Two above-water rocks lie about 0.5 mile S of its S point. A rock, 4.6m high, lies at the S end of a group of above-water rocks extending about 1 mile N of the island.

A light is shown from the SE extremity of East Kangaroo Island.

Anchorage.—Anchorage can be taken, in a depth of 12.8m, about 0.5 mile off the NE side of East Kangaroo Island.

The Chappell Islands

2.18 The Chappell Islands consist of three islands and numerous islets and rocks lying from 5 to 12 miles SW of Trousers Point (40°13'S., 148°01'E.), in the W approach to Franklin Sound.

Goose Island (40°18'S., 147°48'E.), the W island, is 16.5m high in its N part and consists of granite boulders. Little Goose Islet lies close off its NW end. A light is shown near the SE end of Goose Island.

Anchorage.—Anchorage may be obtained, in about 18.3m, sand, E of the middle of Goose Island. This anchorage is good during E winds, but being so close to the shore it is unsafe should the wind shift to the SE.

Badger Island, the largest of the Chappell Islands, is flat, sparsely covered with timber, and 33m high at its NE end. A conspicuous granite boulder stands above Unicorn Point, the SW extremity of the island. A deep channel, about 1.5 miles wide, separates Badger Island from Goose Island.

A rocky spit, with a depth of 2.7m near its outer end, extends about 1.5 miles N from the NW end of Badger Island. Ena Shoal, with a depth of 6.1m and steep-to, lies about 2.5 miles NNE of the NW end of Badger Island.

Little Badger Islet, 5.2m high, lies on the N side of a reef which extends about 0.5 mile E of the E end of Badger Island. A chain of rocks, drying 1.8m, lies on the N edge of a bank with depths of less than 11m extending about 0.5 mile NE and NW of the islet. A shoal, with a depth of 7m, sand and shell, lies about 1 mile E of the islet.

A rock, with a depth of less than 1.8m, was reported (1960) about 0.2 mile SE of the SE end of Badger Island.

Beagle Island, 6.4m high, and another islet close N, lie about 1.2 miles SE of the SE end of Badger Island, on a bank with depths of less than 9.1m. A chain of above-water rocks lies on the NW edge of the bank, about 0.5 mile N of Beagle Island.

Rochfort Rock, with a depth of 1.8m, lies about 1 mile SSW of Beagle Island; the sea breaks over it during W winds near LW.

Anchorage.—Good anchorage may be obtained, in about 11m, E of Badger Island, about 0.7 mile SSW of Little Badger Islet.

Double Rock, 10.4m high, and Boxen Island, 6.7m high, lie about 3 and 4 miles SE, respectively, of Unicorn Point, the SW extremity of Badger Island, near the N and S ends, respectively, of a bank, with depths of less than 9.1m. They are almost connected by rocks and foul ground, with which Boxen Island is surrounded. A drying rock lies about 0.3 mile NNW of Double Rock.

Mount Chappell Island (40°16'S., 147°56'E.), about 0.7 mile NE of Badger Island, rises to a rounded summit, 199m high. A rock, which dries 0.9m, lies midway between Badger Island and Mount Chappell Island.

A spit, with a depth of 9.1m over its outer end, and on which there are several above-water rocks, extends about 0.4 mile W of the SW end of Mount Chappell Island. A bank, with depths of less than 5.5m, and on which there are above-water rocks and drying reefs, extends about 1.2 miles NNE from a position about 1 mile WNW of the SW end of Mount Chappell Island.

A rock, which dries 2.1m, and an above-water rock lie on a bank with depths of less than 5.5m about 1 mile WNW of the

N end of Mount Chappell Island.

Ann Islet and a rock, 4.6m high, each lie on banks, with depths of less than 5.5m, about 1.2 miles NNW and 0.5 mile ENE, respectively, of the N end of Mount Chappell Island.

Bet Shoal, with a depth of 4m, and which breaks in W weather, lies about 1.5 miles ENE of the N end of Mount Chappell Island.

Franklin Sound

2.19 Franklin Sound, between Flinders Island and Cape Barren Island, is about 4 miles wide. It is encumbered by islands and shallow banks, between which there are tortuous and narrow channels available only to vessels with local knowledge.

Kilt Shoal (40°14'S., 148°01'E.), with a depth of 3.4m and with a depth of 6.7m about 0.5 mile SE, lies about 1.5 miles S of Trousers Point, on the N side of the W entrance to Franklin Sound.

Entrance Rock, with a depth of less than 1.8m, and an 8.8m patch, lie about 0.7 mile and 1.5 miles S, respectively, of Kilt Shoal.

A 5.2m patch lies close off **Pig Head Point** (40°16'S., 148°07'E.), the S extremity of Flinders Island.

Oyster Rocks (Isabella Islets), two in number, the NE, 11m high, lie about 2.5 miles WSW of Pig Head Point. These islets lie on a sandbank which dries in places and extends about 2 miles WNW and 5 miles E from the islets.

Little Anderson Islet, bold and steep-to on its N side, lies on this bank about 1 mile S of Pig Head Point, and is connected to Anderson Island (Woody Island), 58m high, close S, by a drying sandbank.

Tin Kettle Island, 31m high near its center, lies about 0.7 mile E of Anderson Island, to which it is connected by a flat which dries in places. A rock drying 1.5m lies at the outer end of a reef extending about 0.4 mile NE of the E end of Tin Kettle Island. A spit, with a least depth of 1.8m, extends about 1.5 miles W from the drying rock, and depths of less than 9.1m extend about 1 mile farther W.

Long Island (40°22'S., 148°00'E.), on the S side of the W entrance to Franklin Sound, is bordered by rocks and is connected at its E end to Cape Barren Island, about 0.5 mile SE. The island is 50m high in its N part where there is a conspicuous granite boulder, and near its W end, 30m high, is another granite boulder.

Dough Bay Islet (Doughboy Islet) lies about 1 mile ENE of Long Island. From Ned Point, about 1.2 miles farther ENE, rocks extend N nearly to a rocky islet, about 0.5 mile offshore; a rock, with depths of less than 1.8m, was reported (1972) about 0.2 mile NW of the islet.

The S shore of Franklin Sound, from Long Island to Apple Orchard Point, about 9 miles ENE, is mostly fronted by banks with depths of less than 5.5m.

2.20 West Entrance Channels.—A bar, with depths of 3.7 to 6.7m, lies across the entrance of the N or main channel between the outer end of the spit extending WNW from Oyster Rocks and the SW point of Flinders Island. Pig's Head Point, bearing 090°, and open N of the summit of **Vansittart Island** (40°16'S., 148°18'E.) leads over the bar in a least depth of 6.7m. After clearing the bar, ease S to pass about 0.5 mile N of Oyster Rocks to clear several depths of 4.9 and 5.2m. Then steer E to pass about 0.3 mile off Pigs Head Point, and N of the spit N of Tin Kettle Island.

A bar, with depths of less than 1m, lies about 2 miles WNW of Ned Point at the entrance of the S channel. The channel then leads N of the rocks off Ned Point, and S of the spit extending about 0.7 mile S of Anderson Island, and then S of Tin Kettle Island where it joins the N channel.

Little Dog Island (40°15'S., 148°18'E.), 36m high, and Great Dog Island, about 1 mile E, front a shallow bay in the NE part of Franklin Sound. A conspicuous hill, 49m high, rises near the center, and a prominent flat-topped hill, 75m high, stands near the W end of Great Dog Island. A spit, with depths of less than 5.5m and a least depth of 0.6m, extends about 1.5 WSW from the W end of Little Dog Island; a rock, 0.9m high, lies about 0.2 mile S of its S extremity. A rock, 0.6m high, lies about 0.7 mile SE of the SW end of Great Dog Island; a bank, with depths of less 5.5m, extends about 0.4 mile ESE of the rock. Another bank, with depths of less than 5.5m, extends nearly 3.5 miles WSW from a position about 0.4 mile SE of the 0.6m high rock.

A direction light is shown from a beacon on the NE shore of Great Dog Island. A beacon stands 180m WSW. When aligned, and with the middle of the white sector bearing 258°, lead through the sound between the shoals NE of Vansittart Island and Flinders Island.

Vansittart Island (40°16'S., 148°18'E.) rises to a conspicuous broad summit, 167.6m high. A 5.2m patch lies about 0.7 mile W of the W end of Vansittart Island. A 5.5m patch lies about 0.2 mile S of the S end of Great Dog Island.

Briggs Islet, 8.8m high, lies at the SW end of a bank, with depths of less than 5.5m, about midway between Great Dog Island and the N end of Vansittart Island. A rock, with a depth of less than 1.8m, lies about 0.2 mile NNW of Briggs Islet.

Pot Boil, with a depth of 0.6m, and Vansittart Shoals, with depths of 1.2m, lie on a spit with depths of less than 5.5m, extending about 3.7 miles E and then 5.5 miles S from the SE point of Flinders Island. The sea breaks heavily on this spit in E winds and the depths over it are subject to change.

A bank, with depths of less than 5.5m, which dries in places on its N edge and over which the sea breaks heavily, extends about 4 miles E from the N end and 3 miles E from the E side of Vansittart Island.

From a position about 1 mile NW of the E end of Tin Kettle Island, the main channel divides. The main channel leads SE between the drying rock off the E end of Tin Kettle Island and the W end of the bank which extends WSW from a position about 0.4 mile SE of the 0.6m high rock off the S side of Great Dog Island. The main channel joins the S channel SE of Tin Kettle Island. Then the main channel leads NE towards Briggs Islet, which may be passed on either side.

From a position about 1 mile NW of the E end of Tin Kettle Island, another channel extends about 4 miles ENE towards the S end of Great Dog Island, bounded N by the spit extending SW from Little Dog Island, and S by the bank which extends WSW from a position about 0.4 mile SSE of the 0.6m rock off the S side of Great Dog Island. The channel passes S of this rock and leads in a SE direction through a narrow channel between shoal banks to join the main channel.

2.21 East Entrance Channel.—The E entrance channel to Franklin Sound lies between Vansittart Shoals and the bank extending from the E side of Vansittart Island. The channel had a depth of 7.3m in the fairway in 1968, except for a shoal with a depth of 5.2m at its N end. The depths in the channel are liable to change after E winds.

Tides—Currents.—At the E entrance of Franklin Sound the flood currents meet, with one coming from NW and the other from SSW. The flood current sets W through the sound and then about WNW on the N side and WSW on the S side of the Chappell Islands. The ebb current sets in the opposite direction. In the sound, the tidal currents attain a rate of from 2 to 2.5 knots.

Anchorage.—Anchorage may be obtained, in 8.2 to 9.1m, S of Tin Kettle Island.

Caution.—Vessels drawing in excess of 1.8m should not use the entrance marked by the white sector of Pot Boil Direction Light except in calm directions.

Flinders Island—East Coast

2.22 The E coast of Flinders Island, in contrast to its W coast, is generally low and fronted by a sandy beach.

Holloway Point, marked by a light, lies about 1.2 miles SE of North Point. Northeast Rock, with a depth of less than 1.8m, lies close off Holloway Point.

Beagle Spit, with depths of less than 11m and a least depth of 3m about 2 miles within its outer end, extends about 7.5 miles E from a position about 2.5 miles SE of Holloway Point. Depths of less than 18.3m extend about 3 miles farther E from the outer end of the spit.

The Patriarch Hills, three remarkable peaks, rise from low sandy land behind Sellar Point, the E extremity of the island. The peaks are separated from the mountains W by Heather Valley. The NE and highest peak, 235m high, lies about 4.5 miles W of Sellar Point; it has a sharp appearance and shows up well from the SE.

Babel Island (39°57'S., 148°20'E.), about 1.7 mile ENE of Sellar Point, rises to a flat-topped peak; a remarkable pyramidal hill, 196m high, lies near its W end. Foul ground was reported (1983) about 8.5 miles NNE of Babel Island. Cat Islet, 32m high and marked by a light, lies close E of Babel Island. Storehouse Islet, 16.8m high, lies close S of Cat Islet.

Several small rocks lie off the N side of Sellar Point. A rock, 1.2m high, and a rock, which dries about 2.1m, lie about 1.2 miles and 0.5 mile NW, respectively, of the W end of Babel Island. About 2 miles W of Sellar Point and 1 mile offshore, are two small groups of above-water and sunken rocks.

Tides—Currents.—North of Babel Island the flood current sets N and the ebb current sets S, parallel to the coast; they are generally regular, especially near the shore. South of Babel Island, the tidal currents are weak and irregular.

Anchorage.—With W winds, there is anchorage, over a sandy bottom, either N or S of the sandy spit connecting Babel Island with Flinders Island, taking care to avoid the above-described rocks. With winds E of N or S, no vessel should anchor in this neighborhood.

Caution.—Minnie Carmichael Shoal, about 11 miles ESE of the summit of Babel Island, was reported to have a depth of 6.4m.

A rock, known locally as Lawrence Rock, the position of which is doubtful, was reported to lie about 8 miles S of Minnie Carmichael Shoal.

An obstruction was reported to lie about 10.5 miles S of Minnie Carmichael Shoal.

In view of the doubtful nature of the above-mentioned reported dangers, as several vessels are reported to have been wrecked on detached dangers off the E coast of Flinders Island when seeking shelter from W gales, mariners are urged to use caution.

Cape Barren Island

2.23 Cape Barren Island is formed of granite peaks, the highest of which is **Mount Munro** (40°22'S., 148°07'E.), 716m high, round-topped and timbered, about 6.5 miles ENE of Cape Sir John, the SW extremity of the island. Mount Kerford, 501m high, a prominent peak, rises about 5.5 miles W of Cape Barren, the E extremity of Cape Barren Island.

Cape Sir John (40°25'S., 147°59'E.) is backed by a conspicuous round-topped hill, 162m high, about 1 mile NNE of it. The coast for about 2 miles N of the cape is rockbound and foul in places up to 0.5 mile offshore. A rock, 2.1m high, from which foul ground extends about 0.5 mile NW and SW, lies about 2 miles NW of Cape Sir John. Another rock, 2.1m high, lies about 1mile SW of the cape.

Thunder and Lightning Bay, entered between Cape Sir John and a point about 1.2 miles ESE, has a rock, 1.8m high, midway between its entrance points. A conspicuous boulder stands on the summit of a 239m hill, about 1 mile NE of the head of the bay. Yellow Rock, 2.4m high, and Key Island, 17.7m high, lie about 1.2 miles W and 0.2 mile SE, respectively, of the E entrance point of the bay.

Numerous rocks extend up to 0.2 mile offshore of the coast between Key Island and a point about 3 miles ESE. Malms Rock, which dries, lies about 0.3 mile S of the latter point.

Wombat Point (40°27'S., 148°08'E.) lies about 2.5 miles E of Malms Rock; close S of the point is a granite islet, 23m high, with an above-water rock about 0.1 mile E.

Sloping Point lies about 4 miles E of Wombat Point, with Battery Islet, about 6.1m high, midway between the points. A rock, awash, lies about 0.1 mile S of Sloping Point, with an above-water rock closer inshore.

Kent Bay is entered between Sloping Point and Passage Point, about 5.5 miles E. The bay is encumbered with shoals, the outermost of which is a sandy shoal with a least depth of 0.6m lying across the entrance, from about 1.7 to 3.7 miles E of Sloping Point.

Cone Point, about 2 miles E of Passage Point, is so named from two remarkable cone-shaped rocks on it.

A headland, marked by conspicuous sandhills and separating two bays, lies midway between Cone Point and Cape Barren, about 5 miles NE.

2.24 Cape Barren (40°26'S., 148°29'E.), the E extremity of Cape Barren Island, is a rocky point, with numerous hillocks over it. Gull Islet, rocky and 12.2m high, lies in the middle of foul ground extending about 1 mile E of the cape. Gull Rock, 3.7m high, lies on the outer part of the foul ground at the S end of a reef of above-water and sunken rocks extending about 0.5

mile N of Gull Rock; the reef is steep-to on its E side, but there are strong tide rips near it. A light is shown from the SE side of Cape Barren.

An obstruction, with a depth of 7.3m, was reported (1973) about 3.2 miles ESE of Cape Barren. A bank, with a depth of 12.2m, lies about 1.2 miles SE of the cape.

Harley Point, approximately 4 miles NNW of Cape Barren, has several above-water and sunken rocks extending about 0.5 mile SE of it. Flat Rock, 0.9m high, lies about 0.7 mile farther SE, with a few sunken rocks extending about 0.4 mile NNW of it.

Several rocky points with intermediate sandy beaches lie between Harley Point and Puncheon Point, about 7.5 miles NW.

Armstrong Channel

2.25 Armstrong Channel, between Cape Barren Island and Clarke Island, is seldom used due to the numerous banks and strong tidal currents in it. A passage of sufficient width and depth for small vessels with local knowledge is swept out by the tidal currents. There was a least depth of 6.4m in the E entrance between the S extremities of Forsyth Island and Passage Island.

The W entrance to Armstrong Channel is obstructed and divided into two passages by Preservation Island, islets, and rocks; the S passage is wider and straighter.

Night Islet (40°29'S., 148°01'E.), the W islet, lies about 4 miles SSE of Cape Sir John and is 14m high. Above-water and sunken rocks extend about 0.7 mile NE of Night Islet. Little Night Islet lies about 0.5 mile S of Night Islet. A spit, with depths of 9.1m over its outer part, extends about 0.7 mile SE of Night Islet. An 11m patch lies about 0.7 mile ESE of Little Night Islet. A 15.8m shoal lies about 4.5 miles SW of Little Night Islet; overfalls occur about 3 miles SE of this shoal.

Preservation Island, 25m high, lies with its NW extremity about 1.5 miles ENE of Night Islet. Islets and rocks extend about 0.5 mile NW from its NW end, and a spit, with depths of less than 5.5m, extends about 2 miles E from its E side. A 5.2m patch lies about 0.5 mile E of the SE extremity of Preservation Island.

Rum Islet, close off the S end of Preservation Island, has a reef extending about 0.2 mile S of it. A rock, with a depth of 3.4m, and a 5.8m patch, lie about 0.4 mile and 1 mile E, respectively, of its S end.

Anchorage.—Hamilton Road affords anchorage, in 7.3m, about 0.3 mile E of the SE end of Preservation Island; there are patches with depths of 5.5m in the vicinity. After a continuance of heavy W gales, a long swell rolls around the S end of Rum Islet; this swell does not gradually increase, but sets in suddenly and may compel a vessel to get under way.

A bank, with a least depth of 4.3m, known locally as Preservation Bank, lies between positions about 1 mile SSW and 0.7 mile S, respectively, of Wombat Point.

Eclipse Rock, with a depth of 3m, around which there is always a confused sea, lies about 0.5 mile W of the W extremity of Clarke Island, and a rock, with a depth of less than 1.8m, lies about 1 mile N of the same extremity.

The N shore of Clarke Island, W of Kangaroo Bay, is fronted by a bank with depths of less than 5.5m, extending up to 0.7 mile offshore.

The better side of Armstrong Channel lies along the Clarke Island shore, care being taken to avoid the above bank. Then the channel lies between the W entrance of Kangaroo Bay and Middle Bank, which, with a least depth of 0.6m, lies between positions about 1.2 miles S and 1.7 miles SE of **Battery Islet** (40°27'S., 148°11'E.).

Seal Rocks, which dry 2.4m, extend about 0.2 mile N of Seal Point, the NE extremity of Clarke Island. The channel lies between Seal Point and Sloping Point, about 1.2 miles NE.

Armstrong Channel then leads about 3.5 miles E, passing N of a shallow sandbank, parts of which dry and which extends from the NE side of Clarke Island to Forsyth Island, about 3 miles E and 30m high. The sandy shoal lying across the entrance to Kent Bay lies in the center of this part of the channel which terminates S in a passage between Forsyth Island and Passage Island, 54m high, about 0.5 mile E. The latter passage is narrow and lies between the banks, with depths of less than 5.5m, extending from these islands; at the S end is a bar, with a least depth of 6.4m and over which the sea breaks, between the S extremities of the islands. Rocks, with depths of less than 1.8m, extend about 0.3 mile SE from the SE end of Passage Island, off which there are strong tide rips.

The narrow passage between Passage Island and Passage Point should only be used in case of necessity, as the tidal currents attain velocities of from 5 to 6 knots. Several above-water rocks lie about 0.2 mile N of the N end of Passage Island, and a rock, which dries 0.6m, lies in mid-channel.

A rock, which dries 0.9m and over which the sea breaks heavily, lies about 1 mile SW of the S end of Forsyth Island.

Clarke Island

2.26 Clarke Island, the S island of the Furneaux Group, rises to a peaked hill (40°31'S., 148°09'E.), 206m high, near its NW side. A flat-topped hill, 160m high, rises in its SW part. The S coast of the island is backed by a plateau from which rise two conical hills, the higher near the middle of the plateau, from where the land falls gradually to Seal Point.

Snug Cove, entered between **Lookout Head** (40°34'S., 148°07'E.) and a point about 1.7 miles NNW, has several islets and rocks off its SE side, and although deep, it cannot be recommended. Lookout Rock, 18m high, lies on a bank with depths of less than 18.3m, about 0.7 mile NW of the NW end of Lookout Head; an above-water rock lies about 0.3 mile N of Lookout Rock, on the N end of the bank. Napper Rock, two rocks which dry 1.8m, lie between Lookout Rock and the NW end of Lookout Head.

A rock, 0.6m high, lies about 0.3 mile SE of the SE end of Lookout Head, and is the outermost of rocks extending SE of the point. Rocks, which dry, lie about 0.5 mile E of the 0.6m rock.

Depths of less than 9.1m extend about 0.3 mile S from the S extremity of Clarke Island.

Moriarty Bay, N of Moriarty Point, the SE extremity of Clarke Island, has bad holding ground, over an irregular rocky bottom.

Off-lying dangers.—Moriarty Rocks (40°35'S., 148°17'E.) consist of two rocks, 7.6 and 6.1m high, lying about 3.2 and 3.7 miles E, respectively, of Moriarty Point. They lie on a

bank, with depths of less than 18.3m, extending from 1 mile SE to 9 miles E of Moriarty Point. Moriarty Bank, marked by heavy breakers, extends about 2.5 miles WSW from the NW rock. East Bank, with a depth of 1.5m, and another bank, with a depth of 3.4m, lie about 2 miles SE and 1 mile SSE of the same rock. Depths of less than 11m extend about 2 miles E of East Bank. The sea breaks heavily over East Bank and the 1.3m bank.

Mount William (40°55'S., 148°11'E.), near the NE coast of Tasmania, bearing 204°, leads E of the above dangers, and the S extremity of Clarke Island, bearing more than 290°, leads S of the dangers.

Low Islets, 6.1m and 4.6m high, lie on a shoal, with depths of less than 11m, which extends about 1.7 miles SW and 0.7 mile NW of them. Above-water rocks and a sunken rock lie at the NE end of this shoal. A rock, which dries 1.2m, lies about midway between Low Islets and the E side of Clarke Island.

Caution.—The whole area between the E side of Clarke Island, Moriarty Bank, and Passage Island is either foul ground, or the strong tidal currents cause such a race and the sea to break so heavily as to make this vicinity dangerous.

Wilsons Promontory to Cape Howe

2.27 The coast between South East Point (Wilsons Point) (39°08'S., 146°25'E.) and the entrance to Grippsland Lakes (37°53'S., 147°58'E.), about 105 miles NE, is low and consists mostly of hummocks less than 30m high, except for the high land on the E side of Wilsons Promontory. Continuing on to Cape Howe (37°30'S., 149°58'E.), about 100 miles farther ENE, the coast is higher, rising in places to an elevation of about 91m. Numerous mountains and hills are inland; many of these behind the E part of this coast form good landmarks due to their close proximity to the coast.

There are few anchorages for deep-draft vessels on this coast. The principal ones are Waterloo Bay and Refuge Cove, on the E side of Wilsons Promontory.

An area to be avoided is centered about 40 miles SE of Lakes Entrance, covering a major offshore oil and gas production field.

South East Point to Corner Inlet and Port Albert

2.28 South East Point (39°08'S., 146°25'E.) was previously described in paragraph 2.8 with Wilsons Promontory.

South Peak, 379m high, rises about 0.7 mile NW of South East Point. An islet, almost connected to the shore by boulders, lies about 1 mile NNE of the point.

Waterloo Bay is entered between Waterloo Point, about 2.5 miles NNE of South East Point, and Cape Wellington, about 2.2 miles farther NE. A light is shown from Waterloo Point. The bay has a depth of 26m in its center, decreasing gradually to 11m about 0.2 mile off its head, but increasing towards its outer points. The SW shore of the bay forms the E end of the valley crossing a promontory, and makes a conspicuous break between the highlands of Boulder Range and Wilson Range.

Anchorage.—The best anchorage is in about 22m, about 0.4 mile from the SW shore. Small vessels bound W and met by a SW gale may anchor close inshore in a small cove under Waterloo Point. Anchorage is not recommended even though the holding is good due to the high ground of Wilsons Promontory and exposure to the swell from both sides of Bass Strait. The bay, from 0.5 mile N of Waterloo Point, is open to severe W winds that sweep through the valley at the head of the bay.

Caution.—There is a marine farm, marked by lighted buoys, approximately 3 miles SE of Waterloo Point.

2.29 Cape Wellington (39°04'S., 146°29'E.), a hilly headland, 78m high at its SE extremity, rises to an elevation of 135m about 0.5 mile inland, and to Kersop Peak, 222m, its highest part, about 1 mile inland. A stone cairn stands on the extremity of the cape, and on Kersop Peak.

Cape Wellington has been reported to give good radar returns at 18 miles.

Tides—Currents.—Off Cape Wellington the flood tidal currents appear to meet and set in opposite directions, one portion of the current which comes from NE turning and setting along the shore N, while the outer portion of the same current sets round the promontory S and W. The ebb current from the SW sets in an opposite manner. These conditions cause a considerable tidal rip and race off Cape Wellington.

Refuge Cove is the central of three indentations lying between Brown Head, about 1.3 miles N of Cape Wellington, and Horn Point, 40m high, about 1 mile farther N. The cove is easily identified, being midway between Kersop Peak and Horn Point, and from its having the first sandy beach which opens N of Cape Wellington.

The entrance to the cove, S of Hobbs Head, is about 150m wide, with depths of 11m in it. The depths decrease gradually to 5.5m close inshore. A round-topped hill with a wooded summit, 61m high, surmounts Hobbs Head. A light is shown on the E side of the S entrance to Refuge Cove.

Anchorage.—Refuge Cove is the only anchorage on the W side of Wilsons Promontory sheltered from the E. The anchorage is in its S part.

2.30 Sealers Cove (39°01'S., 146°27'E.) is entered about 1.7 miles WNW of Horn Point. There are depths of 7.3 to 9.1m in the entrance to the cove, which is about 0.6 mile wide; the depths decrease to 5.5m about 0.2 mile within its entrance. A heavy swell often rolls into the cove.

Sealers Cove Light is shown about 0.7 mile E of the S entrance point of Sealers Cove.

The coast from the N end of Sealers Cove to the S end of Five Mile Beach, about 1.7 miles NNW, is bold and steep-to. The latter beach extends about 4 miles NNE, and may be approached to a distance of about 0.7 mile in depths of 9.1 to 11m. The beach consists of reddish-colored sand and is backed by swampy ground extending about 2 miles W to the Vereker Range.

Rabbit Rock, 15.2m high, lies about 0.2 mile SE of Monkey Point, a bold point about 0.7 mile ENE of the N end of Five Mile Beach.

Rabbit Island (38°55'S., 146°30'E.), 59m high, bare of trees and covered with high grass, lies about 1 mile E of Monkey Point. It is an excellent mark for vessels proceeding N to Corner Inlet.

Anchorage.—There is good anchorage in all but SE or E gales, in 8.2 to 9.1m, about 1 mile NE of Rabbit Island. Coasters bound W will find this a convenient anchorage during SW

gales.

2.31 Lighthouse Point (38°51'S., 146°29'E.), about 4.5 miles NNW of Rabbit Island, is 11m high, heath-covered, with a conspicuous bare granite face, above which is a beacon, 4.9m high. A light is shown on the point.

Mount Roundback, 313m high, rises about 2.5 miles SSW of Lighthouse Point. Mount Hunter, a double-peaked wooded mountain, 351m high, lies about 3.5 miles N of Mount Roundback; a conspicuous peak, 237m high, lies on the E spur of Hunter Range, about 0.5 mile E. Mount Margaret, 218m high, lies about midway between Mount Roundback and Mount Hunter.

Entrance Point, the SW entrance point of Corner Basin, lies about 3.7 miles N of Lighthouse Point, and is a low tree-covered point; a beacon, 4.9m high, stands on the point. Mount Singapore, the N point of Wilsons Promontory, lies about 1 mile W of Entrance Point; it is cone-shaped and 144m high.

2.32 Off-lying islands and dangers.—The Seal Islands (Direction Islands) consist of a group of islands, islets, and rocks lying from about 6 miles E to 9 miles ESE of Rabbit Island.

Cliffy Island (38°55'S., 146°42'E.), the SE island of the group, is 44m high, with rocks awash extending about 0.1 mile off its NE end. A light is shown from the S side of the island; the lighthouse is in communication with Wilsons Promontory. Cliffy Island has been reported to give good radar returns up to 18 miles.

Rag Island, 29m high, lies about 1.2 miles WSW of Cliffy Island. Rocks, awash, extend about 0.1 mile W and 0.3 mile NW of the island, and two conspicuous rocks, about 6.1m high, lie about 0.2 mile E of the island.

Notch Island, 37m high and steep-to, lies about 0.7 mile N of Rag Island. It has two hills on it and the valley between them gives it a notched appearance.

Seal Island (Direction Island), nearly 1 mile NW of Notch Island, is 47m high and covered with tufts of coarse grass. Two rocks lie about 0.1 mile and 0.4 mile NW, respectively, of Seal Island; the outer rock is 2.4m high, with a rock awash close N; the inner rock has a rock awash close NW of it.

White Rock, 10m high, lies about 1.2 miles NNW of Seal Island. A rock, with a depth of 5.5m, lies close S of it and a rock, with a depth of 5.8m, lies about 0.2 mile NW.

Corner Inlet and Port Albert

2.33 The ports of Corner Inlet and Port Albert include all waters of Corner Inlet, Corner Basin, and Port Albert, together with the navigable rivers and creeks flowing into them, NW of a line drawn 050° from the summit of **Rabbit Island** (38°55'S., 146°30'E.) for 22 miles, and then N to the coast.

Corner Inlet leads into Corner Basin and lies between the E side of Wilsons Promontory, N of Rabbit Island and Snake Island (La Trobe Island), with Townsend Point, its S extremity, about 3 miles E of Entrance Point. About 2 miles within the entrance to Corner Basin, the waters branch into several channels intersecting extensive sand and mud flats which mostly fill the basin.

Snake Island (La Trobe Island), separating Corner Inlet from Port Albert, is low, but the trees on it give it an apparent elevation of 12.2 to 18.3m.

Port Welshpool and Port Franklin, in the NE and NW corners, respectively, of Corner Basin, are approached by Lewis Channel and Franklin Channel, respectively; they are the main ports for the Bass Strait fishing fleets. The town of Port Albert, at the head of Port Albert, about 11 miles E of Port Welshpool, is also a port for the Bass Strait fishing fleets.

Tides—Currents.—The tidal rise at Rabbit Island is 2m at MHHW and at MLHW.

The tides in Port Albert are generally influenced by the winds, and no reliance can be placed on calculated times of HW during unsettled weather.

Strong W to SW winds cause the incoming tidal current to run from 1 hour to 1 hour 30 minutes after, and E winds cause it to cease running 40 minutes before the predicted time of high water.

Tidal currents on the NE side of Corner Inlet set with considerable force, sometimes at a rate of over 2 knots.

Pilotage.—Pilotage is not available. A Certificate of Local Knowledge is compulsory for all trading vessels over 12m long and all fishing vessels over 35m long. Further information can be obtained from Gippsland Ports Authority or Marine Safety Victoria.

Gippsland Ports Authority

http://www.gippslandports.vic.gov.au

Corner Inlet (Welshpool) (38°51'S., 146°34'E.)

World Port Index No. 53840

2.34 The entrance to Corner Inlet should not be attempted without local knowledge. The channel lies between sandbanks, with depths of less than 5.5m. The seaward part of the SW bank lies about 4 miles NW of Rabbit Island; it dries in places close to its NE edge between positions 0.7 to 2 miles SE of the entrance point. The NE bank extends about 6 miles SE from Bentley Point, which lies about 1 mile ENE of the entrance point; the bank then extends about 1.5 miles W.

The approach to this channel, between the outer ends of the above banks, is from the E. There are depths of 5.5m on the line of the directional light in the approach. However, in 1985, depths of 5m existed 50m N of the edge of the white sector between Buoy No. 1 and Buoy No. 3 and close SW of the line joining Buoy No. 3 and Buoy No. 5. Then the channel leads NW with ample width and increasing depths between the banks into Corner Basin.

The sea breaks at times on the banks at the approach to the channel, but rarely in the approach itself, which, in heavy weather, can be located between the breakers on either side. On the NE bank, between the channel and Bentley Harbor, the sea breaks heavily over the W 3 miles of that bank.

The white sector of a directional light shown from Lighthouse Point Light leads to the entrance channel. The light can be difficult to identify during poor visibility or in the late afternoon sun.

Port Welshpool.—Lewis Channel, the E channel on the N side of Corner Basin, curves about 4 miles N and E, with a

least depth of 5.2m to Port Welshpool Jetty. The channel is marked by lighted and unlighted beacons. Above the pier, the channel is marked by lighted buoys. In 1985, the least depth between No. 1 Lighted Beacon and No. 2 Lighted Beacon was 4.3m. A depth of 4.4m could be carried into the channel by passing 50m E of No. 2 Lighted Beacon.

Port Welshpool Pier has a berth, 150m long on its S side, with depths of 6.0m alongside; there is a berth 110m long on its N side, with depths of 4.6 to 6.6m alongside.

Port Welshpool Jetty, with a T-head, lies about 0.7 mile E of Port Welshpool Pier. In its outer face is a berth, 115m long, with depths of 3 to 6m alongside. The channel between the jetty and pier has a least depth of 2.1m. A boat harbor is bounded on the W by a breakwater and on the E by the Port Welshpool Jetty.

Franklin Channel is entered about 2 miles NW of Entrance Point, between a shoal with a depth of 1.8m on the S side, and the E end of a drying sandy ridge extending 3.2 miles W on the N side. The channel extends about 5 miles W and then branches into three minor channels. The N branch extends N and NW for about 4 miles to the entrance to the Franklin River, where it is shoal.

Benison Channel, a blind channel, and Middle Channel lie in the SW part of Corner Basin.

Anchorage.—Bentley Harbor is bounded N by Bentley Point, located about 2.5 miles WNW of Townsend Point, and a point about 1.5 miles NE of Townsend Point, and on the S side by the N side of the NE bank extending from Corner Inlet. The harbor is about 1 mile wide at its E end, decreasing to about 0.1 mile off the coast between Townsend Point and Bentley Point. There are depths of 8m at its entrance, decreasing to 3m in its narrowest part. Good anchorage may be obtained by small vessels in the narrow part of the harbor, with shelter from all winds.

Mount Singapore (38°47'S., 146°27'E.), bearing 278° and open S of Townsend Point, leads toward Bentley Harbor. When abreast Townsend Point a vessel should keep along the shore and anchor as convenient.

Anchorage may also obtained, in 11 to 26m, S of the sandy ridge on the N side of Franklin Channel.

2.35 Port Albert, one of the oldest ports in Victoria, is the main fishing port of Bass Strait. The entrance channel and bar are liable to changes in position and depths, and the buoys marking the entrance are liable to be washed away due to their exposed position. The greatest care should be exercised by vessels with local knowledge, and those without local knowledge should not attempt to enter.

Entrance channel.—The main entrance to Port Albert is about 0.5 mile wide. and lies between the E extremity of Snake Island (La Trobe Island) and the SW extremity of **Clonmel Island** (38°45'S., 146°40'E.). Bar Bank, which dries, extends about 1.5 mile SSE from the NE end of Snake Island. Depths of less than 5.5m extend about 0.5 mile SW, S, and E, respectively, from the outer end of the bar. A bar, with a depth of 2.5m, extends across the entrance between the E end of Snake Island and the SW extremity of Clonmel Island.

The fairway lighted buoy is moored 4 miles SSE of the W extremity of Drum Island. Another lighted buoy is moored about 2.2 miles SE of the same point.

Inner channels.—Within the entrance there are two channels. The E or main channel extends about 4 miles NNE to Port Albert from the inner end of the entrance channel. It passes E of the E end of **Sunday Island** and W of the chain of islands extending N from the middle of Clonmel Island to Port Albert. The least depth in this channel in 1964 was 1.8m. The channel is marked by lighted and unlighted beacons.

The W channel leads round the W end of Sunday Island and through **Midge Channel** off the NE end of that island, joining the E channel off the NE extremity of Sunday Island. The channel S and W of Sunday Island is unmarked. Midge Channel and the channel for about 1 mile W on the N side of Sunday Island is marked by a pile beacon on its N side and by seven piles on its S side. A three-pile beacon, 3.7m high, stands about 2.5 miles WNW of the NE extremity of Sunday Island Beacon. A jetty extends 500m N from the NE point of Sunday Island; a light is occasionally shown from its head. A least depth of 1.4m is reported for this channel.

Kate Kearney Entrance lies about 4.5 miles NE of the entrance to Port Arthur and at the NE end of Clonmel Island; the latter island is 4.3m high and covered with verdure. The entrance is fronted by breakers off its SW side, and a bar, with a depth of 2.4m, extends across the entrance. A shoal channel then leads W to join the E channel to Port Albert.

Shoal Inlet lies about 4 miles farther ENE, at the E end of a low sandy island similar to Clonmel Island. Sandspits, marked by breakers, extend up to 0.4 mil seaward from its entrance points. The entrance has a depth of 0.9m and is passable by small vessels with local knowledge. A light is shown from the E side of Shoal Inlet.

Port Albert Wharf (38°40'S., 146°41'E.) is an L-shaped jetty with a berth, 120m long, on its outer face, with a depth of 2m alongside. On the inner side of the head is a berth 59m long. The Hotel Jetty, about 100m NW of the wharf, has a length of 90m long, with depths of 1 to 4m alongside. The Boat Harbor Jetty lies just NW of the Hotel Jetty. It is T-shaped with a berth of 25m in length and a depth of 3m alongside. Vessels carrying explosives should anchor in the explosives anchorage established in Corner Inlet.

Directions.—Vessels bound for Corner Inlet or Port Albert from the W should, after rounding Wilsons Promontory, steer for Cape Wellington, which after passing, the vessel should steer with Cape Wellington bearing 215° astern, in line with Wilsons Promontory Light, to a position about 1 mile NW of White Rock. From a position 4 miles N of Seal Island steer for Lighthouse Point Light bearing 276.5°, passing SW of No. 3 Lighted Buoy, then alter course to 313° with Cliffy Island Light astern in order to follow the buoyed main channel into Corner Inlet. Course should then be altered for Lewis or Toora Channels when abeam of Latrobe Lighted Buoy moored 1.4 miles NNW of Mount Singapore. From the E, steer to pass about 5.2 miles N of Cliffy Island, then proceed as above.

Vessels without local knowledge are recommended to proceed as above and anchor, in a depth of 20m, with the directional light bearing 275° until daylight, when they should proceed as above.

A vessel bound for Port Albert from the W should proceed as directed above to a position about 1 mile NW of White Rock. Then steer NNE for about 7.5 miles, passing close to Port Albert Fairway Lighted Buoy, then change course N

through the outer part of Port Albert Entrance, passing close W of the lighted buoy, situated 2.5 miles SE of Drum Island Front Leading Lighted Beacon, before altering course NW and then NE into the channel leading to the berths at Port Albert.

Vessels are recommended not to approach Port Albert at night without local knowledge, but should keep a good offing until daylight, sounding frequently.

Port Albert Entrance to Cape Howe

2.36 From Port Albert Entrance, the coast extends about 80 miles NE to Lake Entrance. The portion of the coast between Shoal Inlet and Red Bluff (37°52'S., 148°04'E.) is generally known as Ninety Mile Beach. This coast is a continuous steep- to sandy beach, backed by lakes and low wooded ground intersected by inlets and small streams, the latter breaking through the narrow strip of sand after a heavy rainfall. Landing on Ninety Mile Beach is possible but very dangerous.

In the offing off the SW part of Ninety Mile Beach, nothing can be seen but the back ranges of mountains. These mountains extend about 27 miles SW from **Toms Cap** (38°20'S., 146°48'E.), 363m high, which lies about 22 miles N of Shoal Inlet.

The coast from Shoal Inlet to the town of **Seaspray**, at the mouth of **Merriman Creek**, about 25 miles NE, is nearly separated from the land behind it, which is somewhat higher and thickly wooded by fresh and salt water lagoons or ti-tree swamps. The land is low, having an elevation of about 15m on the W side of Merriman Creek, and about 7.6m E of the creek. In places between the hummocks the coast is scarcely above HW, while the waters of **Lake Denison** break through the coast during the floods. Apart from Buckleys Station, a group of houses close N of Seaspray and the buildings of that town, there are no objects easy of identification on this stretch of coast.

The coast from Seaspray to Lake Entrance, about 47 miles NE, is uniform and monotonous in appearance, and continues low, from 12 to 26m high, and covered with ti-trees in places. Lakes lie behind this narrow, sandy stretch of coast; the lakes are separated from each other and surrounded by thickly wooded country, much of it subject to flooding.

Deadman Hill, 64m high, rises about 11 miles N of the mouth of Merriman Creek. Two conspicuous flares, visible for a considerable distance at night, are situated about 2.2 miles SSW of Deadman Hill. Three hummocks, the SW 22m high, the middle covered with ti-trees, and the NE Stockyard Hill, 20m high, lie about 18 miles, 24 miles, and 28 miles NE, respectively, of the mouth of Merriman Creek.

2.37 **Sperm Whale Head** (37°59'S., 147°43'E.), 29m high, about 7.5 miles NE of Stockyard Hill, is the NE extremity of a peninsula separating Lake Reeve from Lake Victoria.

About 7 miles W of Lake Entrance and about 3 miles inland is **Metung Hill**, 75m high, from which comparatively high wooded land continues to Mount Barkly at Lake Entrance, and then to Red Bluff, about 4.5 miles farther E; high ground then skirts the arms and streams of Lake Tyers, and following the line of the coast about 2 miles inland, it gives a higher appearance to the coastline, clearly marking the difference between the land E and that W of Lake Entrance.

Mount Barkly (37°53'S., 147°58'E.) lies 0.5 mile from the outer line of coast and is the most prominent object on the coast just described. It is 62m high, but the trees on it give it an apparent elevation of 71m; it forms a useful mark for making Lake Entrance.

Caution.—Numerous offshore oil and gas platforms, best seen on the chart, are situated in Bass Strait between Wilsons Promontory and Point Hicks, about 150 miles NE; they extend S with less concentration almost to Flinders Island and are marked by lights and fog signals. Several submerged pipelines extend offshore and terminate in lighted production platforms.

A charted area encompassing the Bass Straight Oil Fields has been designated as an Area to be Avoided; vessels of more than 200 gt should avoid the area. The main oil and gas producing field lies between 27 miles SE and 40 miles S of the Lakes Entrance. Vessels should maintain a listening watch on VHF channel 16 while in this vicinity.

A gas pipeline, best seen on the chart, has been constructed between Ninety Mile Beach and Tasmania. The N terminus is situated one mile E of Seaspray, then S into Bass Strait between the Hogan Group and Kent Group. The S terminus is situated at Five Mile Bluff which is located 5 miles E of Port Dalrymple. Gas pipelines contain flammable gas under high pressure. Any ship damaging the pipeline would face an immediate fire hazard. Mariners are cautioned not to anchor or trawl in the vicinity of the pipeline.

Mariners are also cautioned to the existence of submarine power cables in the vicinity of Five Mile Bluff.

Surveillance operations are carried out within a radius of 40 miles of position 38°20'S, 148°00'E by military vessels and aircraft, which may illuminate and approach close to vessels to verify identification.

An IMO-approved Traffic Separation Scheme lies in the waters SE of the Area to be Avoided; two light floats mark the E and W terminus of the charted Traffic Separation Zone. Vessels are cautioned that Rule 10 of the International Regulations for Preventing Collisions at Sea, 1972 (COLREGS 72) applies to vessels utilizing the Traffic Separation Scheme, and that vessels not using a Traffic Separation Scheme shall avoid it by as wide a margin as is practicable.

2.38 **Lakes Entrance** (37°54'S., 147°58'E.) is the dredged channel which provides access to the extensive inland waterways system encompassing Lake Wellington, Lake Victoria, Lake King, and Lake Bonga. The large fishing fleets that work off this portion of the Australian coast operate from the many ports served by Lakes Entrance.

The channel depth here is usually maintained at a depth of about 3m, but the bar that fronts the entrance is treacherous. In 1978, three vessels were lost attempting to cross it. Local knowledge is essential and local authorities should be consulted before planning a voyage here. Details of the channels and ports of the various lakes are given in a publication of the Department of Harbours and Marine, Victoria.

Caution.—Mariners are advised that shoaling has occurred in Lakes Entrance fairway. Mariners are further advised to seek the latest information on the bar conditions before attempting a bar crossing by phoning Gippsland Ports on 3-5152-1974 (BH) or 418-381-366 (AH).

Mariners are cautioned to exercise special care when navi-

gating these waters due to production wells and gas pipelines.

Red Bluff (37°52'S., 148°04'E.), conspicuous from its color, rises gradually to a height of 49m and is wooded, though not so much near the coast as inland. The bluff has a few rocks off it which do not extend far to seaward.

Mount Tara, about 19 miles NNE of Red Bluff, has two conspicuous crests with other smaller crests. The principal summit is flat-topped and has been cleared of trees.

From Mount Tara, E and NE, the country is mountainous, with some of the ranges approaching within a few miles of the coast.

The coast from the entrance to Lake Tyers trends with a curve ENE 21 miles to the Snowy River entrance and is similar to that W of the entrance to the lakes, though the sand hummocks are higher, especially toward the Snowy River, near which they attain a height of 52m. Immediately at the back of the coast, extending the whole distance, is a freshwater morass, and generally 0.5 mile from its margin is the higher back country, which along this part of the coast is about 61m high and densely timbered. The hummocky coast is faced with sand cliffs or patches, but they are uniform in appearance.

A beacon stands on a sand hummock about 1.2 miles W of the Snowy River entrance.

About 4 miles SSW of the Snowy River entrance is a patch of uneven rock bottom, upon which the least depth found was 15.5m.

2.39 Point Ricardo (37°49'S., 148°38'E.) is rocky. Hummocks on the point are about 31m high. Mount Raymond, located 6 miles N of Point Ricardo, is a conspicuous hill, 293m high at its N elevation; mountain spurs extend in a S and SE direction.

Cape Conran, about 5 miles E of Point Ricardo, is 58m high, but not prominent. The land about the point is flat and covered with a dense dwarf scrub. The coast between Point Ricardo and Cape Conran forms a sandy bight skirted with grassy hummocks over 30m high. In the center is one conspicuous hummock, 50m high, with a sand patch near its summit, over which is a grove of tea trees. Under the E part of Cape Conran, extending 0.5 mile offshore, are numerous sunken rocks upon which the sea breaks heavily at times. About 1.5 miles inland from Cape Conran, and extending at that distance from the coast to the Snowy River, higher ground is densely timbered, with an average height of about 91m.

Beware Reef lies about 3 miles E of Cape Conran. The reef is 2m above HW, and has sunken rocks, upon which the depth is uncertain, lying E and SE of it to a distance of 0.4 mile.

Caution.—Two production wells with associated pipelines and restricted areas are situated 15 miles SSW of Point Ricardo.

2.40 Pearl Point (37°47'S., 148°53'E.) can be identified by two conspicuous conical sand cliffs that are located close W.

Point Hicks (37°48'S., 149°16'E.) is easily recognized by a sandy peak, 164m high, lying about 1 mile N of the cape. This summit has a gradual fall to the W of bare sand and is more remarkable when viewed from that direction. Point Hicks has four points, the S of which projects nearly 1.5 miles from the line of the coast. The cape is composed of granite, with boulders strewn over the whole face. A stone obelisk stands on the point. Everard Hill, 5 miles N of Point Hicks, is wooded and conspicuous. The hill is reported to give a good radar return up to 21 miles.

Petrel Point, about 7 miles E of Point Hicks, is 71m high and bordered by half tide and sunken rocks for more than 0.1 mile off. A rock, 9.1m high, lies close E of the point. About 0.2 mile S of the point is a small rock only 0.3m above HW. The coast between Point Hicks and Petrel Point consists of sandy beaches with rocky points having reefs lying off them for 0.2 mile. About midway along, and close to the coast, is a group of conspicuous bare sand hummocks, and to the E of this group are several sand patches.

2.41 Rame Head (37°47'S., 149°28'E.), a granite formation, rises to 113m on its E side; another summit of the same elevation rises close to the SW. To the N the land falls, but again rises gradually, until at 4 miles distant it attains an elevation of 287m. The W part of the head is fringed with rocks and a rock, awash, lies close to the SE of the extreme point.

Rame Head is reported to give a good radar return up to 22 miles.

From Rame Head the coast trends in a N direction for 1.5 miles as far as a sandy beach; then in a NE direction for nearly 1 mile to Wingan Point. Over the sandy beach, and near its W part, is a sand cliff 62m high.

The Skerries, three in number, lie close S of Wingan Point. The highest and central rock is 12.8m above HW. Close to The Skerries are several detached rocks, some above HW; the outer of these, which is covered at HW, is 0.5 mile from Wingan Point.

Sand Patch Point (37°44'S., 149°36'E.) is made conspicuous by a large body of drift sand. Nearly 0.5 mile S of the point is a pinnacle rock with a depth of 2.1m at LW, known as the Long Reef. It is a dangerous rock on which the sea breaks occasionally.

Little Rame Head lies about 4.5 miles NE of Sand Patch Point. The coast between is about 91m high and forms a rocky bight with a few sandy beaches.

2.42 New Zealand Star Bank (37°47'S., 149°44'E.), with a least depth of 15m, lies about 6 miles SE of Little Rame Head. The bank stands on an area of uneven bottom, which tends to generate a confused sea in heavy weather. A depth of 20m lies 2 miles NNW of the bank; a depth of 25m lies 1.2 miles W of the same bank. Depths of 9.4 and 12m have been reported to lie 0.7 mile S and 1.2 miles W, respectively, of New Zealand Star Bank. Mariners are advised to give this area a wide berth.

From November to April, lobster fishing pots may be present within 3 miles of New Zealand Star Bank. They are marked by small spherical floats and occasionally by flagged buoys. Mariners are requested to keep clear of the area. From Little Rame Head the coast trends 8 miles NNE to Bastion Point, the coast between is about 91m high. As a continuous heavy swell rolls on this coast it should not be approached nearer than 1 mile; it is also fringed with sunken rocks. A conspicuous sand patch lies 1 mile SW of Bastion Point.

Bastion Point (37°34'S., 149°45'E.) is comparatively low, being only 25m high. The land behind the point, and between it and Little Rame Head, is densely wooded. A rock, 0.9m high, and a second rock, with a depth of 2.7m, lie 0.3 mile SW and

0.2 mile SE, respectively, of Bastion Point.

Tullaburga Island, about 4 miles ENE of Bastion Point, is a rock, 9m high, with little soil and a few bushes on the NE part. A historic wreck lies on the SE side of the island.

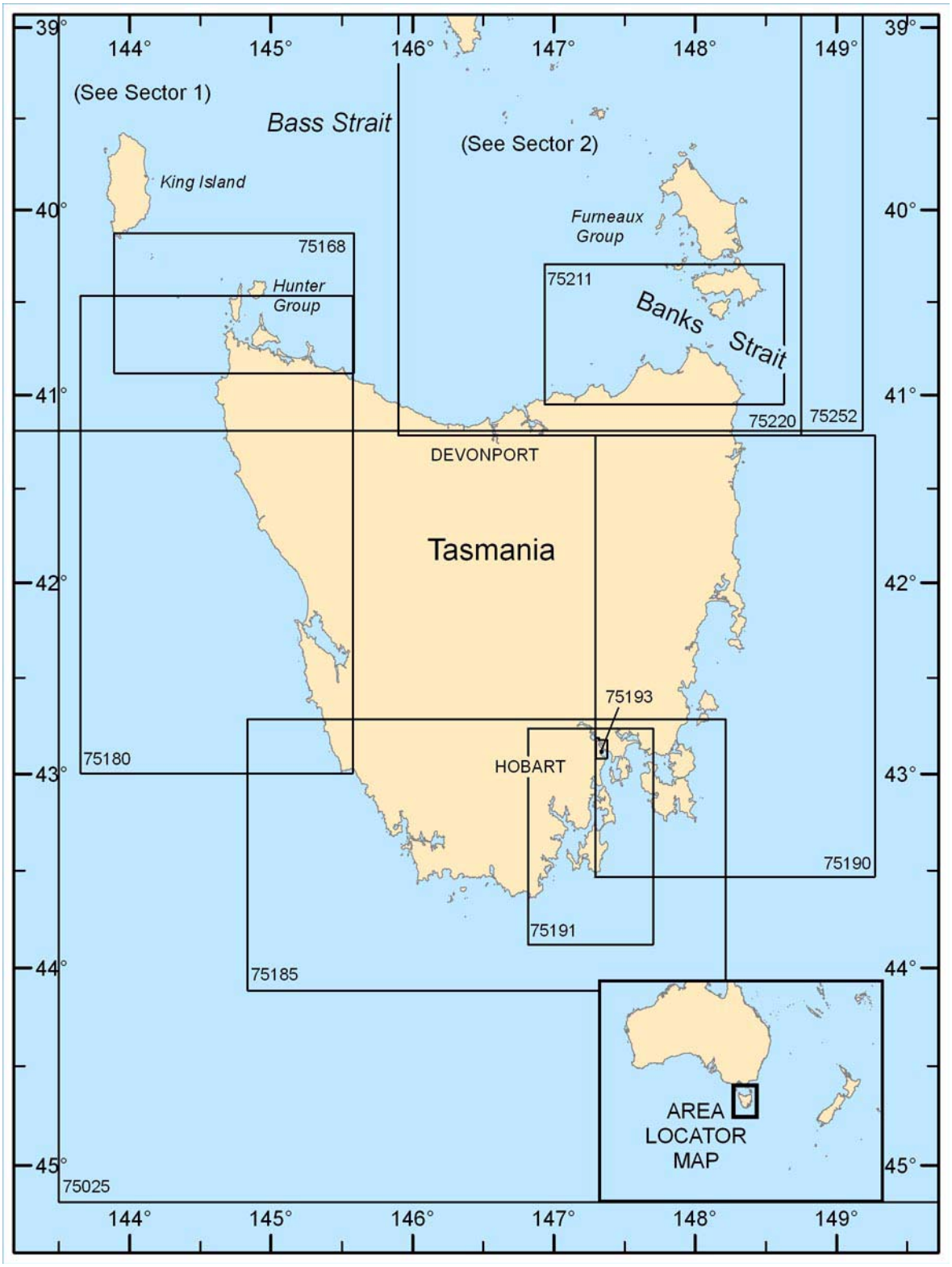
Gabo Island (37°34'S., 149°55'E.) is composed of red granite and has a fairly prominent monument near its center. The N end of the island tapers gradually to a point, which consists of low granite boulders. The W side of the island is covered with grass and dwarf bushes. Near the center are a few sand hills whose bare sides face the SE, and only show as sand hills in that direction; the highest of these hills has an elevation of 52m.

Gabo Island is reported to give a good radar return up to 14 miles.

Anchorage.—On the NW side of the island is a small sandy bay, with 9.1m of water in the central part, where there is good anchorage for one vessel, except in heavy SW gales. There is a submerged rocky ledge on the E shore. Several moderate SW gales have been ridden out in this bay. It is probable that a gale of some duration would have to blow direct into the bay before the swell would make the anchorage unsafe. Though there is often a heavy swell outside, scarcely any is felt at this anchorage.

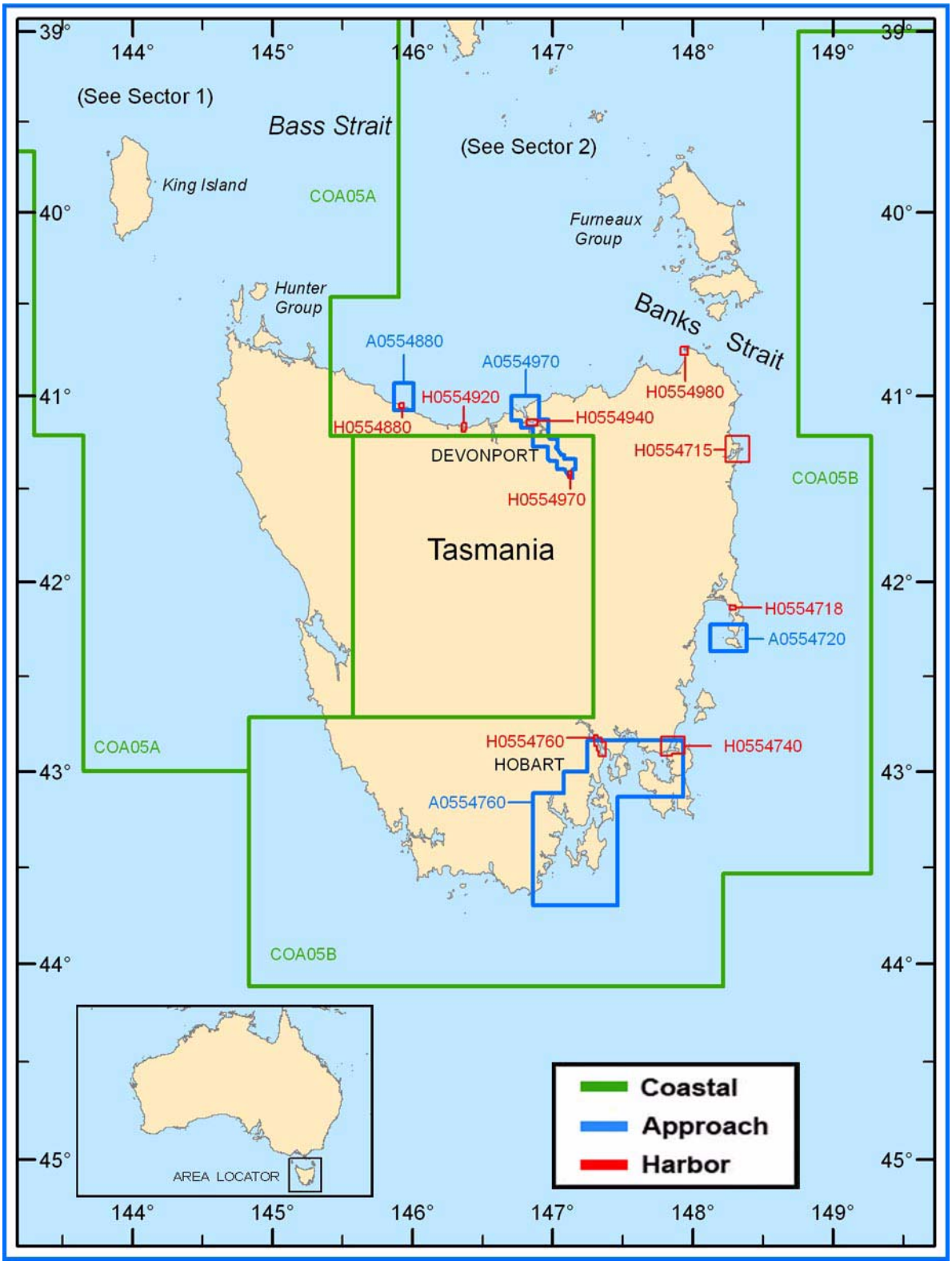
From **Telegraph Point** (37°33'S., 149°54'E.) the coast, which consists of bare white sand hillocks, the highest being 44m, trends NE 3.7 miles to a sandy point, with a ledge of dry and sunken rocks extending 0.5 mile to the S, on which the sea nearly always breaks. This point may be mistaken for Cape Howe, as its bare sand hills make it much more conspicuous than the cape.

Cape Howe (37°30'S., 149°58'E.), a low point composed of stones and sand, is described in paragraph 4.2.



Additional chart coverage may be found in NGA/DLIS Catalog of Maps, Charts, and Related Products (Unlimited Distribution).

SECTOR **3** — CHART INFORMATION



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SECTOR 3 — DNC LIBRARY INFORMATION

SECTOR 3

AUSTRALIA—COASTS OF TASMANIA

Plan.—This sector describes the coasts of Tasmania beginning with the N coast from E to W, followed by the W coast from N to S, and the E coast from S to N.

General Remarks

3.1 Tasmania is the most thoroughly mountainous island on the globe, being one continuous series of mountains, valleys, peaks, and glens. The highest mountains just exceed 1,524m. The S and W parts of the island are particularly remarkable for bold and commanding scenery. The coast, which is rocky and bold in its outlines, is broken by numerous inlets, many of which constitute good natural harbors. Rivers are numerous, and a few of them are navigable for a portion of their course. There are also several mountain lakes near the sources of the rivers; the largest, Great Lake, 1,164m above the sea, is about 12 miles long, and has an area of 11,200 hectares.

The whole N coast lies generally in very smooth water, with the prevailing winds being off the land and the long SW swell outside being interrupted by the islands at the W entrance of the strait.

The W coast of Tasmania is mostly rocky, of sterile aspect, with reefs fronting it to the distance of 3 or 4 miles in some places and a heavy swell usually rolling in upon it from the SW. The prevailing winds are from the same quarter and bring much bad weather, especially in the winter months of June, July, and August.

The S coast of Tasmania is rugged, abrupt, and barren. Some small islands lie from 3 to 12 miles off it. The projecting heads of land are supported by basaltic columns, like the Giants Causeway of Ireland, and it is without any known places of shelter from onshore winds, although it contains two or three sandy bays.

The E coast of Tasmania extends about 133 miles N from Cape Pillar to Eddystone Point. It contains numerous indentations, although few provide good anchorage. Mariners are cautioned that the inshore waters off the E coast of Tasmania have not been surveyed and less water than charted may exist.

Winds—Weather.—The climate, though differing in the E and W portions, the former being dry and the latter very wet, is generally favorable. Although the hot N winds of Australia do occasionally reach the island, they are greatly subdued in temperature by their passage over Bass Strait. The climate possesses the full summer heat due to its latitude, but the nights are always cool and refreshing.

The mean temperature at Hobart is 12°C. The maximum temperature of Hobart in summer is 41°C, which is rarely reached; in winter, it seldom falls below -2°C, though in the uplands it often falls to -8°C, producing ice of considerable thickness. The rainfall at Hobart averages 600mm annually, at Launceston it averages 700mm, and at Macquarie Harbor, on the W coast, the average is over 2,500mm. This area of the coast is very windy and often violent, but thunderstorms are rare.

The signs of the approach of a W gale on the S coast of Australia are so well marked that no vessel need encounter one unprepared. From May to October, if the barometer falls rapidly below standard atmospheric pressure, with a fresh and gusty N wind and heavy storm clouds gathering to the NW, a W gale is approaching. The N wind is usually light as the sky to the NW becomes overcast and the wind then shifts to NW in a heavy squall. In the lull before this squall, St. Elmo's fire is often seen on the ironwork of the masts and yards.

When the barometer rises and the wind shifts to the W and SW, the weather will begin to clear when the winds are well S of SW. Frequently the barometer remains nearly stationary or falls as the gales set in, and the force of the wind remains high for a week or 10 days, though the average of these winter gales is 3 to 4 days.

The months of October, November, and December have occasionally settled weather, with a preponderance of SE winds, though the W gales of October are frequently as severe as those experienced during the winter. An occasional gale is likely to be experienced in November, may be experienced in December, and sometimes, but rarely, may be experienced in the early months of the year.

The force of the SE wind in summer has been known to increase to a strong gale, about 48 hours in duration, which raises a very irregular cross sea as the constant SW swell does not subside with the SE wind. The gales are accompanied by a red haze and the barometer remains steady, but below average pressure for the time of year. The wind continues from the SE while the gale lasts, not changing its direction seaward or landward as in good weather. These gales are infrequent.

Fog is extremely rare on the S coast of Australia; the haze which comes with the sea breeze in the summer is occasionally sufficient to reduce visibility to a distance of 3 or 4 miles.

The prevailing winds on the W coast of Tasmania are from the SW and are accompanied by foul weather, particularly in the months of June, July, and August. Northwest and W gales are frequent.

In the bight of the N coast of Tasmania, between Circular Head and Cape Portland, there is almost a constant current to the E during the greater part of the year.

On the E coast, the set is generally to the S. On the W coast, the current generally sets to the N, particularly during the prevalence of SW and S winds.

Ice.—In addition to the severity of the climate which may be experienced in high latitudes, there is the danger of disrupted masses of ice and icebergs. The absence of these dangers can not be relied upon in any season of the year, they are, however, rarely encountered N of latitude 40°S. Between 40° and 45°S icebergs have been occasionally met with as far as 65°E; at 45°S as far as 135°E; and at 50°S as far as 140°E. Icebergs are seldom sighted between the meridians of 130°E and 170°W along the shipping routes.

Southeast of the Cape of Good Hope, midway between Kerguelen Island and the meridian of Cape Leeuwin, and midway

between New Zealand and Cape Horn, icebergs are most numerous. The periods of maximum and minimum frequency vary. It may also happen that while icebergs are being reported in the lower latitudes, the ocean in the higher latitudes is free of ice.

The dimensions of many of the ocean icebergs are remarkable. Icebergs of 5 to 20 miles in length are frequently sighted S of the 40th parallel and icebergs of 20 to 50 miles in length are not uncommon. As many as 4,500 bergs have been reported in a run of 2,000 miles, some with heights of 245 to 520m and lengths of 6 to 82 miles.

Caution.—Marine farms, some of which may not be charted, may be encountered in the sounds, bays, harbors, coves, and tidal rivers of Tasmania and should be avoided.

Eddystone Point to Port Dalrymple

3.2 Eddystone Point (41°00'S., 148°21'E.), 25m high, forms the N point of Bay of Fires. The point is reported to give a good radar return up to 18 miles.

The coast from Eddystone Point trends NW 10 miles to Cape Naturaliste, with several small points and bays between. Off the points are numerous granite boulders, some of which are 6.1m high.

Cape Naturaliste (40°51'S., 148°13'E.), 22m high, is faced by sand cliffs, but the coast about it is lower than that of Eddystone Point.

Mount Cameron, Mount William, and Bayley's Hill are the only remarkable hills in this vicinity. The highest peak of Mount Cameron lies 18 miles W of Eddystone Point. It is one of several peaks and the summit is conical; the ridge, of which Mount Cameron is the highest part, is over 3 miles in length in a NE-SW direction. Mount William, 9 miles NW of Eddystone Point, rises gradually to a rounded summit. Bayley's Hill, about 5 miles W of Eddystone Point, is broad and flat-topped.

George Rocks, a group of granite boulders, the highest of which is 20m, lies 4 miles NNW of Eddystone Point. These rocks occupy a space of 1.5 miles and, with the exception of the largest two, are quite barren. Scattered through the group are a few rocks that dry, but most of the rocks are from 3 to 9.1m high.

Caution.—Passage between George Rocks and the mainland is not recommended, due to the presence of above and below-water rocks scattered in the vicinity of George Rocks.

Eucalyptus Rock, which rarely breaks, lies about 8 miles NNW of Eddystone Point. Its location my be identified by kelp in the area. Salamander Rock lies about 3.5 miles ENE of Eucalyptus Rock. No distinct break has been seen on this rock. The rock lies in the direct track of vessels sailing between Melbourne and Hobart.

A depth of 27.4m has been reported to lie about 4.8 miles E of Salamander Rock.

Anchorage.—Great Musselroe Bay (40°49'S., 148°09'E.) affords good anchorage, in about 12m, about 1 mile NW of Cockle Bank (40°48'S., 148°11'E.).

Caution.—It is recommended that vessels unfamiliar with this area keep at least 3 miles outside Salamander Rock when proceeding to or from Banks Strait.

3.3 Swan Island (40°44'S., 148°06'E.) is of gray granite, but sand hills covering the granite give it the appearance of being nearly all sand. Swan Island Light is obscured from the SW.

Tides—Currents.—Spring tides rise 2m. The flood current sets to the NW; the ebb current sets to the SE at a velocity of 3 knots at spring tides, influenced however, by the wind.

Anchorage.—Anchorage can be taken off a small sandy bay on the SE side of Swan Island. The bottom is rock, or sand over rock; the holding ground is bad. It is not advisable to anchor at Swan Island if W gales are expected, as it is not uncommon for the wind to shift to the SE.

Caution.—Due to the strength of the tidal currents, vessels using the passage between Swan Island and the mainland should give a wide berth to the foul ground on each side.

3.4 Banks Strait, which separates the Furneaux Group from Tasmania, may be said to extend between Goose Island to the NW and Eddystone Point to the SE.

In the strait, with a head wind, it is generally impossible for sailing vessels to work to the W during the ebb current; the custom is to anchor either under Swan Island or in Musselroe Bay. Occasionally, small vessels anchor off the Little Mussel Roe River, the water there being shallower.

Numerous unmarked shoals frequent the NE coast of Tasmania, and the navigation of Banks Strait consequently requires care. The bottom consists of sand and in some parts rocks.

Winds—Weather.—During the survey of Banks Strait, the heaviest and most frequent gales (generally from the W) were experienced in the months of September, October, and November.

On the termination of a W gale, the wind in the vicinity of Banks Strait sometimes shifts to the SW, the barometer reading a little above 1003mb. The wind seldom blows home with much strength, but sufficiently so, with the swell rolling in simultaneously to necessitate leaving the anchorages, which are open to the SE. All anchorages in Banks Strait which are exposed to the SE require great caution in their use, owing to the uncertain nature of the winds.

Tides—Currents.—The flood current is the W current and the ebb the E; the currents are each of 6 hours 12 minutes duration at springs; but during neaps the flood runs 7 hours and the ebb 5 hours 30 minutes.

In the narrowest part of the strait (8.5 miles wide), between the Swan Islands and Clarke Island, the tidal currents run at the velocity of 3 knots at springs; W winds accelerate the E current, which occasionally attains a velocity of 5 or 6 knots.

At springs, in the middle of Banks Strait, the E is the stronger of the tidal currents. At such times, either current, when opposed to the wind, causes a high topping sea, somewhat dangerous for small craft.

3.5 Cape Portland (40°44'S., 147°56'E.) is low and rocky. Anchorage with holding ground reported good, is available in Foster Inlet. The anchorage in the lee of Maclean Island provides excellent protection in E gales.

The best channel into the bay is between Cape Portland and the shoal area extending N from Maclean Island. There are no dangers in the approach, but a careful watch should be kept on the vessel until past Cape Portland owing to the strong tidal

currents in this vicinity. On one occasion during a survey, the strength of the current was observed to be 5.5 knots, setting in a NE direction. This causes very dangerous overfalls and tide rips. The tidal currents inside the inlet are weak, seldom running at more than 0.5 knot.

The rocks N of Maclean Island, which dry at LW, are nearly always visible as they usually break.

Waterhouse Point (40°49'S., 147°40'E.) is the rocky termination of a range of hills descending from Hardwickes Hill, about 3.2 miles SW. The point has a reef of rocks, pinnacles of which dry at low water, projecting 0.3 mile to the N.

The coast from Waterhouse Point trends SW 1.5 miles to a small point abreast Little Waterhouse Island. This part of the coast has a sandy beach, with numerous dry and sunken rocks extending 0.3 mile from the shore.

Waterhouse Island, about 1.7 miles W of Waterhouse Point, has an even summit, 45m high, and falls gradually at its N end. In some parts there are a few trees, but the island is nearly cleared of timber.

Tides—Currents.—Spring tides rise 2.4m. The flood is the W current, and its velocity about 2 knots at the anchorage.

Anchorage.—The anchorage between Waterhouse Island and Waterhouse Point, on the E side of the island, is a safe and useful anchorage, affording shelter from E or W gales. Anchor as convenient in the channel, either near the SW end in 9.1m, about 0.3 mile off the only sandy beach on the SE side of the island, or in the N part of the channel, over a sandy bottom, in about the same depth, near a patch of 5.5m, with Croppies Point (40°49'S., 147°36'E.) over the W extremity of Little Waterhouse Island, bearing 223°.

The N entrance to the anchorage is encumbered by shoals of 4.2 to 6.4m, and by the bank extending 0.5 mile E from Waterhouse Island.

3.6 Papanui Rock is a rocky patch about 0.5 mile in extent, over which the sea breaks. Located about 3.7 miles NW of the N extremity of Waterhouse Island, it has a depth of 2.7m over its shallowest part, with depths of 25.6 to 34.7m close around it.

South Croppies Point lies nearly 1 mile SSW of Croppies Point, with two small points and exposed sandy bays between. Croppie Rock, with a depth of 3.3m, lies 0.5 mile bearing 307° from South Croppies Point.

About 2.2 miles SW of South Croppies Point is a rock 2.7m above HW, and about 0.5 mile further in the same direction a rock 0.6m above HW. These rocks are about 1 mile offshore.

From South Croppies Point, the coast, a sandy beach backed by sand hills which attain an elevation of 43m, trends in a SW direction for about 11.5 miles to the head of **Anderson Bay** (40°57'S., 147°27'E.), where the Great Forester River and the Brid River discharge themselves into the sea. The coast then trends in a NW direction for about 5 miles to East Sandy Point, being of a rocky and broken nature.

The mouth of the Great Forester River is blocked by a sandy bar, which dries at LWS. The outermost rocks in this vicinity are always above water.

Southern Cross Reef, with a least depth of 1.8m and which is steep-to on the N side, lies nearly in the middle of the bay.

Anchorage.—Anderson Bay generally affords shelter only with S winds, but fair shelter has been obtained in W gales, 0.5 mile SE of East Sandy Point, in 9m, sand, good holding ground. In approaching this anchorage care must be taken to avoid a rocky ledge projecting from a point located about 1 mile SE of East Sandy Point, and the reef near the center of the bay, mentioned above.

East Sandy Point (40°56'S., 147°21'E.) is formed by a long low ridge extending in a N direction from the high ground inland. The cape terminates in a conspicuous sand hill, 38m high, which shows a bare face to seaward except in a W direction. A ledge of rocks, which covers and uncovers, with no outlying dangers, stretches 0.2 mile N from the cape.

West Sandy Point, about 3 miles W of East Sandy Point, is formed by a series of low sand hills fronted by shelving rocks.

Caution.—A rocky patch, which breaks heavily in bad weather and has a depth of less than 1.8m at LW, lies 0.8 mile N of West Sandy Point. Two miles W of the point, Flat Rocks Reef, detached ledges which mostly cover at about three-quarter flood, extend 1 mile from the shore. The soundings off this coast are irregular and it should not be approached nearer than 2.5 miles.

3.7 **Ninth Island** (40°50'S., 147°16'E.) is flat-topped, devoid of trees, and nearly covered with grass. The depths around the island are irregular, especially N and E of it, where there are patches of 9.6m at 1.2 mile distant.

From West Sandy Point, the coast trends SW for about 7 miles, then W about 7 miles to Stony Head. Noland Bay is the E part of this indentation. Its shore is sandy, with sand hills 9.1 to 21.3m high, and fronted by ledges of rocks which cover and uncover. Nearer Stony Head, the land becomes more elevated and is faced by cliffs 12.2 to 30m high.

Stony Head is a conspicuous headland, 98m high, with cliffs and broken ground, 37m high, seaward of its summit. This headland is the extremity of a range of hills sloping down from the inland mountains, the most conspicuous of which is Ryans Hill, 229m high, about 2.5 miles S of the head.

Tides—Currents.—Spring tides rise about 3m. The flood is the W current and sets parallel to the shore; the ebb is the E current. In the channel between Stony Head and Tenth Islet, about 2.7 miles NW and near salient points, the currents attain a velocity of about 1 knot. As the distance from the shore increases, the tidal currents become weaker and affected by prevailing winds.

3.8 **Five Mile Bluff** (41°01'S., 146°52'E.) lies about 7 miles WSW of Stony Head.About 1 mile W of Stony Head, there is a slight projection fronted by shelving rocks and shallow water, which should be given a berth of 1 mile.

Two Mile Reef lies about midway between Five Mile Bluff and Low Head (41°03'S., 146°47'E.), the E entrance point of Port Dalrymple. The reef extends from the shore in a NW direction for 0.8 mile, and shoal water extends for 0.5 mile farther in the same direction. This reef covers at half tide.

Vessels are liable to be set by the ebb current into the bay between the Two Mile Reef and Low Head. Between Five Mile Bluff and Low Head a vessel should keep offshore at least 2 miles, as inside this limit the sea breaks heavily with onshore gales.

Caution.—A gas pipeline, best seen on the chart, has been constructed and extends from Five Mile Bluff, N across Bass

Strait, to Ninety Mile Beach on the mainland.

Gas pipelines contain flammable gas under high pressure. Any ship damaging the pipeline would face an immediate fire hazard. Mariners are cautioned not to anchor or trawl in the vicinity of the pipeline.

3.9 **Hebe Reef** (41°03'S., 146°45'E.), the outermost danger off the entrance of Port Dalrymple, is about 0.5 mile in extent, mostly in an E and W direction. The small portion of its center, which covers at half-tide and is marked by a light, lies about 2.2 miles W of Low Head. A bank, with a depth of 5.5 to 6.4m, extends 0.5 mile E from the reef, but there are 11m and 12.8m depths at less than 0.3 mile N and S of the reef. In good weather the sea runs over the reef without breaking. Two 10.1m patches lie 0.5 mile W and SW, respectively, of the drying portion of Hebe Reef.

West Head (41°04'S., 146°42'E.), the W entrance point of Port Dalrymple, projects 0.7 mile from the line of coast and is nearly 0.5 mile broad. Rocks, which dry 0.6m, extend 0.3 mile N from the point.

Port Dalrymple to Launceston

3.10 Port Dalrymple lies at the mouth of the River Tamar, which flows through a valley between two irregular chains of hills that project out NW from the great body of inland mountains. In some places, these hills are wide apart and the river then widens to a considerable extent; in others, they nearly meet and contract it to narrow limits. Of the two chains of hills which bound the valley, the E one terminates at Low Head. The other chain descends to Badger Head, about 6.5 miles WSW of Low Head.

The ends of these chains, when seen from directly off the entrance, appear as two clusters of hills having some resemblance to each other. In good weather the distant blue heads of the black mountains are seen over the tops of both clusters.

The port limits are a line drawn from the N extremity of West Head, NE to the highest part of Hebe Reef, then ESE to the N extremity of Low Head.

Tides—Currents.—At the pilot station, springs rise 3.1m, neaps 2.8m. The rise is irregular, the greatest observed being 3.1m and the least 1.2m. The highest tide noticed was during the neaps, caused by a strong NW gale. The flood current runs at a velocity varying from 2 to 5 knots, according to whether the river is in a confined or open area. The ebb current setting around Low Head into the bay to the E drifts vessels in that direction. At 3 miles in the offing, the flood current runs WNW at 1 to 2 knots.

At Low Head, the flood current runs for 50 minutes; at Georgetown it runs for 40 minutes, after HW by the shore; springs rise 3m.

At Launceston, springs rise 4m. During winter, after rains, the current sets down for several days at a velocity of 1 to 3 knots.

Depths—Limitations.—Sea Reach Channel has a least depth of 10m (1999). This is the controlling depth for Bell Bay and Beauty Point. Vessels are required to have an underkeel clearance of 1.4m. The maximum permissible draft is 9m at LW and 11.1m at HW. Vessels up to 168m in length can enter the port at any time, draft permitting. Vessels over 168m in length may enter only during the flood current and may enter at night only at the discretion of the pilot.

The channel between **Rosevears** (41°19'S., 147°00'E.) and Launceston had a least depth of 3m (1998) as far as Kings Wharf, 38 miles from the entrance, to which vessels of 100m in length with a maximum draft of 5.5m can proceed at HW.

In the lower reach of the Tamar, the channels along Beauty Point, Bell Bay, and Long Reach have least depth of 10.8m. A marine farm has been established along the S bank of Long Reach 0.5 miles W of Middle Point.

Pilotage.—Pilotage is compulsory for vessels 35m long or over, unless an exemption certificate for the port is held. Vessels making appropriate signals should wait in the offing about 0.5 mile E of the range or, if necessary, at the anchorage until instructed by the pilot station to proceed to pick up the pilot. Pilots usually board 3.3 miles NW of Low Head Light in position 41°00.7'S, 146°44.3'E. Vessels requiring a pilot to enter Port Dalrymple should not proceed S of 41°01'S.

The pilot boat, painted orange, displays the sign "PILOT." The pilot station is located on the N side od Pilots Bay.

The pilot station, pilot launch, and tugs are equipped with VHF channels 12 and 16; the call sign is "Tamar Pilot." The pilot station is on the air about 1 hour prior to a ship's arrival if notified of the arrival time. If contact is required earlier, Launceston Radio may be called and the pilot station will be notified by telephone.

Vessels of less than 107m in length may, when during heavy weather and so instructed by the pilot station, proceed into the harbor just within Shear Rock, located about 0.3 mile W of the pilot station. Larger vessels, when unable to board the pilot, may be instructed to remain outside until the weather moderates. Vessels above 170m in length overall are only taken in during flood tide. Vessels exceeding 250m in length or 45m beam must contact the harbormaster for instructions.

Entry is dependent on the vessel's draft coordinating with tide cycle at George Town. A vessel would enter during a period between LW and 30 minutes after HW at George Town; usually the pilot boards 15 minutes before such time.

Regulations.—The vessel's ETA should be advised by radio 24 hours before arrival. Vessels should maintain a listening watch on VHF channels 12 and 16 while at anchor or transiting the river.

Anchorage.—Anchorage is available outside the harbor entrance, in 25 to 30m, good holding ground, 1.5 to 2 miles NW of Low Head. Care should be taken to avoid the 8.7m patch reported NNE of the anchorage although its existence is extremely doubtful. This anchorage is not recommended in N winds in excess of force 5, as vessels are liable to drag their anchors.

Caution.—Considerable effect of local magnetic anomalies cause the compass unusable at the approaches and in various stretches of the River Tamar.

There are unsurveyed areas and inadequately surveyed areas at the approaches and inside the River Tamar where reefs and shoals are present.

The E shore of Port Dalrymple, from Low Head, trends 1.7 miles in a SE direction to She-Oak Point, and consists of alternate points and small bights, bordered by a shoal, the 5.5m edge of which projects 0.1 to 0.4 mile from the LW line. The shoal extends as a spit 0.1 mile NW from Low Head; off Dotterell Point, 0.3 mile S of the light, it projects 0.4 mile W, near-

ly to Middle Bank.

3.11 Middle Channel, the main entrance, lies between the Middle Bank, on the NE, and Yellow Rock, on the SW side. It is nearly 0.2 mile wide, with a least depth of 15.8m on the entrance range. Middle Bank (41°03'S., 146°47'E.), the most dangerous shoal in the entrance of Port Dalrymple, is a rocky patch 0.3 mile long and 0.2 mile wide, located 0.5 mile WSW from Low Head, with depths of 2.1 to 3.7m over its outer part. The sea breaks heavily over this bank in bad weather; and there are always heavy tide ripples on the ebb and flood. A light stands on the SW extremity of the bank.

Barrel Rock, which uncovers at half ebb, is marked by a beacon and lies about 0.7 mile S of the light structure on Low Head.

Barrel Spit, a rocky ledge with less than 3.7m at LW, extends from the beacon 0.2 mile in a S direction, the S extremity of which, with 4.1m of water, is marked by a lighted beacon.

Range lights are shown from two towers, painted white with a vertical red stripe, on She Oak Point, about 1.7 miles SSE of Low Head. The lights are 0.2 mile apart and kept in line bearing 128° lead through Middle Channel.

For vessels approaching from the NE, these lights will be seen showing white and red across the neck connecting Low Head with the mainland, but farther W they will be shut out by the high land of Low Head until the entrance to the river opens to the SE, when both lights will be seen showing red.

The inner reach of Middle Channel, from Middle Bank to just inside of Shear Rock, is marked by two lighted beacons standing about 0.3 mile N of She Oak Point, and in line bearing 123°, lead about 0.1 mile NE of Shear Rock.

On the S side of the middle channel, about 0.7 mile SW of Low Head, is Yellow Rock, marked by a lighted beacon, an extensive patch of kelp with a double-headed rock, on which the least depth is 2.7m. This rock forms the E extremity of West Reef, the N edge of which extends from it nearly 0.8 mile in a W direction. This reef is about 0.3 mile wide, but the only part of it uncovered at HW is Black Reef, which is 0.6m high, near the center, about 1 mile SW of Low Head.

Shear Reef, marked by a beacon, dries 2.1m and is connected with West Reef by shoal water where the greatest depth does not exceed 4.6m. A spit, with a depth of 2.7m on its extremity, projects 0.1 mile NE from Shear Reef. Shear Rock, with a depth of 0.3m, lies just within the end of the spit.

A light is shown from the S side of the channel, close E of Shear Rock, in a position about 0.8 mile S of Low Head.

3.12 Sea Reach Channel has a least depth of 10.4m over the outer edge of Honduras Bank. Toroa Patch, with a dredged depth of 10.4m on the range line, lies about 1 mile S of She Oak Point. The patch has a least depth of 7.6m close E of the channel and must be avoided by deep-draft vessels. Honduras Bank lies about 1 mile S of She Oak Point, with a depth of 3.3m on its E part, extends about 0.4 mile from the W shore and is marked by a lighted beacon.

The W side of Sea Reach Channel is marked by a lighted beacon on Northwest Bank in a position about 0.4 mile WNW of She Oak Point, and by a lighted beacon standing on Elbow Spit about 0.6 mile SSW of She Oak Point.

A light shown from a position about 0.3 mile SSE of the light structure on Low Head forms a range of 345.5° with that light, to lead through Sea Reach Channel to Elbow Spit.

Simmons Mistake is a reef extending out from the E shore in a position about 0.5 mile S of She Oak Point. The W edge is marked by a lighted beacon.

A lighted beacon stands about 1.2 miles S of Simmons Mistake. It marks the edge of a flat extending W from George Town.

Bombay Rock (41°06'S., 146°48'E) located 0.3 mile NW from the above beacon, has a depth of 3.6m and is marked on its NW edge by a lighted beacon.

Two lighted beacons, situated on the S shore of Kelso Bay on the W side of the channel, in line bearing 182.2°, give the line of the channel past Honduras Bank and Bombay Rock.

Kelso Bay is filled with a flat that extends about halfway across the river towards George Town. The N extremity of this flat forms a spit, with a depth of 0.9m, marked on its NW edge by a lighted beacon.

Garden Island is a small island located on the W side of the channel, SSW of George Town. Three lights are shown along the E shore of Garden Island. A beacon stands on the NE side of the bank, 0.3 mile NW of the SW extremity of Garden Island, and a lighted beacon stands 0.2 mile farther NW.

Range lights stand on the E shore about 0.5 mile S of George Town, and in line bearing 126°, show the line of the channel to Garden Island; a reciprocal pair of range lights, bearing 306°, stands on the opposite shore.

Power cables cross the river in an E-W direction from a position about 0.1 mile S of Saltpan Point. The cables are marked on both shores by two beacons; anchorage is prohibited within 0.1 mile either side of the beacons.

A light is shown from Point Effingham in a position about 1 mile SSE of Saltpan Point. Tugs usually meet vessels off this point.

Shag Rock, about 0.3 mile SW of Point Effingham, is just covered at HW. There is deep water close around the rock, and 34.7m between it and the shore. A beacon marks the rock and a light is shown about 100m SE of the rock.

Caution.— A historic wreck, with an associated restricted area, lies 10 miles WSW of Moonlight Head and can best be seen on the chart.

3.13 **Beauty Point** (41°09'S., 146°49'E.) (World Port Index No. 54943) stands on the W shore of the River Tamar. The Beauty Point Wharf extends about 150m from Beauty Point, 0.5 mile S of Inspection Head. Five dolphins lie NNW and two dolphins SSE on the line of the end of the wharf. A marina is situated NW of the wharf. A charted area, prohibited to navigation, lies off the pier.

Inspection Head Wharf, with two berths, lies about 0.5 mile N of Beauty Point and close S of Inspection Head. The wharf has a length of 335m and a depth of 9.9m alongside. There is swinging room of about 200m, with a least depth of 9.9m, abreast the N end of the wharf. A light is shown from the N extremity of the wharf.

The channel leading to Inspection Head Wharf has a least depth of 18.3m and is marked by beacons and lighted beacons. A light stands on Orari Bank, a 3.9m patch, that lies on the E side of the entrance. A pile beacon, showing a light, stands in 4.6m, about 0.1 mile E of Inspection Head Wharf and marks

the W edge of the shoals E of the channel.

The channel from Inspection Head to the wharf at Beauty Point has a least depth of 12.2m in the fairway.

From the entrance to Beauty Point the channel trends E, passing N of Middle Island to Bell Bay. The channel is marked on each side by lighted beacons.

3.14 Port Dalrymple (41°08'S., 146°52'E.) (World Port Index No. 54940), also known as Bell Bay, is the largest port in Tasmania and lies on the N shore of the River Tamar. The port is sheltered from prevailing winds and has ample space and depth to allow large vessels to swing and berth under their own power. The industrial complex of Bell Bay stands on the W shore. The Comalco Works is a prominent feature. The channel leading to Bell Bay has a least depth of 10.4m and is marked by lighted beacons. An underkeel clearance of 1.4m is required by vessels, with a maximum allowable draft of 9m at LW and 11.5m at HW. Local knowledge is necessary.

The quarantine lines for Port Dalrymple are, as follows:

1. A line drawn 152° through Saltpan Point (41°06.4'S., 143°48.9'E.) and Point Effingham to the S shore. This line affects vessels approaching Bell Bay and Launceston.
2. A line drawn from Inspection Head 079° to Middle Island. The line affects vessels approaching Beauty Point Harbor.

Quarantine clearance can be obtained at any time, day or night.

Anchorage.—Good anchorage can be taken in 8m about 0.2 mile NW of Bell Bay No. 2 Light, with soft regular bottom, and out of the strength of the current, where a vessel not having a docking pilot or berth is recommended to wait before proceeding to Bell Bay or Launceston.

Anchorage is prohibited in the vicinity of submarine cables and pipelines as portrayed on the chart in the area between Clarance Point and Saltpan Point, Anchor Point and Deceitful Cove, NW of Point Effingham, and at the entrance to West Arm.

An extensive bank, with depths of less than 5.5m, fronts the SW shore of Long Reach. The bank, extending up to 0.6 mile offshore, congests the channel from Bell Bay to Little Dragon Beacon (41°10'S., 146°54'E.), and includes West Olverine Shoal. A marine farm lies just W of Great Dragon Beacon.

Shoals, with depths of 4 to 5.2m, lie about 0.2 to 0.3 mile N from Point Rapid, nearer to the S than the N shore. The main channel is to the E of the shoals.

From Point Rapid, the W shore of Moriarty Reach trends SW 1 mile to Ruffins Bay, off the S point of which there are some rocks marked by a beacon, and then sweeps around in a SSW direction about 1.2 miles to a point close off which is Drumstick Islet, with sunken rocks along its SE side marked by beacons.

The E shore of Moriarty Reach from Long Reach trends SW 1 mile to Sheep Tail Point, then 0.5 mile S to another point. Between this point and Rockey Point, 0.7 mile SSW, lies Redwood Bay.

At the entrance of this bay is Reids Rock, which uncovers at half-ebb and is 0.2 mile long, NNE-SSW, with a red beacon on it. The channel between Reids Rock and the W shore is 0.1 mile wide, with a least depth of 14.6m.

Redwood Islet lies 0.1 mile SW of the SW point of the bay just described, from which point the shore trends SSW 0.5 mile to the E point of the NW entrance of Whirlpool Reach; the channel between Redwood Islet and Drumstick Islet is 0.1 mile wide, with a least depth of 21.9m.

3.15 Whirlpool Reach, from its NW entrance, trends SE nearly 1 mile and is less than 0.1 mile wide, with irregular depths of 12.8 to 36.6m.

Whirlpool Rock is just within the NW entrance of Whirlpool Reach. It is composed of numerous pinnacles of blue stone, intermingled with thick clay, and is about 36.6m by 27.4m in extent at LWS. It lies nearly in the center of the channel and 150m from the E shore, and has a depth of 4.6m. This rock narrows the main channel, which lies to the W, to about 100m.

Two white beacons on the E shore, when in line, show when a vessel is abreast of the rock. The alignment of two beacons on Oak Bluff clears close SW of the rock.

The Batman Bridge crosses Whirlpool Reach, at the narrowest part, from Oak Bluff to the E shore. The bridge, with a vertical clearance of 27.7m, is marked by lights at each side of the span and at the E tower.

From the SW side of the SE entrance of Whirlpool Reach, the SW shore trends SE nearly 1.5 miles and then SSE 1.2 miles to the Supply River.

Spring Bay, a bight which indents the shoreline about 1.5 miles, is located between the SE entrance to Whirlpool Reach and Mowbray Point, about 1.2 miles farther SE. At 0.3 mile within the entrance is Middle Bank, with a depth of 1.2 to 5.5m. There is a channel with depths of 11 to 20.1m all around the bank.

Anchorage.—Anchorage can be taken, in 9.1 to 14.6m, sand and shell, between the SE entrance to Whirlpool Reach and Middle Bank.

From Whirlpool Reach to Mowbray Point, the depths in the fairway are 14.6 to 31.1m. About 1 mile SSE of Mowbray Point, a shoal bank, with depths of 6.9 to 7.8m, extends across the channel to a drying spit that extends NW from Egg Islet.

Anchorage.—Anchorage can be taken, in 11.4m, about 0.4 mile SW of Egg Islet.

3.16 Hillwood Explosives Wharf is situated on the N shore about 0.5 mile E of Egg Islet. The timber-berthing head is about 20m long, with a depth of 4.6m at the outer end of the wharf.

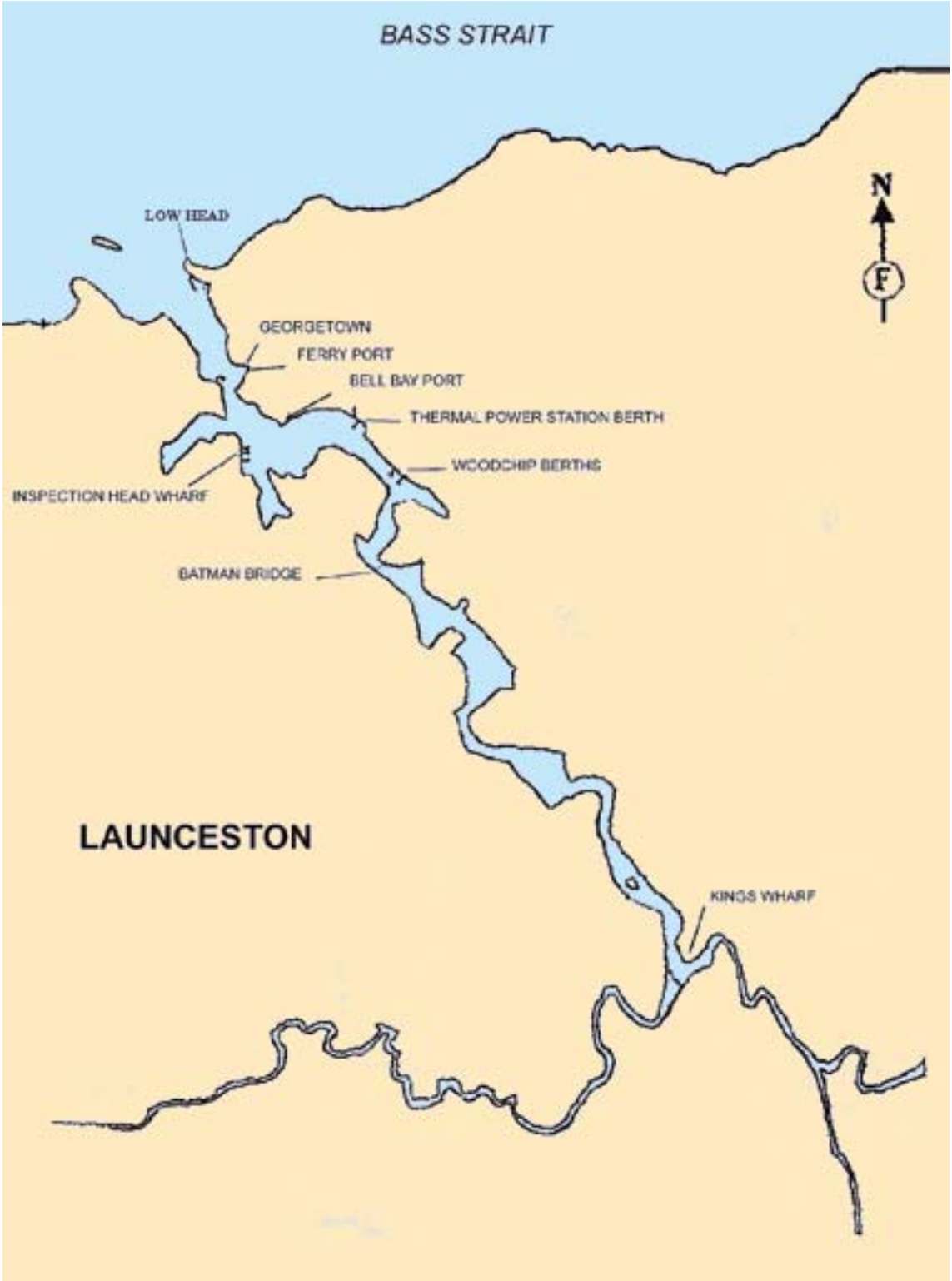
From Egg Islet, the channel trends ESE 1.5 miles past Swan Point and is 0.3 mile wide, with depths of 14.6 to 25.6m between the NE shore and the shoals which extend from Swan Point. A submarine cable is laid from Swan Point in a NNE direction to the opposite shore. A beacon stands on the shore at each cable landing.

The river then increases to 1 mile in width, but the channel is only 400m wide or less, with depths varying from 8.8 to 19.2m. South from Stony Creek, about 2.5 miles S of Swan Point, the river contracts to 0.3 mile in width, the channel here being only 200m wide.

Gem Rock, at the entrance to Stony Creek, is dry at LW and marked by a beacon.

About 0.5 mile S of Stony Creek, there is a jetty with a depth of 3.4m alongside its outer end.

From Stony Creek the river sweeps around E 2.7 miles to



Launceston and the River Tamar

Cimitiere Point and is generally about 600m across. The channel being 150 to 200m wide, with depths of 5.5 to 17m in the fairway.

From Cimitiere Point to Launceston, the channel, with a least depth of 3m, is indicated by numerous lighted beacons, but it is unnecessary to describe it, as a pilot or local knowledge is absolutely necessary.

Caution.—An overhead cable, crossing the river about 0.5 mile above Launceston, allows a maximum air draft of 28m. A power cable, with a safe vertical clearance of 26.5m, spans the River Tamat 100m S of Ti-tree Bend.

3.17 Launceston (41°27'S., 147°07'E.) (World Port Index No. 54970), the second city in Tasmania, is situated at the head of the River Tamar, which, following the winding course of the river, is 38 miles from the sea. It lies in a valley enclosed with hills.

Depths—Limitations.—The width of the channel in the approach is about 122m. Owing to the narrowness of the channel, passing vessels cause a considerable scend, rendering it necessary for those in charge of vessels lying alongside the wharves to keep a careful lookout on the moorings.

Vessels up to 100m in length and with a draft of up to 5.3m can proceed to Launceston.

The Town Pier at Launceston has a berthing length of 135m with a depth of less than 3m alongside and is subject to silting. The swinging basin opposite the wharf has the same depth.

The Synchrolift Berth is situated at the N end of the disused King's Wharf. It has a length of 105m and a depth of 4.5m alongside.

Pilotage.—See paragraph 3.10.

Launceton to Devonport

3.18 Badger Head (41°06'S., 146°39'E.) and another projection 1.5 miles S of Badger Head, are rocky and the NW termination of the Asbestos Hills, in which the mineral of that name is found. The hills are from 289 to 396m high, and in clear weather are conspicuous from seaward. From the rocky projection S of Badger Head, a low coast curves in a SW direction 4 miles to a spit forming the SE side of the entrance of Port Sorell.

Port Sorell (41°08'S., 146°33'E.) is only available for small craft and boats.

From the NW entrance to Port Sorell, the coast trends 7.5 miles SW to the entrance of the River Mersey, and may be approached within 1 mile in from 7.3 to 12.8m, except at about 4.5 miles W of Port Sorell, where Horseshoe Reef extends 1.5 miles from the shore.

Egg Islet and Wright Islet are two rocks, one on the N and the other on the SW part of Horseshoe Reef, which consists of detached dry and sunken rocks.

Devonport (41°11'S., 146°22'E.)

World Port Index No. 54920

3.19 Devonport has, next to Port Dalrymple, the best and most secure anchorage on the N coast of Tasmania. The entrance to Devonport may be easily recognized by its W head, Mersey Bluff, high land with a light on it. A reef, discernible from the broken water on it, projects 0.1 mile from the shore between the bluff and the river entrance.

The River Mersey, which flows into Devonport, is navigable for a distance of about 1.5 miles. A training wall, situated on the E side of the entrance channel, is awash at HW in two places and the outer end is submerged.

Port of Devonport

http://www.tasports.com.au

Tides—Currents.—Both the flood and ebb currents attain a velocity of 1 to 2 knots inside the river, but after heavy rains the ebb has been known to run 4 knots.

There is always an eddy off the wharf on the W side of the channel. This ceases for an interval of about 10 minutes at SW. On the flood, this eddy, which runs parallel to the wharf, is only felt at a distance of about 30m. On the ebb the eddy sets onto the wharf.

Outside the port, the flood is the W current and is not felt beyond 5 miles from the coast.

The average range of the tide has been observed to be 3m.

Depths—Limitations.—There is a bar across the entrance consisting of sand, which does not alter, except during a NW gale, when it may silt up slightly.

A dredged channel, about 76m wide, leads through the entrance of the harbor to a 300m wide turning basin, about 1 mile above the entrance. The entrance channel is maintained to a depth of 9.5m; the turning basin is maintained to a depth of 9.2m. There are no air draft restrictions in the port area.

Four berths are on the W bank of the River Mersey with three berths on the E bank. as follows:

1. Berth No. 1 East is used for passenger and freight ferries. It can accommodate vessels up to 195m in length and has a depth of 6.7m alongside. This berth also has a stern ramp 11.4m in width.
2. Berth No. 2 East is for ro-ro, container, and general cargo vessels. It can accommodate vessels up to 195m in length and has a depth of 8.8m alongside. This berth also has a stearn ramp 23m in width.
3. Berth No. 3 East is a general purpose berth handling containers, general cargo, bulk clay, gypsum, and fertilizer. It can accommodate vessels up to 200m and has a depth of 10m alongside.
4. Berth No. 1 West handles bulk cement. It can accommodate vessels up to 190m and has a depth of 9m alongside.
5. Berth No. 3 West handles general cargo and bulk tallow. It can accommodate vessels up to 180m in length and has depths ranging from 5.2 to 6.3m alongside.
6. Berth No. 4 West handles oil products, bulk tallow, containers, livetock, and general cargo. It can accommodate vessels up to 205m in length and has a depth of 9.5m alongside.
7. Berth No. 5 West is used by tankers and passenger vessels. It can accommodate vessels up to 110m in length and has a depth of 5.5m alongside.

Pilotage.—Pilotage is compulsory for all foreign vessels and any vessel exceeding 35m in length. The pilot boards all vessels, weather permitting, in an area about 3 miles NE of Mer-

Devonport

sey Bluff. Vessels requiring pilots should hold at latitude 41°07'S.

Vessels requiring the services of a pilot are advised to radio their ETA and draft 12 hours prior to arrival.

Signals.—A fixed blue light by night, and an orange-colored shape displayed by day, shown at the masthead of the pilot station flagstaff, indicate that a vessel is leaving the port, when the channel is closed to incoming vessels.

Regulations.—The quarantine line for the port is drawn 090°-270° through Mersey Bluff Light.

Anchorage.—Anchorage can be taken 2 miles NNE of Mersey Bluff Light. Caution should be exercised when anchoring in NW winds.

Devonport to Burnie

3.20 The **River Don** (41°10'S., 146°20'E.), about 1.5 miles W of Devonport, is narrow and shallow with two or three villages within. Don Bluff is higher than Mersey Bluff, and has cultivated land and dead trees upon it. A reef, which projects 0.3 mile from Don Bluff, serves to break the sea from the immediate entrance.

A radio mast stands on Don Hill, about 1 mile W of Don Bluff; another radio mast stands on a 79m hill, about 0.5 mile S of the first.

The **Forth River** (41°09'S., 146°15'E.), the mouth of which forms Port Fenton, lies 3 miles W of the River Don and has a bar at the entrance which nearly dries at LW. A reef projects

Devonport—No. 3 Berth West and No. 4 Berth West

from the headland on each side of the entrance. A bank, with depths of less than 3.7m and upon which the sea breaks at LW, lies about 1 mile N of the mouth of the river.

A rock, with a depth of 4.1m, lies 5.7 miles WNW of Mersey Bluff.

3.21 **Ulverstone** (41°10'S., 146°10'E.) is situated on the E bank of the River Leven, a short distance within the entrance. The entrance of the river, which is open to the NE, lies between

masses of irregular and pinnacle-shaped rocks and ledges, with a bar across it. The mouth is wide and well-sheltered from the prevailing W winds by the reefs extending N from Picnic Point, the W entrance head, under the lee of which there is good temporary anchorage outside the bar, in moderate weather, for vessels awaiting the tide. The coarse sandy bar at the entrance of the River Leven has a dredged channel across it, with a depth of about 1.2m.

Channel Rock, which dries 0.3m, lies 1 mile NE of the E breakwater head and is the principal danger in the entrance to the River Leven. Half-Tide Rock lies about 0.5 mile E of Channel Rock. This rock is sufficiently distant from the entrance to not form a danger if its position is known. Black Jack Rock, which also dries, lies at the elbow of the W breakwater and extends SE toward the entrance channel.

A beacon, 4.5m high, stands on the E breakwater at the entrance.

There is a wharf, 137m in length, with a depth of 2.1m alongside. The harbor is now used by recreational craft only.

Pilotage.—Pilotage is not compulsory, but a pilot is available and should be employed by vessels without local knowledge.

3.22 Dial Range is a ridge of mountains, 485m high, some 5 miles W of the mouth of the River Leven, and terminating to the N in two headlands lying NW and SE, 2.5 miles from each other; the SE projection is Dial Point. Both heads are fronted by dry and covered rocks.

Round Hill Point (41°04'S., 145°57'E.) is backed by Round Hill. A light stands on Round Hill Point. Round Hill has been reported to give a good radar return up to 23 miles. A pair of beacons stand close SW of Round Hill Point. These beacons, in line bearing 137°, are useful as cross bearings in the approach to the harbor of Burnie. Between Round Hill Point and Blackman Point, 2.2 miles W of it, is Emu Bay, into which flows the small Emu River.

Caution.—An isolated 11m patch lies about 1 mile NNE of Round Hill Point. Several isolated rocky patches, best seen on the chart, lie N of Blackman Point. Vessels should round Blackman Point at a distance of not less than 1.2 miles and, when approaching the bay, should remain in depths of 20m or greater until alignment on the entrance range is negotiated.

Burnie (41°03'S., 145°55'E.)

World Port Index No. 54880

3.23 Burnie occupies the W portion of Emu Bay. The bay is 2 miles wide W to E and stretches 1 mile N from Parsonage Point, 0.5 mile NW of Blackman Point. Vessels approaching from the W should keep within the safe sector of Round Hill Point Light and in depths of no less than 20m to the pilot station.

Port of Burnie

http://www.tasports.com.au

Vessels approaching from the E shoul keep 2 miles off Round Hill Point to the pilot station. The port is fog free and has no restriction on night movements. From the approaches to the berth, the port has a least depth of 10m.

Depths—Limitations.—Berthing information is given in the accompanying table titled **Burnie—Berthing Information**. The port is protected by two breakwaters. The port has deep water, with 10m in the approaches to the berths.

Burnie—Berthing Information

Berth	Length	Depth alongside	Remarks
1	85m	10.0m	Former tanker berth. No longer used.
4	183m	10.5m	Ro-ro.
5	213m	11.0m	Bulk cargo and petroleum discharge. Maximum vessel length of 250m.
6	198m	11.5m	Maximum vessel length of 280m.
7	219m	11.5m	Ro-ro. Maximum vessel length of 250m.

Aspect.—Saint Valentines Peak, about 19 miles SSW of Burnie, is a bare mass of granite. As it glistens in the first beams of the morning sun like an immense spire, it becomes the most remarkable hill feature on the N coast of Tasmania. The peak can be seen on a clear day from 60 miles.

A conspicuous chimney and a water tower stand 0.5 mile S and about 1 mile SSW, respectively, of the Emu River entrance.

Pilotage.—Pilotage is compulsory for all vessels over 35m long. Vessels are advised to provide ETA at the boarding position 24h in advance. The pilot boards about 2 miles NE of the breakwater. If a pilot is not employed, berthing instructions will be transmitted on VHF radiotelephone, or if necessary by flashing light from the signal station. The pilot boat is equipped with VHF radiotelephone.

Anchorage.—Anchorage can be taken in the bay but as a swell is nearly always setting in around the reef off Blackman Point, it is advisable to anchor in a position about 2 miles NE of Blackman Point in the vicinity of pilot boarding place, preferably in alignment with the leading line on 224°, sand and clay bottom. A vessel should not anchor in a depth of less than 13m.

Caution.—Vessels should keep clear of the breakwater because of the possibility of a strong set to the N.

Unless vessels are equipped with synthetic mooring lines, shore springs are required, as some surging occurs alongside the piers.

Due to the narrowness of berthing slips, tugs are required for single screw and cargo vessels.

Burnie to Stanley

3.24 The mouth of the **River Inglis** (40°59'S., 145°44'E.) is open to the NE and is protected from all winds W of NNW by Table Cape. It is further protected by a ledge of rocks ex-

tending to the NE from the left bank of the river, upon which ledge an embankment of stones has been formed. This ledge is marked by a lighted beacon. It is also protected from the E by ledges of rocks extending from the shore in that direction. There is said to be no outer bar at the River Inglis. The depth over the inner bar is about 2.4m.

Table Cape (40°57'S., 145°44'E.) is the cliffy extremity of woody flat-topped land. The cape is reported to give a good radar return at up to 28 miles. A light, 25m in height, is displayed from Table Cape. A red obstruction light is shown from a hill about 6.5 miles SW of Table Cape.

From Table Cape, the coast extends W about 7 miles to a low point surmounted by The Sisters, two remarkable round hills. A reef, with a small islet on it, projects N nearly 1 mile from the point. A detached patch lies ENE about 0.5 mile from the islet.

On the W side of the reef is a sandy bay, with a depth of 3.7m near the shore. This bay is apparently protected from the E by the reef, with the islet on it, which projects from the point. The coast from the point to Rocky Cape, about 4.5 miles NW of it, is bordered with rocks.

Rocky Cape (40°51'S., 145°31'E.) has a high pointed summit, with other peaks inland, rising to a height of 330m. The head is bordered with rocks. A rock, that dries 0.6m, surrounded by a reef, lies about 1 mile NE of the head. Foul ground extends about 1.5 miles N from Rocky Cape.

Sawyer Bay extends from Rocky Cape WNW for 11 miles to Circular Head. It has low sandy shores, except between the Detention River, 3 miles SW from Rocky Cape, and the Black River, 5 miles S from Circular Head, where the shore is rocky with hills rising behind it.

Anchorage.—Anchorage can be taken in the roads of Stanley Harbor, in a depth of 11m, sand and clay. In E winds, anchorage should be taken, in a depth of 8.5m, about 0.1 mile WSW of the main berth of the port. This anchorage avoids the swell that E winds set into the bay.

3.25 Port Latta (40°51'S., 145°23'E.) (World Port Index No. 54875) is an open sea loading terminal. The pier, which is equipped with a conveyor, has an ore berth at its head that can accommodate vessels up to 245m in length, with an alongside depth of about 15.2m. Ore carriers of more than 100,000 dwt and tankers are only berthed in daylight.

The use of a mooring master is compulsory. The mooring master will board about 2 miles N of the facility and will generally remain on board until departure. A VHF radiotelephone is available.

Aspect.—A large conspicuous pellet plant stands on the shore close to the main facility. In thick weather Circular Head, Rocky Cape, and the ship loader facilities are reported to give good radar returns.

Pilotage.—Pilotage is compulsory for vessels over 35m in length. The pilot boards 2 miles NE of the jetty head and remains on board throughout the stay of the vessel.

Anchorage.—Vessels can anchor in the vicinity of the pilot boarding place, in a depth of 29m.

3.26 Circular Head (40°46'S., 145°18'E.) is the E point of a peninsula which projects N from the coast and is 0.5 to 1.5 miles wide is locally known as the Nut. The isthmus, which connects this peninsula with the mainland, is low and narrow with an inlet on either side. The Nut, which appears from the E like a small flat-topped island, is a singular mass of trappean rock rising abruptly from the sea to the height of 151m and is visible in clear weather from 30 miles. A slight covering of grass, with some bushes, gives it a smooth appearance. The Nut is reported to give a good radar return.

3.27 Stanley (40°46'S., 145°17'E.) (World Port Index No. 54870) is situated on the S shore of Circular Head and is protected by a breakwater on its E side. Breakwater Pier has a length of 161m and an alongside depth of 8m. A ro-ro berth, with a mooring dolphin at its end, is 100m in long, with depths of 8.8 to 5.8 at the inner end. Adjacent to the ro-ro berth is Foreshore Wharf, which is 60m in length, with a depth of 4.5m alongside. The Fisherman's Dock lies just to the W and is formed by two breakwaters. Eight finger piers extend from the S breakwater.

Pilotage.—Pilotage is compulsory. The pilot boards about 1 mile SE of the breakwater head. The harbormaster's office is equipped with VHF radiotelephone.

Caution.—There is a strong set running E at the S end of the breakwater. It is especially strong during W and NW winds.

Stanley to the Fleurieu Group

3.28 Highfield Point (40°45'S., 145°18'E.) is a rocky point, 41m high, with drying rocks lying close offshore.

North Point, about 2.5 miles NW of Highfield Point, is a low shingle point with a dangerous rocky ledge, drying 0.9m at LW, extending ENE 0.8 mile from it.

A beacon stands 0.1 mile from the E extremity of the reef extending from North Point.

There are heavy tide rips off this reef with E winds. Shoals also extend about 1 mile NW from North Point.

Tides—Currents.—Both the flood and ebb set over the reef E of North Point at a velocity of 2 to 3 knots.

From the W side of North Point the coast, with a beach of sand and shingle, trends S 4 miles to West Inlet; then W, with a sandy beach, 6 miles to the opening to Duck Bay. Westward of the opening is Perkins Isle, the sandy coast trends NW 3.5 miles to Robbins Passage. Cape Elie, on the N side of Robbins Passage, is 2.5 miles NNE of Perkins Isle.

Perkins Bay (40°46'S., 145°10'E.), between North Point and Cape Elie, has a bottom of sand over clay and affords good holding ground and good anchorage with E winds. A heavy swell runs into this bay with strong N and NW winds. A disused submarine cable enters the bay on its NE side. Buoys and beacons mark shellfish beds.

Robbins Passage, which separates Robbins Island from the mainland, is bounded to the S by Perkins Isle and the coast, and to the N by Robbins Island. The E entrance to Robbins Passage, which appears like the mouth of a river, is 2 miles wide between the N point of Perkins Isle and Cape Elie, the SE point of Robbins Island. The entrance to Robbins Passage is fronted by a bank, with depths of less than 5m, extending up to 2 miles offshore. The channel through the passage is suited for small craft only.

Woolnorth Point (40°38'S., 144°44'E.), the NW extremity of Tasmania, is low and rocky, with low sand hills partially

overgrown with coarse grass and scrub. Two miles SW from the point, the land rises to a height of 82m and trends toward the W coast of the island, which consists of open undulating land from 91 to 122m high.

The Fleurieu Group

3.29 The Fleurieu Group consists of three principal and many small conspicuous islands.

Robbins Island, the SE and second in size of the Fleurieu Group, is a sandy island of a triangular form. The island is generally flat and swampy, but a ridge of hills, the summits of which are bare and 51 to 70m high, lies at the SW end of the island, and a ridge of timbered hills, 76m high, lies near the E point of the island. A belt of thick timber extends for 0.8 mile from the S shore of Robbins Island.

Cape Elie (40°43'S., 145°04'E.), the SE extremity of Robbins Island, is low and sandy. Guyton Point, about 2 miles NNW of Cape Elie, divides the E side of Robbins Island into two sandy beaches, the NW and more extensive of which forms a slight indentation, called Ransonnet Bay, with a depth of over 5.5m at a distance of 0.5 mile off shore. Between Guyton Point and Cape Elie, the bottom is foul for a distance of 0.6 mile offshore, but depths of 9.1m and over will be found at 1.5 miles off shore.

Walker Island (40°36'S., 144°56'E.) is separated from Robbins Island by a narrow winding channel which dries in places at LWS. A fringe of low hills borders the E and W sides of the island, rising to a height of 27m at its SE point.

A chain of small islets and rocks, the highest 18m, extends E for 0.3 mile from the N point of Walker Island, and a small rock, 4.5m high, lies 0.6 mile SW from the same point and 0.2 mile offshore.

The Petrel Islets, a cluster of four principal islets, extend 1.5 miles N of Walker Island. The largest islet lies 0.5 mile N of the N extremity of Walker Island and rises in a sand hill, the top of which is covered with scrub to a height of 22m. The outer and NE islet is a reddish-colored rock and lies about 0.5 mile NE of the last-mentioned islet; a rock, 0.3m high, lies off its N end. The other two islets lie close NW and SW, respectively, of the main islet, to which they are almost joined at LW. They are of the same character as the NE islet, and are 21m and 19.8m high, respectively.

Petrel Bank, mud and sand, with a least depth of 2.3m, extends to the E of the NE Petrel Islet. The E extremity of this shoal, as defined by the 5.5m curve, is located in a position 3.5 miles, bearing 100°, from the NE Petrel Islet; the N edge of the same shoal, which is steep-to, is located 1.5 miles, bearing 066°, from the NE Petrel Islet. The shoal is dangerous to vessels rounding the Petrel Islets, as no clearing marks can be given and the tidal currents are strong.

Walker Channel, on the W side of Walker Island, has a least width of 0.3 mile and a least depth of 11.9m in the fairway. This channel is considered dangerous without local knowledge.

3.30 **Three Hummock Island** (40°25'S., 144°55'E.) is the NE island of the Fleurieu Group. It is of an oval form, with a bay on its NW side, and a coastal ridge of moderately-elevated land, partly bare of vegetation, extending from the S to the NE point of the island. Three hills, from which the island derives its name, rise gradually from this ridge; the S hill, a conical peak 239m high, 1 mile NE of the S extremity, is the highest part of the island. A conspicuous tower stands on this peak. The N hill, 168m high and densely wooded, lies 1 mile SW of Cape Rochon, the NE extremity of the island. About 1.5 miles S of this hill is the third and intermediate hummock, 116m high. The island has been reported to give a good radar return up to 18 miles.

Between the S and NE extremities of Three Hummock Island, the coast consists of sandy bays and rocky points. On the NW side is Coulomb Bay, a broad shallow bay, with a long sandy beach. The shores of the island generally consist of a number of rocky points with several off-lying boulders; one, 3m high, lies 0.1 mile off the S point of the island, with a depth of 27.4m at a short distance. The largest and most conspicuous of the several boulders on the W point of the island is 7.6m high. The tidal currents are strong on the S side.

Taniwha Rock, with a depth of 1.5m, is located 0.5 mile, bearing 074°, from the E extremity of Three Hummock Island, with deep water around it. A rock, with a depth of 2.1m, lies about 0.2 mile NW of Taniwha Rock. Some rocks, 0.3 to 0.9m above water, lie between it and the shore.

A shoal of 2.7m is located about 1 mile E of the E extremity of Three Hummock Island. A shoal, with a depth of 12.3m, lies about 2.5 miles NNW of the NW extremity of the island.

Mermaid Rock, with depths of less than 1.8m, lies about 0.5 mile N of Cape Rochon. A rock, with a depth of 4.6m, was reported to lie 0.3 mile N of Mermaid Rock. There is deep water close to Mermaid Rock, and a passage of a little more than 0.1 mile wide between it and the shore.

From Cape Rochon the rocky coast trends W 3.5 miles to the NW extremity of the island, and then SE 1 mile to the NE point of Coulomb Bay. There are depths of 8.2 to 12.8m in the bay. A projection, 0.8 mile S of the SW point of the bay, forms the W extremity of the island which, although rocky, may be rounded at a distance of 0.5 mile in depths of 12.8 to 20.1m. A jetty, with a few buildings standing nearby, projects from the shore about 0.4 mile SE of the W extremity of the island.

3.31 **Hunter Island** (40°30'S., 144°45'E.), the W and largest of the Fleurieu Group, has a small rocky bight on the W side. It is moderately elevated; the highest part, Chase Hill, lies about 3.5 miles S of Cape Keraudren, a low, sloping, rocky point, and the N extremity of the island. Its N part has a most barren and sterile appearance, but its S coasts are formed by wooded hills of moderate height.

A rock, which dries about 2.4m, lies 0.2 mile offshore, 1.2 miles SSW of Cape Keraudren.

The E side of Hunter Island has small sandy bays between its slightly projecting points, off which there is a good anchorage, in a moderate depth, with shelter from all but E winds.

Anchorage.—The best anchorage on the E side of Hunter Island is in about 14.6 to 18.3m, from 1 to 1.5 miles offshore, with the W extremity of Three Hummock Island bearing 019° distant 3.5 miles. The approach to this anchorage between Hunter Island and Three Hummock Island has a depth of 14.6m.

Dangerous Bank, upon which the sea breaks mainly with a moderate swell, lies W of Cape Keraudren, with its shallowest

spot about 2 miles WSW of the cape. There is deep water between the cape and the bank, but the channel is not recommended.

3.32 Cuvier Bay (40°28'S., 144°45'E.), on the W side of Hunter Island, cannot provide a desirable anchorage as it is exposed to W winds. Temporary anchorage can be taken during S and E winds in the S part, in 14.6 to 18.3m, mud, 0.8 mile offshore. The coast in the bay is steep, except near the N part, and rocks extend 0.5 mile N from the W point of the bay, which should be given a berth of 1 mile.

Cutter Rock, with a depth of 5.5m, is located 0.7 mile W of the W extremity of Hunter Island. A rock, which dries 0.3m, lies about 0.5 mile S of Cutter Rock. These should be given a wide berth.

Caution.—The W side of Hunter Island is rocky and, as dangerous rocks and breakers extend considerably to seaward from the W extremity of the island, it should be carefully avoided.

3.33 Albatross Islet (40°23'S., 144°39'E.), 0.8 mile long, N-S, and 0.3 mile wide, lies about 6 miles W of Cape Keraudren. The E side is an almost perpendicular cliff with deep water close-to. Both sides are steep, but rocks extend 0.2 mile from the S extremity of the island. When seen from a SW by W or NE by E direction, a deep notch in the middle of the island appears to divide it.

There are strong tide rips over both ends of the island during the strength of the currents.

North Black Rock, about 50m in extent and steep-to, lies about 6 miles S of Albatross Islet.

South Black Rock, about 5.5 miles SSW of North Black Rock, is a round mass about 0.1 mile in extent. A rock, which dries 2.1m, lies about 0.5 mile SW of South Black Rock.

Tides—Currents.—The tidal currents W of these islets and reefs run at a velocity of 2 to 3 knots, the flood to the NE.

Steep Islet, about 4 miles E of South Black Rock, is 0.3 mile wide and its summit is covered with grass. Its coasts are mostly steep cliffs. Rocky ledges extend off its N and S sides and a bank extends 0.3 mile off the E side. A rock, 3m high, lies 0.2 mile SW of its W extremity.

A rock, with a depth of 2.3m, lies about 1.5 miles E of the N extremity of Steep Islet.

Nares Rocks (40°35'S., 144°41'E.) lie nearly 1 mile S of Steep Islet and consist of four small rocky islets, the largest of which is 8.8m high. A rock, which dries 1.8m, lies 0.4 mile WNW, and another drying 2.4m, 0.1 mile E of the highest rock.

Delius Islet, 6.4m high, is the largest of a group of small rocks located 1.2 miles E of Nares Rocks, on a reef about 0.2 mile in extent. Rocks lie 100m to the S and to the W of the reef. A rock, which dries 2.1m, lies 0.3 mile N of the islet. Two other rocks lie between it and the islet. A shoal, with a depth of 7.3m, lies 0.8 mile NW of Delius Islet.

Bird Islet, about 1 mile S of Delius Islet, is 0.6 mile long, N-S, and 15.2m high at its S end, with a channel 0.5 mile wide between it and Keafer Point, the SW extremity of Hunter Island, in which the depths vary from 12.8 to 42m. A cairn stands on the islets N extremity.

Brown Rocks, 8.5m high, are located about 1.5 miles W of Bird Islet. They are a chain of bare rocks extending for 0.3 mile E-W. A rock, with a depth of less than 1.8m, lies 0.1 mile N of the easternmost of the Brown Rocks.

3.34 Trefoil Island (40°38'S., 144°41'E.) is nearly 1 mile in extent and receives its name from its resemblance to a clover leaf. The S and W sides are abrupt cliffs; it is covered with grass, but is bare of trees. The highest part of the island is over the S extremity. Reefs extend from its NW and S sides.

A bank of sand, with depths of 2.7 to 5.5m, joins Trefoil Island with the mainland. It breaks heavily with W winds. Trefoil Rock lies nearly midway between Trefoil Island and the W side of Woolnorth Point, about 1.2 miles ESE of Trefoil Island.

The Henderson Islets, located about 1.5 miles NNE of Woolnorth Point, consist of a group of small islets and rocks occupying a space 0.8 mile long, N-S; the N islet is 4.5m high. They are located on the foul ground which extends from Woolnorth Point to Bird Islet.

A stone cairn stands on an islet, near the S end of this group, about 0.4 mile SSW of the N and highest islet.

Crescent Bank is 4.5 miles long and about 0.5 mile wide. It extends E from a position about 2 miles E of Woolnorth Point. Its shallowest part is near the W end, 4.6m deep; the E part has depths of 5.5 to 8.2m.

Tides—Currents.—East of Hunter Island, the W or flood current begins at 4 hours 30 minutes to 3 hours 30 minutes before HW. It sets to the W between the Petrel Islets and Three Hummock Island, when it divides, part running to the SW through the channels between Walker Island and Hunter Island, and then W between the islets S of the latter; the other part sets N up Hope Channel, turning sharply to the W and SW around Cape Keraudren and racing with great strength over Dangerous Bank. The E or ebb current begins 3 to 3.5 hours after HW and sets in the opposite direction.

West of Hunter Island, the flood or W current is met by the flood current setting to the N up the W coast of Tasmania. In general, within a distance of a few miles W of Hunter Island, the current runs in accordance with the currents on the E side of the island. These currents, however, are complicated by the currents on the W coast of Tasmania, which often results in a preponderance of set to the NE. The W and SW gales of winter also greatly affect the currents W of Hunter Island.

The tidal currents set with great strength through Hunter Passage and the chain of islets and rocks between Hunter Island and Woolnorth Point, attaining a velocity of 5 knots in places at springs and forming heavy races off the points of the islands and many swirls and eddies in the channel.

Reid Rocks (40°15'S., 144°10'E.) is a cluster of small rocks located in an area of foul and dangerous ground was previously described in paragraph 1.22.

Note.—Other dangers S and E of Reid Rocks are described in paragraph 1.22.

Fleurieu Group to Macquarie Harbor

3.35 The waters off the W coast of Tasmania have been little surveyed, therefore, caution should be exercised when sailing this area. Lesser depths of water and unreported dangers may exist in addition to what is described.

Cape Grim (40°41'S., 144°41'E.), the NW cape of Tasma-

nia, is a bold grass-topped headland of dark-colored rock, with an almost perpendicular front. A radio tower, approximately 90m high, reported conspicuous, stands on the headland. Steeple Rock, a fallen fragment from the cliffs above, lies close S of it and is 43m high.

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Cape Gri from S

The Doughboys are two remarkable islets, with almost perpendicular sides, lying E and W of each other and close off Cape Grim; their tops are covered with coarse grass. The W doughboy lies 0.8 mile W of Cape Grim. There is deep water close seaward of them.

The coast between Woolnorth Point and Cape Grim consists of a sandy beach and a rocky point, fronted by dry and covered rocks.

Tides—Currents.—At Cape Grim, the SW current has a velocity at springs of 5 knots and at neaps of 3 knots.

From Cape Grim, the coast, consisting of black cliffs, trends about 4.5 miles S to Bluff Point, on the E side of which is Studland Bay, a small exposed sandy bight with an islet in it.

3.36 Hally Bayley Shoal (40°49'S., 144°23'E.), the position of which is approximate, lies about 13 miles NW of West Point. The area has a depth of 5.5m; the sea occasionally breaks over the obstruction.

Porpoise Shoal lies about 7 miles W of West Point and has a depth of 5.7m. The sea breaks over this shoal occasionally; deep-water soundings have been obtained between it and the coast.

West Point (40°57'S., 144°38'E.), about 16 miles S of Cape Grim, is a sandy projection enclosed by dry and covered rocks.

Church Rock (40°49'S., 144°35'E.), the position of which is approximate, lies about 3 miles S of West Point.

Sandy Cape (41°25'S., 144°45'E.) projects 2 miles from the line of the coast and is reported to give a good radar return up to 18 miles.

Between Sandy Cape and another projection, 18 miles SE from it, the coast forms an exposed bight. The Pieman River entrance is about 16.5 miles SSE of Sandy Cape.

There is a patch of dry and covered rocks close off the mouth of the Pieman River; 1 mile to the S of it are two conical rocks standing on a reef of dry and covered rocks extending along a projecting part of the coast.

There are three bare rocks on the N side of the entrance to the Pieman River. The least water on the bar is 3 to 3.6m, located S of the E rock. The sand forming the bar is continually shifting; in good weather the entrance to the river is contracted both in width and depth; after heavy rains the scour of the current deepens and widens the channel.

With S winds, the conical rocks S of the river entrance partly break the sea on the bar; with NW or W winds the bar is very dangerous with heavy breaking rollers.

From the Pieman River, the coast is rocky with a large projection, about 3 miles across, lying immediately S and rising to Yarrana Hill. From the two previously-mentioned conical rocks, the coast trends S for 19 miles to Trial Harbor and then 16 miles S, with a long sandy beach, to the entrance of Macquarie Harbor.

Trial Harbor, a small bight, is sheltered from winds N of NW by Heemskerk Point and from the S by a low reef of rocks that extends in a SW direction, but the harbor is wholly exposed between the NW and SW. It is a dangerous place; local knowledge is necessary. Trial Harbor should only be approached during good weather.

Aspect.—From West Point to about 60 miles S of it, the country is low for 2 or 3 miles inland. The land then rises gently to a chain of low barren hills, behind which there is a second chain much higher and better wooded than the first. Mount Norfolk is located about 10 miles E of Sandy Cape and is the middle and higher of a chain of hills which are conspicuous from the offing and in clear weather are visible before the coast abreast of them.

3.37 Cape Sorell (42°12'S., 145°10'E.) is a rocky projection of moderate height, forming an extensive bay between it and the N end of the long sandy beach, in the S part of which is the entrance of Macquarie Harbor. Cape Sorell is the W head of the entrance.

Its extremity is low, terminating in straggling bare rocks of brown appearance; the coast on each side is very rocky and sterile. Many patches of breakers and above-water rocks lie detached from the shore. There is one small rock, just above the water's surface, lying 0.2 mile NW of the cape, with apparently no safe channel inshore of it.

Watts Hill, about 1.5 miles E of Cape Sorell, is a conspicuous lump of rock on the NE part of the cape. An above-water rock, connected with the coast by a reef, lies 0.1 mile NW of the foot of the hill. There is a small rocky islet E of the hill about 100m from the coast.

3.38 Macquarie Harbor (42°13'S., 145°14'E.) is an extensive sheet of water trending from its entrance 19 miles SE, and is from 2 to 4 miles wide, with regular depths within the entrance ranging from 9.1 to 36.6m. It is the second-largest har-

bor in the southern hemisphere after Sydney

Pilot Bay extends from the foot of Watts Hill SE about 1 mile to the W entrance point of Macquarie Harbor and has a sandy beach in the W bight. This bay is only accessible to boats as it is being filled by the W sands of the bar. A light is shown from the W entrance point.

Mount Antill, about 1 mile S of Watts Hill, is similar to it, but has a remarkable double summit.

Entrance Island lies about 85m E of the steep rocky projection which forms the W entrance point of Macquarie Harbor. The island is a mass of rock, having some small detached rocks extending about 100m from its N point. The proper channel into Macquarie Harbor is between this island and the W entrance point. A light is shown from the W side of Entrance Island. A beacon stands about 40m SE of the light.

The channels are liable to alter in position and depth, owing to the occasional great rush of water out through the banks and shoals which, being composed of sand, are of a shifting nature. It is not advisable to enter without local knowledge.

From a point located about 0.3 mile W of Entrance Island, a breakwater extends from the shore in a 359° direction for a distance of 0.5 mile, then for a further distance of 0.2 mile in a 336° direction.

Tides—Currents.—The tidal rise at MHHW is 0.9m, at MLHW it is 0.7m, but the height of tide is influenced by W and NW gales, and by great freshets that, during the prevalence of rainy or thick, cloudy weather, flow into the harbor from the high mountains in the interior, at which periods the channels between the shoals are deeper than usual. During a two week observation, the tides were irregular, making HW sometimes twice, and at other times only once in 24 hours, and in both cases the ebb ran twice as long as the flood, producing a difference in the level of the water, which on several occasions did not exceed the average fall of 0.5m.

An ebb for 9 days together, without the water rising or falling so much as 0.3m, has been experienced, although at other times, during NW gales, the inundations were great, frequently overflowing the adjoining lowlands.

The tides at Macquarie Harbor are very irregular, partly owing to their being disturbed by the winds, which have an extraordinary influence on the height of the water in the harbor. The extreme range of tide seems to vary from 0.5 to 0.9m, but this is so irregular that it is impossible to predict anything about the tides, except that in good weather and with SW winds the tides are low, but with strong N winds the tides are highest. An onshore gale, or even a fresh breeze, may raise the level of the lagoon to the extent of completely masking the tides.

At the entrance, there is usually only one tide in 24 hours, but a false tide often follows a short time after HW, the effect of which is that after the water has begun to ebb strongly the tide again rises, the ebb slackens for an hour or more, then finally the tide begins to fall, and the strong ebb sets out again. The extensive shoals which obstruct the entrance prevent the full effect of the sea tide reaching into the lagoons; thus, in fine weather, with a range of tide up to 0.6m, there is a strong flood and ebb tide into and out of the harbor, the effect of which extends even 20 miles up the Gordon River; but this range of 0.5 or 0.6m causes a range of only 23 to 38cm at Strahan, and the same at the mouth of the Gordon River.

The tides are higher in winter than in summer to the extent of nearly 0.3m; about the time of HW and LW the tide is slack for more than an hour, while the water slowly rises for some time before the flood tide; this phenomenon is said to account for the extraordinary difference observed in the length of the ebb as compared with the flood tide, the ebb being frequently 18 hours and the flood only 6 hours. With a N gale coming on, the tide flows into the harbor very strongly, and often for 24 hours continuously; the harbor then fills up 1 to 1.2m, and even 1.5m above LW. As soon as the gale begins to abate, or even during its height, if it shifts to the W, the water of the harbor ebbs out with great force, the duration of the ebb being often 18 hours, and only checked for 5 or 6 hours as the tide rises at sea. In good weather there are often days when there are no tidal currents either in or out; on the other hand, the flood tide is longer and the ebb shorter in good weather. In good weather, undisturbed by approaching bad weather or by floods in the rivers, the flood and ebb tides are or nearly equal in duration; occasionally the flood tide attains a velocity of 4.2 knots, and this generally indicates the approach of bad weather.

During a very heavy gale from the W, the range of tide varied from 3 to 4m on the bar; the tide ebbed and flowed all through the gale, with very a short flood, about 7 hours, and a long ebb, about 17 hours.

Tidal signals are displayed from the port signal station situated on the W entrance point.

Great attention must be paid, not only to the ranges and to obtaining quick soundings, but to the tidal currents, which run here with great strength, and during freshets, sometimes at a velocity of 5 and 6 knots.

In the narrow channel between Entrance Island and the W rocky shore, the ebb tide runs at times like a cataract, with a velocity of 10 knots. In sailing against the ebb between Entrance Island and the steep rocky point to the W of it, favor the W shore while passing the island, as the tidal current sets strongly out of a bight just within it, and is likely to set a vessel upon the island.

Depths—Limitations.—The outer bar is located opposite the center of the W breakwater. The bar had a reported depth (2001) of less than 4.0m. Entering vessels are limited to a length of 72m, and a draft of 3.6m. The depths in Macquarie Harbor, between the spit off River Point and the reef projecting from Headquarters Island, range from 7.3 to 36.6m in mid-channel, and then generally decrease to 11 and 18.3m within 0.5 mile of the shore on either side. From at depth of 14.6m, about 1 mile SE of Headquarters Island, the depths decrease to 3.7m on the bar of the Gordon River.

Pilotage.—Vessels bound for Strahan, in Macquarie Harbor, should advise the Harbormaster, Hobart, of their ETA at the bar at least 72 hours in advance, confirming or amending the time as early as practicable. When within range, about 30 miles, a vessel should contact the pilot station at the W entrance point by VHF. Watch is kept when a vessel is expected. On receipt of this information, the harbormaster will communicate to them information regarding the bar conditions and local tides.

Vessels are to reduce speed to a minimum consistent with safe navigation in the vicinity of Macquarie Heads. Vessels are not to exceed 8 knots E of the 005° lead into Strahan Harbor.

As a rule, the pilot will board vessels from a wooden motor

launch, 0.1 mile N of the head of the W breakwater. In approaching this position, vessels should keep Bonnet Island light more nearly in line with the W entrance point light structure than with that of Entrance Island. Pilotage is compulsory.

Regulations.—Landing is prohibited, without special permission, on Entrance Island and Bonnet Island.

From about 0.5 mile E of Entrance Island, the sandy beach, which forms the E side of the entrance to Macquarie Harbor, trends SW about 0.4 mile to Braddon Point, on each side of which the land is low and sandy for several miles, and covered with shrubs. The land which forms the W side of the channel is steep and rises to irregular ranges of rocky hills of quartzite and sandstone.

The W side of Braddon Point is fronted by a bank, the outer edge of which extends W about 0.3 mile off the point nearly to the opposite shore, then passing close to Entrance Island, and 0.5 mile N to a spit which always breaks, forming the E part of the bar. From this spit, the NE edge of this bank trends SE to within 0.3 mile of the beach.

Anchorage.—In the approach to the harbor entrance, there is no shelter from winds between the N and W for anything except small vessels. Gales from the W and NW are frequent and violent; when wind is expected from these quarters, anchorage outside the bar is unsafe.

In good weather, anchorage may be taken, in 22m, about 1.5 miles NW of the breakwater, while awaiting the pilot or the tide.

Vessels carrying explosives must anchor S of a line drawn from Regatta Point to Magazine Point.

A telegraph cable has been laid across Macquarie Harbor, 0.4 mile S of the W entrance point of the harbor, to a position about 0.1 mile SE of Sandy Point. Two beacons, the positions of which are approximate, mark the W end and there is a hut between them and the shore. Vessels are cautioned against anchoring in the vicinity of the cable.

3.39 From the W entrance point, the W coast of the bay trends S 0.5 mile and then SE 0.8 mile to Wellington Head, a conspicuous hill, located 0.7 mile S of Braddon Point. This head rises rather abruptly from the W side of the harbor, and is easily distinguished by its table top, which is 76m above the level of the sea and is separated from the other hills to the W by a deep notch that gives it the appearance of being isolated before the connecting land becomes visible. There is a white mark about halfway up the hills on the S side of the head.

Bonnet Island (42°13'S., 145°14'E.) lies close to the shore, 0.3 mile N of Wellington Head. It is small, with a round bushy summit. The Cap is a small rock about 100m SSE of Bonnet Island.

Bowra Rock, with a depth of 0.9m, is located on the N side of the channel about 0.1 mile NNE of the N extremity of Bonnet Island. A light is shown from the N side of Bonnet Island.

Channel Bay (42°15'S., 145°14'E.) extends from Wellington Head 1 mile SE to Spur Point and recedes 0.5 mile. Its N entrance is blocked by the training wall built from Wellington Head across the N entrance to Channel Bay and on the extensive shoal fronting Channel Bay. The wall extends 1.5 miles in a curve, parallel to the sand banks about 0.2 mile distant.

Round Hill is a 95m high, steep projection, with Spur Point, its N extremity, about 0.7 mile SSE of Wellington Head.

The N shore of Macquarie Harbor from Braddon Point trends ESE 2.2 miles to River Point, and then sweeps around in a NE direction about 1 mile to Yellow Bluff, and is fronted by extensive sand banks, nearly dry at LW, which form the E and N sides of the channel leading to the port of Strahan.

Kelly Channel is marked by beacons and buoys as far as the deep-water portion of Macquarie Harbor.

From Round Hill the SW shore forms a bight extending 1.5 miles SE to Backagain Point, a high projection, having 8.2m of water close to it. The steep elevated shore of this bight is separated by extensive sandbanks to the S by a narrow channel, which is said to be finally lost among the shoals to the E.

Between Backagain Point and Liberty Point, the N extremity of a narrow sharp ridge of moderate elevation, lying 2.5 miles ESE of Backagain Point, the coast forms two bights separated by Table Head, a high steep flat-topped point, 1.5 miles ESE of Backagain Point. Each of these two bights is about 0.8 mile in extent, very shallow, the 3.7m curve being some 2 miles N of the point.

Betsy Island and Bird Islet lie 0.7 and 0.6 mile E, respectively, of Backagain Point; the former, though little more than 0.1 mile in extent, is conspicuous, but the latter is a mere rock. Both islets, together with the rocks about them, are connected with and surrounded by the extensive sandbanks which stretch 2 miles to the N and NE from Table Head. These sand banks are usually covered.

Kelly Channel, the passage from the entrance channel into the deep water of Macquarie Harbor, is about 0.1 mile wide, with from 3.7 to 5.5m of water at its W end, N of Round Hill. The channel then trends E between the sand banks for 1.5 miles, with depths of 1.8 to 5.5m. Kelly Channel then gradually widens in an ENE direction to more than 1 mile at its E entrance between the sands, where the depths increase to more than 21.9m.

The intensified sector of Bonnet Island Light leads over the outer bar to a point abreast Entrance Island. Range beacons shown from a point about 0.5 mile S of Entrance Island and bearing 117.5°, lead from Entrance Island to the next set of ranges. The second set of range beacons, bearing 322.5° astern, lead to Bonnet Island, where the third set of range beacons are intersected. The front beacon of this third set is shown from the training wall about 0.3 mile SSE of Wellington Head, in line bearing 156° with a beacon shown from Round Hill Point. The fourth set of ranges, in line astern bearing 318.5°, lead parallel to the training wall on the W side of the channel. The last set of range beacons, in line astern bearing 295.7°, leads from abreast a beacon on the training wall to the entrance for Kelley Channel. Care should be taken to properly identify this range as four beacons stand on this bearing.

3.40 **Strahan** (42°10'S., 145°20'E.) is situated in the N portion of Long Bay. The port is mainly used by local craft and fishing boats. A vessel with a maximum length of 72m and a draft of 4.1m can be taken to berth.

A conspicuous radio mast, painted in orange and white bands, stands close SE of Strahan at an elevation of 22m

The N arm of Macquarie Harbor, which forms the approach to Strahan, extends N of an imaginary line joining Yellow Bluff to Sophia Point, about 3.5 miles ESE. A deep channel extends through this arm between the shore banks on either side

Strahan

to Strahan. This channel is wide for the first 3.5 miles to the entrance to Long Bay, between Town Point, on the W, and Dead Horse Point, on the E, above which it has a width of about 0.2 mile. Magazine Point is located about 1 mile N of Town Point on the W side of Long Bay; Regatta Point lies about 0.7 mile N of Dead Horse Point on the E side of Long Bay. The general depths range from 27.4 to 50m in Long Bay, shoaling to 20.1m at the N end.

Two lights, in line bearing 005°, with the forward shown from Regatta Point and the rear 0.4 mile N, lead into Long Bay on a course between Dead Horse Point and dangers lying off Town Point.

Pine Cove (42°12'S., 145°22'E.) is a bight in the E shore of the N arm of Macquarie Harbor. In proceeding from Kelly Channel to Pine Cove the shoals and rocks extend about 0.5 mile S of King Point, close NW of the cove. They are marked by a beacon and must be approached with caution. Depths gradually decrease to 5.5m within the cove, where there is good anchorage for small vessels, with mud bottom. A submerged rock, dangerous to navigation, is located about 0.5 mile E of the beacon.

Tides—Currents.—There is little or no tidal current in Pine Cove, and the rise and fall does not usually exceed 0.4m.

Sophia Point, a low projection of the NE shore of Macquarie Harbor, about 3 miles NE of Liberty Point, is enclosed by a reef, with straggling rocks extending about 0.4 mile from it.

The SW shore of Macquarie Harbor from Liberty Point trends S 2.2 miles, and E 0.8 mile to a projecting head, forming the NW entrance point of Double Cove.

The remainder of Macquarie Harbor is not completely surveyed and should not be entered without local knowledge.

Macquarie Harbor to Port Davey

3.41 The waters off the W coast of Tasmania have not been fully surveyed and uncharted dangers may exist.

From Cape Sorell, the coast extends SSE about 25 miles and then SW about 3 miles to Point Hibbs. The coast consists of a series of rocky bights and projections. For the first 12 miles from the cape, the coast is fronted by rocky ledges and above-water rocks, generally extending about 1.5 miles from it. The land behind the this coast rises by a gentle ascent, for a distance of 2 or 3 miles, and is apparently smooth and uniform, but barren of timber and most other vegetation.

Sloop Rock (42°17'S., 145°11'E.), a small islet, lies about 5.5 miles S of Cape Sorell. A line of above and below-water rocks lies between Sloop Rock and Cape Sorell. A group of rocks lies about 1 mile S of Sloop Rock. An above-water rock was reported (1981) to exist about 2.6 miles SSE of Sloop Rock.

Breakers are reported to exist, about 3 miles offshore, in two places between Sloop Rock and Point Hibbs. Rocks, awash, lie about 3 and 5 miles N, respectively, from Point Hibbs.

Point Hibbs (42°37'S., 145°15'E.) projects SW about 3 miles from the coast and is higher than the neck by which it is joined to the mainland. Hibbs Pyramid, a remarkable pyramidal rock lies about 1 mile NE of Point Hibbs. This rock may resemble the crown of a hat when bearing NNE over the extremity of the point. A ledge of rocks projects about 1.5 miles from Point Hibbs and along the S side of the point. Some of the rocks on the E part of the ledge are above-water.

Between Point Hibbs and Low Rocky Point, about 25 miles SSE, the land is somewhat more elevated and not so destitute of timber as that N of Point Hibbs.

Svenor Point (43°12'S., 145°45'E.) is a flat point of land with several rocks off it. Hobbs Island, round and small, is located about 2 miles SE of the point.

From Svenor Point, the coast trends 8 miles farther SSE to Cape St. Vincent, the land between forming several small bights with islets occasionally close offshore.

Aspect.—The coast for about 18 miles to the SE of Low Rocky Point is high, and at the back are several bare white peaks, as if covered with snow.

3.42 Cape St. Vincent (43°19'S., 145°50'E.), a narrow projection fronted by a reef and drying rocks, lies about 1.5 miles NW of North Head, the N entrance point of Port Davey. West Pyramid, an islet, lies about 1.5 miles NW of Cape St. Vincent. From North Head the coast trends ENE 1.2 miles to Pollard Head, and then 1.5 miles in the same direction to Garden Point. There are some sunken rocks close to Pollard Head.

Dangerous sunken rocks exist at the following distances and bearings from Garden Point Light:

a. 17.9 miles, 302.5°.
b. 17.7 miles, 302°.
c. 17.5 miles, 301°.
d. 15.3 miles, 284°.
e. 15.1 miles, 268°.
f. 14.9 miles, 264°.

Caution.—Caution is required in the approach to Port Davey, as hydrographic surveys in the area are incomplete and uncharted dangers may exist.

Port Davey extends 10 miles from its SE to its NW extremity and has several branches. When nearing this port, the land on either side appears rugged and barren, and is steep and mountainous to the E. The entrance is 3.7 miles wide between North Head and Hilliard Head SE of it.

Stokes Rock, with a depth of 15.8m, lies about 3.2 miles NW of Hilliard Head and usually, but not always, breaks.

3.43 Hilliard Head (43°23'S., 145°55'E.), the S point of the entrance to Port Davey, is a high craggy projecting point, with some sunken rocks close to, and a group of islets and rocks SE of it.

East Pyramid, a group of peaked islets, extends about 3.5 miles SE from Hilliard Head. Sugarloaf Rock, about 106m high, the SW and highest of the islets, is somewhat similar in appearance to Big Caroline Islet.

Mutton Bird Island, 3 miles SE of Hilliard Head, is low, with no definite summit; from seaward it looks like part of the coast. There are several islets and sunken rocks between it and East Pyramid.

Big Caroline Islet, about 76m high, is located about 1 mile NNW of Hilliard Head and is a conspicuous pyramidal rock.

From Hilliard Head to Forbes Point, about 0.8 mile NE, the SE shore of Port Davey forms a bay, between which and Big Caroline Islet is Swainson Islet, about 61m high, with some sunken rocks close around it and a dry rock near its NW extremity. There are depths of 12.8 to 18.3m between Hilliard Head and Swainson Islet, and from 14.6 to 27.4m between the head and Big Caroline Islet.

On the E side of Forbes Point is **Norman Cove** (43°22'S., 145°57'E.), about 0.3 mile in extent, having from 7.3 to 9.1m of water in it. From Norman Cove the shore sweeps around 0.3 mile to Knapp Point, close off which is Hay Islet, lying about 0.5 mile NE of Forbes Point. Knapp Point has been reported to give a good radar return up to 11 miles.

Hannant Point, which lies in line with Hay Islet and Forbes Point, is a narrow projection separating Spain Bay on the SW side from Hannant Inlet on the NE side of the point. Spain Bay has depths of 14.6 to 20.1m across its entrance, close within which there are two small rocks. This bay, which runs in about 0.8 mile from its entrance has not been sounded inside the small rocks.

Nares Rock, awash at LW, lies about 0.5 mile NW of Knapp Point. There are depths of more than 31.1m between Swainson Islet and Nares Rock, and from 12.8 to 32.9m between the rock and Norman Cove.

3.44 The **Shanks Islets** (43°21'S., 145°57'E.), eight in number, the highest and largest of which is about 61m high, lie 0.8 mile NW of Hannant Point. These islets, which extend 0.4 mile N and S, have sunken rocks close about them, but there is a clear channel, with depths of 11 to 33m between the shore, about Knapp Point and a line from Nares Rock to the Shanks Islets, and depths of 16.5 to 21.9m from Spain Bay to within 0.2 mile E of the Shanks Islets. A 5.5m patch lies about 0.2 mile N of the summit of the largest islet.

Tides—Currents.—From what was observed during a short period in Port Davey, there appears to be no uniform motion in the tides, neither in their ebbing nor flowing, nor in their rise. It seems that they are greatly influenced by the force and direction of the winds. A range of about 0.6m was observed under normal conditions.

Depths—Limitations.—The soundings across the entrance gradually increase from 9.1m off North Head to 50m in the middle, and then decreasing to 16.5m close to Big Caroline Islet. From a 46m depth midway between Big Caroline Islet and Garden Point, the soundings gradually decrease to 21.9m within 0.1 mile of the islet, and to 16.5m 0.3 mile from Garden Point. From 9.1m close to Nares Rock, the soundings increase to 42m 1.3 miles in a N direction, and then decrease to 18.3m at 1 mile E of Garden Point.

From O'Brien Point, about 1 mile NE of Knapp Point, the E shore of Port Davey trends NNE 1.5 miles to Turnbull Head, which forms the SE side of the entrance to Bramble Cove. There are depths of 11 to 18.3m about 0.1 mile offshore, except between the Shanks Islets and the mainland, where there is a depth of 8.7m about 0.2 mile from the shore, and at nearly 0.5 mile S of Turnbull Head, where a rocky ledge projects nearly 0.1 mile from the shore.

The Breaksea Islands extend from 0.5 mile N of the Shanks Islets to nearly 1 mile WNW of Turnbull Head. They are three in number, the middle and longest island being 76m high near the center and over 0.5 mile long, the N island is over 0.3 mile long and 78m high while the southern, which is almost joined to the middle island, is about 0.2 mile long and 53m high, but neither of them exceeds 0.2 mile in width.

A rock, 6.6m high, lies near the S end of the S island; the coasts of all have drying and below-water rocks close along them, but there are depths of 16.5 to 24m within 0.1 mile of their W sides, and 5.5 to 24m within 0.1 mile of their E sides. There are depths of 9.1 to 20.1m between the islands and the mainland.

These islands are joined to the mainland near Milner Head, about 0.4 mile N of Turnbull Head, by a 9.1m bank.

South Passage, the channel between the Shanks Islets and the Breaksea Islands, is 0.3 mile wide, with depths of 18.3 to 29.3m. There are depths of 10.1 to 25.6m from the middle of the passage to within 0.1 mile of the ledge of rocks S of Turnbull Head. Drafts of up to 11m may be carried through this passage to the anchorage in Bramble Cove.

North Passage, lying between the Breaksea Islands and Boil Rock, 1.5m high, about 0.3 mile N, has a least depth of less then 8m.

3.45 Bramble Cove (43°20'S., 146°00'E.) is a safe and commodious harbor within Port Davey, having an entrance 0.3 mile wide, with depths of 7.3 to 21.9m, between Turnbull Head and Milner Head. There is a rock 1.8m high close to Turnbull Head, and the edge of the 9.1m bank extends 0.1 mile N of the head.

Within the entrance, Bramble Cove forms a basin extending 1 mile E-W and about 0.8 mile N-S, with regular soundings decreasing from 25.6m in the entrance to about 7.3m about 0.1 mile off the shores, except to the E of Sarah Island, where 7.3m will be found 0.1 mile from the shore, and to the E of Turnbull Head, where there are depths of 21.9 to 40m.

There is a rock, 0.6m high, with some sunken rocks close to the E shore.

Turnbull Island, 30m high, lies on the S side of Bramble Cove. It is cleared of trees to seaward and has a cairn on its summit. A rocky ledge, with a depth of 3.7m, extends 150m from its N end.

Mount Misery, which is 478m high and very precipitous on its S side, directly overlooks Bramble Cove. It is the S summit of a conspicuous range running about N-S. Mount Berry, 646m high, is the central or highest part of this range and is completely hidden from Bramble Cove by Mount Misery.

The tides in Bramble cove are very irregular. The tidal rise at

Bramble Cove is 1.7m at MHHW.

Anchorage.—In Bramble Cove, the best anchorage is with the N end of the Breaksea Islands in line with the S extremity of Milner Head and with the W end of Turnbull Island bearing 190°. This position gives good shelter from NW winds, which are reported to be the strongest. The bottom is hard sand. Anchorage anywhere seaward of Bramble Cove is to be avoided if possible, as a shift of wind from the S or SW will bring a heavy sea right into and up the port.

Caution.—It was reported (1994) that a stranded wreck lies 1.5 miles NW of Turnbull Island.

Bathurst Channel is a narrow but deep fairway connecting Port Davey to Bathurst Harbor. The channel has a width of less than 100m in places and should not be attempted without local knowledge. Bathurst Harbor, an extensive sheet of water, is of shoal depth and of no commercial significance.

Port Davey to Southeast Cape

3.46 From Hilliard Head, the coast trends SSE about 13 miles to South West Cape. The land is mountainous and presents a barren and desolate appearance.

South West Cape (43°35'S., 146°02'E.) is bold and remarkable, with a sharp and rugged outline. When approaching from the E, the cape should be given a wide berth, as the prevailing winds are from the W, and the long W swell which rolls in with great force, in conjunction with the current which generally sets to the E and toward the cape, may set a vessel toward the cape.

Caution.—On occasion, there appears to be broken water and evidence of breakers about 0.5 mile S of South West Cape, which might indicate the presence of a sunken rock.

Between two steep rocky heads, about 3.5 and 7 miles ENE of South West Cape lies New Harbour. A sandy bay divided into two bights by a rocky point, with two clumps of rocks in the entrance.

Cox Bight (43°30'S., 146°15'E.) is a deep, sandy, but exposed bay. From Cox Bight to Louisa Bay, about 4 miles E, the coast rises to Bathurst Range, which attains an elevation of 800m.

Maatsuyker Group (43°38'S., 146°19'E.) consists of two large and several small isles. Maatsuyker Island, the SW of the two principal islands, has a reef projecting to the SW, on which are Needle Rocks. There are several islets and rocks on a reef which extends N from the island. De Witt Island is the NE principal island in the group. There is a sunken reef extending N from De Witt Island midway to Louisa Bay. In 1986, a shoal with a depth of 11m was found midway between the NE point of Flat Witch Island and the SW point of De Witt Island.

About 2.5 miles S of De Witt Island are Flat Top Island and Round Top Island, the highest, with an elevation of 286m.

Mewstone, a cliffy islet, lies about 5.5 miles S of Round Top Island. There are rocks close E and W of it. The Mewstone swarms with birds.

Caution.—On some charts the Maatsuyker Group is charted nearly 2 miles SE of its actual position. Hydrographic surveys in this area are incomplete and uncharted dangers may exist.

3.47 **Mount La Perouse** (43°30'S., 146°46'E.) is a remarkable table-topped summit with precipitous cliffs along its S and SE sides. Pinders Peak, about 3 miles WSW of Mount La Perouse, is a conspicuous thumb-shaped peak. A sharp remarkable conical apex, 802m high, rises from a spur trending SE from Mount La Perouse toward Recherche Bay. This apex usually shows out clearly when the higher mountains to the W are obscured.

Another spur trends ESE toward the hills above Whale Head. On this spur the most remarkable part is a dome-shaped, wooded, summit, 488m high, which rises abruptly from the flat country surrounding it. The higher portions of the mountain ranges above 914m elevation are usually rocky and precipitous, but below that altitude the mountain sides and valleys are very thickly wooded.

South Cape Bay lies between South Cape and South East Cape, about 5 miles E. The bay is open and exposed.

Southeast Cape to South Port

3.48 **South East Cape** (43°38'S., 146°52'E.) is formed by Three Hillock Point on its SW extremity. The cape is a broad projection terminating E at Whale Head; 2 miles N of South East Cape, the land rises to Bare Hill, which is 276m high.

Pedra Blanca (43°52'S., 146°59'E.) and Eddystone are two cliffy islets lying about 15 miles SSE of the cape. The two islets lie on a reef about 1.2 miles apart.

Flying Scud Rock (43°53'S., 146°59'E.), with a depth of 9.1m, lies about 2.7 miles S of Pedra Blanca. Sidmouth Rock, which dries, lies about 1.2 miles ENE of Eddystone Islet.

D'Entrecasteaux Channel (43°36'S., 147°09'E.) is a smooth water passage between the SE coast of Tasmania and Bruny Island, leading from the SW to the Derwent River. The S entrance of this channel extends from South East Cape, 20 miles ENE to Tasman Head, the S point of Bruny Island, with depths of 64m to 82m for the greater part of the distance across. The channel, about 35 miles long, is slightly winding, with the general direction being NNE. The width is irregular, varying from 5 miles within the S entrance to a little more than 0.5 mile in the N entrance. There is a least depth of 9.1m in the channel and 11m in the fairway.

The coast from Whale Head trends NE for 3.3 miles to Second Lookout Point, a rocky projection, on the N side of which is a landing place. Fishers Point, which shows a light, lies about 1.7 miles N of Second Lookout Point and forms the S entrance point of Recherche Bay.

Recherche Bay (43°33'S., 146°55'E.) is entered between Fisher Point and Sullivan Point, 2.5 miles to the NNE. The bay is divided into two arms; Rocky Bay is the S arm and The Pigsties is the N arm. Between these two arms, the Catamaran River, spanned by a bridge, enters the sea.

Rocky Bay is entered between Fishers Point and Needle Point, about 1 mile NNW. Denmark Reef, a 40m patch marked by kelp, lies about 0.4 mile E, with Kelly Rocks, some of which are above-water, between this reef and Needle Point. It was reported (1992) that dangerous underwater rocks lie 300m NW of Needle Point. Rocky Bay is an unsafe anchorage with heavy swells. With S winds a vessel may anchor, in a depth of 6.4m, 0.3 mile E of the Waterhole.

The Pigsties (43°33'S., 146°54'E.) is entered between Ryans Point and Bennetts Point, 0.5 mile to the ENE. Shag Rock, awash at low water, lies in the entrance to The Pigsties.

Anchorage.—An excellent anchorage is afforded in The Pigsties for small vessels with local knowledge. The bottom is such soft mud that a vessel is not injured by it if aground.

3.49 The Actaeon Isles, which lie about 3 miles NE of Recherche Bay, are two isles with numerous rocks and a reef extending out from them. Sterile Isle, the S Actaeon Isle, lies nearly 3.5 miles E from the entrance to Recherche Bay and is covered with grass and bushes. Actaeon Isle, the N of the Actaeon Isles is covered with scrub and grass. A light is shown from the N summit of the island. A number of rocks and shoals lie to the S and W of the isles and can best be seen on the chart.

South Port Lagoon (43°29'S., 146°58'E.) lies with its entrance 2.2 miles NNW of Actaeon Light. The entrance to the lagoon is upwards of 0.1 mile wide, and generally has a heavy surf across it. South Port Bluff lies 1 mile NE of the entrance to the lagoon. A conspicuous tomb stands on the bluff.

South Port Isle, nearly 0.5 mile NE of South Port Bluff, is flat-topped, with a cliffy coast. A small islet lies about halfway between it and the shore. A shoal, with a depth of about 12.8m, lies 0.7 mile NNE of South Port Isle.

South Port (43°27'S., 146°58'E.) lies on the W side of D'Entrecasteaux Channel, and is entered between the rocky point about 1 mile N of South Port Bluff and Rossel Point, about 1.5 miles to the NE. Stack of Bricks, a rock 9.4m high and steep-to on its S side, lies close off Rossel Point. The land on the S shore of South Port is thickly wooded and high. The N shore consists of two bays separated by Burying Ground Point. The village of South Port lies behind the E end of the W bay. There is a jetty at the head of The Deep Hole in the SW corner of South Port.

South Port Narrows, a shallow muddy inlet, is marked at its entrance by buoys. At the W end of the narrows is Major Honners Bay, which opens into two branches, Ida Bay and Hastings Bay. The village of Hastings stands at the head of Hastings Bay.

3.50 **Hythe** (43°26'S., 146°59'E.) lies at the head of the inner bay of South Port. There is a small pier used mainly by coastal steamers. A conspicuous church in the village is a good landmark.

Anchorage.—The W bay on the N side of South Port affords anchorage, in a depth of 6.4m, sand and mud, but is exposed to S and SE gales. The best berth is in a depth of 6.4m, about 0.4 mile S of Hythe pier. A second berth is in a depth of 11m, about 0.2 mile SSW of Pelican Islet (43°27'S., 146°58'E.).

South Port to Dover

3.51 **Burnett Point** (43°26'S., 147°02'E.) lies 1.5 miles NNE of the entrance to South Port. The coast in this vicinity consists of cliffs about 30.5m high. Sister Bay and Lady Bay are two indentations, in which the depths range from 5.5 to 18.3m, sand. From the S entrance point of Sister Bay, a reef with a rocky islet extends about 0.2 mile to the E.

Marine farms may be encountered in the vicinity of Sister Bay and Lady Bay, as well as other areas to the NW.

Port Esperance (43°20'S., 147°03'E.) is entered between Scott Point and Esperance Point, about 1.7 miles to the N. Its navigable width is reduced by a rocky bank, with depths of less than 11m, which extends about 0.4 mile N of the N side of Scott Point.

Anchorage.—The area in this port which is available for anchoring is restricted by Hope Island (43°20'S., 147°03'E.), which lies close to the S edge of a bank, with depths of less than 9.1m, extending about 1.5 miles S from a position about 1.2 miles NE of Esperance Point. A light is shown from the E end of Hope Island.

The main anchorage for the port lies 1 mile WNW of Hope Island, in a depth of 25m. A sheltered anchorage, 0.3 mile wide, lies in the channel, in depths of 13 to 40m S of Hope Island. Another anchorage lies in a depth of 11 to 15m, 0.2 mile NNE of Hope Island Light.

3.52 **Dover** (43°19'S., 147°01'E.) (World Port Index No. 54830) lies in the NW part of Port Esperance. There is a wharf, marked by a light, with a frontage of 31m and a depth alongside of 6.1m, available for vessels drawing up to 5.5m.

Huon Island lies 4 miles NE of Esperance Point and about 1.7 miles E of Huon Point. The island is wooded and conspicuously green. There are some houses and a small pier on its N side. A light is shown on the SE side of the island. A light is also shown from a position 1 mile N of Huon Island Light, near Charlotte Cove (43°16'S., 147°09'E.).

The **Huon River** (43°15'S., 147°05'E.) is about 2.7 miles wide at its entrance between Huon Point and Ninepin Point, 2.7 miles to the E. The river entrance W of Huon Island has depths up to 46m. Off Cygnet Point, 3 miles above the entrance, on the E side of the river, there are depths of 28 to 29m. Off One Tree Point Light, 8 miles above the entrance, there are depths of 18.3 to 20.1m, decreasing to 7m about 1.5 miles above the light on One Tree Point.

Garden Island lies on the E side of the Huon River just inside the entrance. The island about 0.7 mile in length, N-S, and shows a light on its SW side. The N part of the island lies in Garden Island Bay.

Cygnet Point lies 2 miles NW of Garden Island Light. The point is the SE entrance point to Port Cygnet. The port extends 4 miles N from the point. The E shore of Port Cygnet is broken and irregular, consisting of points and bights. There are several small jetties on the W side of Port Cygnet, in which the general depths are 11 to 20.1m. The head of the port dries. Beaupre Point, the NW entrance point to the port, shows a light. The town of Cygnet lies at the head of the port.

A marine farm has been established approximately 1 mile S of Port Huon, along the W side of the Huon River, just S of Pillings Bay.

3.53 **Port Huon** (43°10'S., 146°59'E.) (World Port Index No. 54810) lies on the N side of Hospital Bay, about 0.2 mile W of Shipwrights Point. The port consists of a pier, the E side of which is 173m in length with a depth of 7.6m alongside, and the W side is 203m in length with a depth of 9.7m alongside. The least depth in the approach channel is 9m. There is a jetty for small vessels about 0.3 mile W of the pier. A light is shown from the head of the pier.

A T-head jetty, extending about 0.1 mile offshore, is situated on the S shore of Hospital Bay. It has a length of 82.3m alongside the outer face, with a depth of 8.2m (1995) alongside.

Mooring buoys and dolphins are situated close off each end of the T-head and lights are shown from the head of the jetty. The ruins of a jetty lies close SE of the above jetty.

Pilotage.—Pilotage is compulsory for vessels of over 35m in length, unless exempted. Requests for pilots, giving the ship's ETA at the pilot station, should be made to the Harbormaster, Hobart, at least 24 hours in advance.

Pilots board, as follows:

1. If approaching from the N—1.5 miles E of Kellys Point. Confirmation or amendment of ETA should be made 2 hours in advance.
2. If approaching from the S—1.5 miles ESE of Burnett Point. Confirmation or amendment of ETA should be made 7 hours in advance.

Anchorage.—There is good anchorage in Hospital Bay, with plenty of room for small vessels, in a depth of 9.1m, at a distance of 0.3 mile, bearing 235° from Shipwright Point, soft mud. Large vessels can take anchorage about 0.3 mile W of **Bullock Point** (43°11'S., 146°59'E.), in a depth of 12.8m, mud.

Huon Island to North West Bay

3.54 Arch Islet (43°17'S., 147°11'E.) is a perforated rock, 15.3m high, lying 1.5 miles E of Huon Island and 0.5 mile offshore.

Anchorage.—Anchorage may be taken, in a depth of 10.9m, about 0.2 mile NE of Arch Islet.

Three Hut Point lies 3 miles NE of Arch Islet. The village of Gordon lies close behind the point. There is a pier off the village that is available to vessels of 2.4m drafts.

During W and NW winds, an anchorage is afforded, in a depth of 8.3m, good holding ground, off Three Hut Point.

Middleton (43°14'S., 147°16'E.) lies 2.5 miles NNE of Gordon. A lighted beacon stands at the end of a submarine cable 0.5 mile SSE of Middleton.

Anchorage.—Anchorage can be taken, in 8.2m, 0.5 mile N of the lighted beacon and 0.3 mile offshore. A beacon is moored close W of the anchorage.

Green Islet, which is grass-covered, lies in the middle of D'Entrecasteaux Channel, about 2.5 miles NNE of Middleton. Depths of less than 11m extend about 0.3 mile E of this islet. A light is shown on the W side of the islet.

Woodbridge (43°10'S., 147°15'E.) is a village that stands on the cliffs at the head of Peppermint Bay. A small jetty fronts the village.

Anchorage.—Anchorage may be obtained, in a depth of about 11m, mud, about 0.4 mile off the village. A light is shown from the jetty.

Little Oyster Cove lies 2 miles N of Peppermint Bay. The cove is 0.3 mile across the entrance and recedes 0.8 mile, with depths of 9.1 to 10.6m in the outer portion. The inner part, with depths of 5.5 to 6.4m, has several jetties on the S side with depths up to 3.6m alongside. A light is shown from a ferry wharf near the W end of the cove.

Channel Rock (43°07'S., 147°17'E.) is a small rocky patch 0.1 mile in extent and having a depth of 3.7m. The rock lies 0.2 mile S of Simmonds Point beacon. When approaching this area vessels should keep well to the E of the rock. A submarine cable is laid across the channel in an E direction from Simmonds Point to Woodcutters Point on North Bruny Island. The shore landings are marked by beacons on both points and anchorage is prohibited within 0.1 mile of the line of these marks.

North West Bay (43°03'S., 147°17'E.) is entered between Snug Point and a point about 1.5 miles to the NNE. Within its entrance the bay extends 4 miles in a N direction and 2 miles from its entrance to its W shore. A number of villages dot the shores of the bay. A T-shaped jetty for explosives is situated on the E shore of the bay. Marine farms have been established in the bay.

3.55 Electrona (43°04'S., 147°16'E.) lies on the W side of the bay, about 2.2 miles NW of Snug Point.

Pilotage.—Pilotage is compulsory for all vessels over 35m in length. Vessels bound for Electrona Jetty embark the pilot 1.5 miles E of Kelly Point, the N extremity of North Bruny Island.

Requests for pilots, giving the ship's ETA at the pilot station, should be made to the Harbormaster, Hobart, at least 24 hours in advance; confirmation or amendment of the time should be made at least 2 hours before arrival in the case of ships embarking a pilot off Kelly Point.

Anchorage.—Anchorage may be obtained, in a depth of 12.8m, about 0.6 mile NW of Hurst Point.

Margate (43°02'S., 147°16'E.) is a small town which lies about 1.5 miles N of Electrona. There is a small jetty, with a depth of about 3.6m at its head, situated at the fish cannery about 1 mile S of Margate. A light is shown from the jetty.

Anchorage.—Anchorage may be obtained, in depths of 11 to 12.4m, about 0.6 mile SE of Dru Point (43°02'S., 147°17'E.).

Pierson Point (43°03'S., 147°21'E.) lies 1.5 miles ENE of the N entrance point to North West Bay. The point is high and cliffy and forms the NW side of the N entrance of D'Entrecasteaux Channel. A light is shown from Pierson Point.

Anchorage.—Anchorage may be obtained in Tinderbox Bay, 0.7 mile SW of Pierson Point, in a depth of 14.6m, mud bottom.

Bruny Island

3.56 Bruny Island (43°18'N., 147°18'E.) is 27 miles long from Tasman Head to Kelly Point in a S-N direction. The island is 9 miles wide across its S side. The W coast of the island forms the E shore of D'Entrecasteaux Channel. Bruny Island consists of South Bruny Island and North Bruny Island, which are connected by a narrow sandy isthmus lying between Isthmus Bay to the W and Adventure Bay to the E.

Bruny Island—South and West Coasts

3.57 Tasman Head (43°31'S., 147°18'E.), the S point of South Bruny Island, 300m high, forms the NE point of the S entrance point of D'Entrecasteaux Channel. The headland is high, abrupt, and composed of basaltic pillars. Bridge Rock (Arched Rock), 52m high, lies about 0.1 mile offshore SE of Tasman Head.

Friar Rocks lie from 0.5 mile to 1.2 miles S of Tasman Head. Passage between the N rocks and Tasman Head is reported to be free of dangers, but passage between the rocks should not be attempted. The sea breaks over the S rock of the group.

Cloudy Bay (43°29'S., 147°13'E.), a bight in the S end of South Bruny Island, exposed to all the fury of SW gales, is 3 miles wide at its entrance between East and West Heads. The bay extends 3.2 miles to the N to a long narrow tongue of land which separates the bay from Cloudy Lagoon. With the exception of small craft, no vessel should anchor in Cloudy Bay unless it is absolutely necessary to do so, in which case the best position is in Mabel Bay (Half Moon Bay).

Cape Bruny (43°30'S., 147°09'E.), the SW point of South Bruny Island, lies 1.5 miles SSW of West Cloudy Head. A light is shown on Cape Bruny. The land near the cape is covered with grass and scrub, and about 0.7 mile NNW of the cape is Mount Barren, a good landmark. Courts Isle extends from a few meters to 0.5 mile S of the cape.

A rocky bank, with depths of 22 to 33m, extends about 2.2 miles SW from Cape Bruny. The sea breaks over this bank in heavy weather.

Standaway Bay extends from Cape Bruny NW 4 miles to Point Labillardiere, 1 mile S of Hopwood Point, which shows a light. Mount Bleak, 155m high, rises close E of Point Labillardiere. This point has been reported to give good radar returns up to 16 miles.

3.58 Partridge Isle (43°24'S., 147°06'E.) lies 0.7 mile NNE of Hopwood Light. The island is private property.

There is anchorage, in 18.3m, mud bottom, with Hopwood Point in line with the S extremity of Partridge Isle, bearing 216°, and the N extremity of the island bearing 317°.

Pilotage.—Pilots for ports in D'Entrecasteaux Channel or the Huon River board vessels from a motor boat between the S end of Partridge Isle and the E end of South Port Isle. Vessels bound for Hobart or Port Huon requiring a pilot off Partridge Isle should notify the harbormaster at least 24 hours prior to the ETA off the isle.

Great Taylor Bay (43°25'S., 147°09'E.) is 2.5 miles wide at its entrance and 3.5 miles long in a S direction. Partridge Isle forms the W entrance point of the bay. Depths in the bay range from 31m at the entrance to 14.6 and 16.4m 1 mile from the head of the bay, then gradually shoaling. A small pier is situated on the W side of the head of the bay.

Great Taylor Bay is too large to afford shelter from gales at all times, although the bottom is black mud, it is hard and vessels have dragged their anchors, even with a long scope of chain.

Anchorage.—Anchorage may be taken off the E side of Partridge Isle, in a depth of 18.3m, mud and sand, about 0.3 mile E of its E extremity (43°24'S., 147°07'E.).

3.59 Ventenat Point (43°21'S., 147°12'E.) lies 4.5 miles NE of the N extremity of Partridge Isle and forms the W side of the entrance to Little Taylor Bay. There are shoal patches 8 and 10m lying 1 mile N and NW, respectively, of Ventenat Point, and a reef marked by a beacon extends about 0.1 mile N from the point.

Zuidpool Rock (43°20'S., 147°10'E.), which is steep-to, lies near the middle of D'Entrecasteaux Channel, 1.7 miles NW of Ventenat Point. A light is shown on Zuidpool Rock.

Little Taylor Bay lies on the SE side of D'Entrecasteaux Channel and is entered between Ventenat Point and a point about 1.5 miles ENE.

Anchorage.—Anchorage may be obtained, in depths of 7.3 to 9.1m, sand and mud, between 0.5 mile and 0.7 mile SE of Ventenat Point, sheltered from S and W winds. The bay is available for large vessels, but the anchorage cannot be considered good. Daniels Bay is a shallow bight on the E side of the bay and is not recommended as an anchorage.

3.60 Satellite Island (43°19'S., 147°13'E.) lies about 1 mile N of the E entrance point of Little Taylor Bay. The island is cultivated and has a thick grove of trees on its W side. There is a pier, with a depth of 2.4m, on the NE side of the island. About 0.7 mile ENE of the island stands the village of Alonnah, at which there is a breakwater. A light is shown on each corner of the seaward end of the breakwater. A stranded wreck, marked by a light, lies about 0.3 mile SW of the breakwater. A light is shown from the shore about 1 mile NNE of Alonnah Breakwater.

Isthmus Bay (43°15'S., 147°19'E.) is entered between Simpsons Point, the N extremity of South Bruny Island, and The Bluff, 2.5 miles E of Simpsons Point. The E shore of the bay consists of a narrow isthmus, which is bordered by a flat on its W side, and which joins South Bruny Island to North Bruny Island in its center and separates the waters of D'Entrecasteaux Channel from those of Adventure Bay. The village of Simpsons Bay lies on the W side of the bay. There is a small pier, for vessels drawing 2.4m, close off the village.

Great Bay is entered between the N entrance point of Little Fancy Bay and Stockyard Point, about 1.7 miles to the NW. Depths in the bay are 9.1m at the entrance, shoaling gradually to 5.5m at 0.5 mile from the head of the bay. Adams Bay, which is mostly shallow, lies in the NE portion of Great Bay, and Ford Bay, also shallow, lies in the S part of the bay.

Missionary Bay (43°11'S., 147°19'E.) lies between Stockyard Point and Soldier Point, 1.5 miles to the W. Depths in the bay range from 8m in the entrance to about 2m at the head of the bay. Snake Islet lies 0.5 mile NW of Soldier Point and is grass covered. A rocky patch extends 0.2 mile SW from the S side of the islet. A beacon marks the SW edge of the patch.

Kinghorne Point, which shows a light, lies about 0.7 mile NW of Snake Islet. Roberts Point which also shows a light, lies 1.5 miles N of Kinghorne Point and forms the N entrance point to Apollo Bay, which has depths of 9.1 to 16.5m. Leading lights, in line bearing 194°, are established 0.6 mile ENE of Roberts Point.

3.61 Barnes Bay (43°08'S., 147°20'E.) lies between Lennonville Point, which shows a light, and Quarantine Point, a rounded projection 0.9 mile to the ENE. Immediately S of Lennonville Point is a small cove in which small vessels may anchor, in a depth of about 12.8m.

Sykes Cove forms the S part of the bay. In the NE corner of the bay is a narrow channel leading into Simmonds Bay, an inlet extending N-S with depths of 5.5 to 7.3m in either end. A light is shown on the S side of the inlet. Shelter Cove lies on the NW side of Barnes Bay and on its E side stands the quarantine station. There is a small pier for boats off the quarantine station; a light is shown from Quarantine Point, about 0.7 mile S of the small pier.

There is anchorage, in a depth of 18.3m, mud, at the entrance to Shelter Cove, partially sheltered from NW winds.

Bligh Point, which shows a light, lies 2.5 miles N of the en-

trance to Barnes Bay. In the bights on both sides of Bligh Point there is shoal water. From this point, the coast trends about 2 miles in a NE direction to Kelly Point, which forms the SE side of the N entrance of D'Entrecasteaux Channel.

The channel entrance has depths of 10.9 to 14.6m in the fairway. There is a considerable amount of kelp off Kelly Point; shoal water extends for 0.1 mile to the N and 0.1 mile to the W of the point.

Bruny Island—East Coast

3.62 **Bull Bay** (43°05'S., 147°22'E.) lies about 1.2 miles SSE of Kelly Point and is entered between Cape de la Sortie and Bull Bay Point, 1.2 miles to the SSE.

Anchorage.—Anchorage may be obtained, in a depth of about 12.8m, sand, about 0.3 mile N of Bull Bay Point.

Yellow Bluff (43°08'S., 147°24'E.) which may be identified by its conspicuous yellow cliffs, lies 2.5 miles SSE of Bull Bay Point. Trumpeter Bay lies 1.5 miles S of Yellow Bluff and is opened to SE winds. There are a few houses near the shore, as well as a landing place on the sandy beach near the center of the head of the bay, off which is the best anchorage, in depths of 14.6 to 18.3m.

Variety Bay lies 2.5 miles SSE of Trumpeter Bay. The shores of the bay are thickly bordered with kelp extending up to 0.2 mile offshore. In the S part of the bay, a small vessel may obtain some shelter from SE winds in a depth of about 18.3m, about 0.1 mile outside the kelp.

Cape Queen Elizabeth (43°15'S., 147°26'E.) is a precipitous grassy bluff which lies 3 miles S of Variety Bay. The Hounds Tooth, a bare rock of conical shape, 75m high, lies close off the cape. The cape forms the SE extremity of North Bruny Island.

Adventure Bay is entered between Cape Queen Elizabeth and Penguin Islet, about 6.2 miles SSW. The W side of the bay is formed by the sandy isthmus that connects North Bruny Island with South Bruny Island. The SW part of the isthmus is flat with scattered trees, and the NE part is composed of sand hills.

The depths in the bay are regular, over a sandy bottom, depths of 18.3m being generally found about 0.5 mile offshore. Vessels should avoid anchoring in the vicinity of Moorina Bay, as the bottom is rocky and uneven.

The best berth is off a small sandy bight about 0.7 mile WSW of Penguin Island in a depth of 18.3m, with good holding ground and protected from all but N and NE winds.

Fluted Cape (43°22'S., 147°23'E.) lies about 1 mile SE of Penguin Island. The cliffs of the cape are composed of basaltic columns and are from 213 to 235m high. The summit of the cape, which is well-marked, is 290m high, and like the neighboring country is thickly wooded. Cape Connella, a bold bluff, lies about 1.5 miles S of Fluted Cape.

Mangana Bluff, a bold headland, lies about 3 miles SSW of Cape Connella. Close S of the bluff lies Arched Islet, flat-topped and 24.4m high. Boreel Head lies 1.5 miles NE of Tasman Head and consists of a double-headed point, which forms a bold headland rising to an elevation of 232m at its N end.

The Derwent River

3.63 The **Derwent River** (43°00'S., 147°22'E.), from its entrance between Cape de la Sortie and Iron Pot Islet, which shows a light, trends N about 11 miles to Hobart, above which it extends 120 miles to its source. The river has a width of about 2 miles from its entrance to the SE part of Hobart and a least depth of about 15.2m in the fairway.

A submarine cable is laid across the river from a position about 3 miles N of Iron Pot Islet. Anchorage is prohibited within 0.5 mile of the cable; the landing places are marked by a beacon on each shore.

The Derwent River—West Shore

3.64 The W shore of the river from Peirson Point trends 2.5 miles NNW to the S point of Blackman Bay. The bay extends N-S for 0.5 mile and indents the coast for about 0.3 mile. Depths in the bay range from 10.9m at the entrance to 1.8m at its head.

Kingston Bay (42°59'S., 147°19'E.) lies about 1.5 miles N of Blackman Bay. Depths in the bay range from 16.4 to 21.9m in the entrance, to 1.8 to 2.7m at its head. Browns River Entrance is located on the NW side of the bay and the town of Kingston Beach stands on its S shore.

Alum Cliffs, which are conspicuous, extend from the N side of the entrance to the Browns River, to the SW end of Taroona Beach, about 0.5 mile SW of **Crayfish Point** (42°57'S., 147°21'E.). A red beacon stands close off Crayfish Point.

Blinking Billy Point (42°55'S., 147°22'E.) lies 2.2 miles N of Crayfish Point. The point is rocky, and from it, John Garrow Shoal, with depths of less than 11m, extends about 0.3 mile to the E. A light is shown inside the shoal from a position about 0.3 mile E of Blinking Billy Point. A light is shown 0.5 mile SW of Blinking Billy Point. Little Sandy Bay lies between Blinking Billy Point and Sandy Bay Point, about 0.3 mile NNW. A dolphin stands close inshore at the S end of the bay.

Submarine pipelines extend E and ESE from Blinking Billy Point, terminating at the 5m and 20m depth curves, respectively.

Sandy Bay (42°54'S., 147°20'E.) is entered between Sandy Bay Point and Battery Point, about 1.5 miles NW, and is backed by the suburb of Sandy Bay. A conspicuous casino and hotel stand on Wrest Point; a radio mast stands about 1 mile SW of the casino. A T-headed pier, with a depth of 2m alongside, lies about 100m W of Wrest Point.

The Derwent River—East Shore

3.65 The E shore of the river from Cape Direction to Gellibrand Point, about 5 miles N, is formed by a peninsula, mostly covered with trees, which separates the S portion of Ralph Bay from the Derwent River. The peninsula is mostly low land, but there are two fair size hills; the higher stands about 0.5 mile NW of Cape Direction while the smaller lies 2 miles S of Gellibrand Point.

Half Moon Bay (43°01'S., 147°24'E.) is entered between Johns Point and The Pigeon Holes, about 1.7 miles to the N. The head of the bay consists of a sandy beach and has depths of 5.5m, about 0.1 mile off the beach. The town of South Arm, off which there is a small pier, stands on the SE shore of the bay.

It was reported (1994) that a buoy, marking foul ground, has been established in approximate position 43°01.5'S,

147°22.5'E. Mariners are advised to steer well clear of this area.

Opossum Bay, which has a sandy beach, lies between a point about 1 mile N of The Pigeon Hole and White Rock Point, about 1 mile farther N. Depths of 5.5m extend about 0.1 mile offshore, and the town of Opossum Bay stands at the S end of the bay. A light is shown on White Rock Point.

Ralph Bay (42°57'S., 147°26'E.) is entered between Gellibrand Point and Trywork Point, 1.5 miles N. The entrance to the bay between the two points is about 1.2 miles wide and has a depth of from 12.8 to 26m, but inside the bay the water is mostly shallow.

Mortimer Bay is an indentation of the E shore of Ralph Bay, between 2 and 3 miles ESE of Gellibrand Point. From Maria Point, the NW extremity of Mortimer Bay, the E shore of Ralph Bay trends N 3.5 miles to the foot of Mount Mather.

Tranmere (42°55'S., 147°25'E.), the SE suburb of Hobart, lies at the foot of a narrow peninsula and about 2 miles N of Trywork Point. About 1 mile N of Tranmere Point is Punchs Reef, with depths of less than 11m.

Kangaroo Bluff lies about 2 miles WNW of Punchs Reef. The bluff forms the S entrance point of Kangaroo Bay and the NW point of the quarantine anchorage for Hobart. A light is shown on Rosny Point, the W entrance point to Kangaroo Bay.

Hobart (42°53'S., 147°20'E.)

World Port Index No. 54760

3.66 Hobart, the capital city of Tasmania, situated on the Derwent River, also serves as a principal port and maintains a port control station. Contact on VHF channel 16 (listening frequency) and VHF channel 12 (working frequency) with the port may be established at an extended range exceeding 50 miles, enabling passing vessels to establish contact with Hobart Port Control.

Hobart Port

http://www.tasports.com.au

Tides—Currents.—The tides at Hobart are irregular; the maximum rise and fall is 1.4m. The flood current is barely perceptible between Iron Pot Islet and Kelly Point, but from this point to Hobart it attains a rate of 0.5 knot. Between Macquarie Point and Rosny Point, the ebb current runs 1.5 knots at half tide; off Battery Point it runs about 170°, sweeping around Sandy Bay at the rate of 0.8 knot, and after passing Sandy Point, its strength gradually decreases to 0.5 knot at the entrance to the river.

Depths—Limitations.—The Tasman Bridge spans the Derwent River about 1 mile N of Rosny Point. The center span, with a navigable width of 73m and a vertical clearance of 44m, is authorized for use by vessels over 25m in length. The two adjacent spans, each with a navigable width of 44m and a vertical clearance of 44m, are authorized for vessels between 25 and 15m in length. Vessels 15m long and less may use the spans outside the spans mentioned above. Vessels more than 50m may not approach within 0.2 mile of the bridge when visibility is less than 1.5 miles. A height restriction of 47.0m exists between the center span.

The Bowen Bridge spans the Derwin River at Dowsing Point. The main channel, with a width of 46m between Pier 4 and Pier 5, has a vertical clearance of 14.5m. The total channel width at the bridge is 93m.

Hobart Port Facilities			
Berth	**Length**	**Depth**	**Remarks**
Prince's Wharf			
Inner	65m	7.5m	
1	138m	7.3m	Ro-ro.
2	100m	7.9m	
3	88m	9.0m	Privately owned.
4	120m	7.2m	Ro-ro. Privately owned.
Elizabeth Street Pier			
South	157m	8.1m	
North	153m	7.2m	
Macquarie Wharf Complex			
1	169m	4.1 at inner end	Containers.
2	154m	9.1m	
3	175m	10.0m	
4	244m	12.0m	
5	135m	13.0m	Ro-ro.
6	189m	10.5m	Ro-ro.
Self's Point Petroleum Product Wharf			
1	100m	14.0m	T-head wharf; 258m between dolphins.
Risdon Wharf			
2	250m	10.2m	Privately owned.
Shag Bay			
		6.5m	150m into the bay.

Heading S on the Derwent River, past Macquarie Point, the Macquarie Wharf complex lies on the W bank. At the head of Sullivans Cove lies the Elizabeth Street Pier. The Prince's Wharf lies on the S side of Sullivan Cove. Risdon Wharfs, which are privately owned, are situated about 2 miles above the Tasman Bridge. Vessels proceeding to Self's Point Oil Berth must also pass under the bridge.

Pilotage.—Pilotage for Hobart is compulsory for vessels over 35m in length, unless the master holds a current Pilotage Exemption Certificate.

Requests for pilotage should be made through the Harbormaster, Hobart, at least 24 hours in advance; the vessel's ETA should be confirmed or amended 3 hours in advance.

Vessels bound for Port Huon and Spring Bay should confirm their ETA 6 hours in advance.

Courtesy Hobart Ports Corporation

Elizabeth Street Pier, with Prince's Wharf in background

When within 6 miles of Iron Pot Light, vessels must display the appropriate signals.

Vessels awaiting pilot should anchor S of 42°55'S, in a depth of 22m, good holding ground.

The port of Hobart includes all waters of D'Entrecasteaux Channel and Storm Bay N of a line joining Southport Islet (43°29'S., 147°01'E.), 15 miles NE of South East Cape to Cape Raoul (43°14'S., 147°48'E.), 37 miles NE and of all bays and estuaries opening either into the channel or the bay.

Regulations.—No vessel may anchor or weigh anchor, except in case of necessity, above a line drawn from Sandy Bay Point to Kangaroo Bluff, except under the direction or by permission of the harbormaster. This rule does not apply to vessels anchored out of the fairway and not interfering at all with navigation.

Vessels are forbidden to sound sirens or whistles above a line drawn from Secheron Point to Kangaroo Bluff, except to prevent collision, when short blasts may be sounded as required.

Vessels must not be navigated at such speed as to damage, or be likely to damage, any wharf, shore, or bank, or any other vessel, or to interfere with the navigation of any other vessel, except by permission in writing from the harbormaster.

Vessels entering the harbor are to indicate their intended berth by displaying the appropriate numeral pendant together with the pilot flag. Outbound vessels are to display the International Code answering pendant below the pilot flag.

A copy of the "Rules and Regulations of the Port of Hobart" may be obtained from the harbormaster.

Vessels greater than 35m in length may not pass under the Taman Bridge on Monday through Friday, from 0700 to 0915 and from 1600 to 1830. A vessel intending to pass under the bridge shall sound one long blast upon entering the main navigation channel.

Anchorage.—Anchorage may be obtained in almost any part of the Derwent River. The safest part on all occasions is on the W side of the river. There are a number of prohibited anchorages which are clearly indicated on the chart.

Merchant vessels with explosives aboard may not anchor N of a line joining **Battery Point** (42°53'S., 147°20'E.) and Rosney Point, nor within 0.2 mile of the shore without the written permission of the harbormaster. Those vessels carrying explosives may anchor off Powder Jetty, about 0.4 mile NNW of Macquarie Point.

The Quarantine Anchorage lies between the latitudes of the John Garrow Shoal Light to the N and White Rock Point to the S, excluding Ralph's Bay. In the anchorage there is a depth of 20m, soft mud.

The Derwent River above the Tasman Bridge

3.67 Cornelian Bay (42°51'S., 147°19'E.) lies on the W side of the river, about 0.7 mile above the bridge. The bay affords anchorage for moderate size vessels, in 8.2m, mud bottom, 0.2 mile from Cornelian Bay Point, bearing 359°. A beacon marks the S end of a shoal projecting from Cornelian Bay Point.

New Town Bay lies on the W side of the river, about 0.7 mile N of Cornelian Bay. The bay is entered between the NE extremity of a peninsula which separates it from Cornelian Bay, and Woodman Point, about 0.5 mile NNW.

Anchorage.—Anchorage for small vessels may be obtained, in a depth of about 5.5m, about 0.2 mile S of **Rock Cod Point** (42°50'S., 147°19'E.). A beacon marks the edge of a bank 0.1 mile E of Rock Cod Point.

Lindisfarne Bay (42°51'S., 147°21'E.) lies on the E side of the river, about 0.5 mile NE of the Tasman Bridge. A beacon marks the edge of the coastal bank close S of Lindisfarne Point, on which there is a monument. A marina lies close NE of the point. A beacon stands on the edge of the coastal bank on the E side of the bay, 0.2 mile E of Lindisfarne Point.

Anchorage.—Anchorage may be obtained by a moderatesized vessel, in a depth of about 9.8m, about 0.1 mile S of Lindisfarne Point, but it is not recommended as it is exposed W and close to a submarine cable. A number of small piers stand on each side of the bay.

Geilston Bay is located on the E side of the river, about 1 mile NW of Lindisfarne Bay, and is entered between Limekiln Point and Bedlam Walls Point. The bay is mostly shoal. Shag Bay, a small inlet, lies about 0.5 mile NW of Geilston Bay.

Prince of Wales Bay (42°50'S., 147°18'E.) is a large, but shallow, inlet divided into three arms, with a common entrance on the W side of the river, on the S side of Dowsing Point. A wharf extends from Doss Point, 0.2 mile inside the entrance to the bay. A tower stands on a hill about 0.3 mile W of Doss Point.

There is anchorage, in a depth of about 15.5m, about 0.2 mile E of Dowsing Point.

Hobart

Cape Direction to Cape Pillar

3.68 Hope Beach (43°02'S., 147°27'E.) forms a slight curve extending from Cape Direction in a ENE direction for 3 miles to Goat Bluff, a small cliffy point, on which there is a small hillock. The beach, which is low and narrow, is the only barrier between Ralph Bay and the sea.

Betsys Island, about 1.2 miles long and 0.5 mile wide, lies about 1 mile S of Goat Bluff. The island is bold and precipitous; landing can only be made on the N side on a cobblestone beach near a ruined hut. Little Betsy Islet lies about 0.2 mile to the S. A number of rocks on which the sea breaks lie about 0.3 mile SSE of Little Betsy Islet.

Black Jack Rocks (43°02'S., 147°29'E.) lie in the middle of the passage between Goat Bluff and Betsy Island. The passage forms a convenient short cut for small vessels proceeding between Hobart and Frederick Henry Bay. A light is shown from the rocks.

Frederick Henry Bay (42°55'S., 147°35'E.) is entered between Cape Deslacs and North West Head, 3 miles E. The bay indents the coast 9 miles from its entrance to its head and is from 5 to 6 miles wide. The bay is fairly clear of dangers and has depths of 18.3 to 20.1m at its entrance and 7.3m about 0.5 mile off its head.

Pipe Clay Lagoon lies in the SW part of the bay, about 1.7 miles NW of Cape Deslacs. Single Hill lies on the NW side of the bay and shows an aero light from its summit.

Mount Rumney (42°52'S., 147°27'E.), 2.2 miles WNW of Single Hill, also shows an aero light. Aero lights are also shown 5.2 and 5.5 miles NNE of the summit of Mount Rumney.

3.69 Seven Mile Beach (42°51'S., 147°33'E.) forms the head of Frederick Henry Bay. At the E end of the beach is a narrow

opening which leads into Pitt Water, a shallow lagoon. Spectacle Island lies 1.2 miles S of the entrance to Pitt Water and close W of Spectacle Head. Carlton Bluff lies 2 miles ESE of Spectacle Island and looks like an island from the bay. On its N side is the entrance to the Carlton River, used by ketches at HW.

Bass Shoal, with depths of less than 11m and a least depth of 5.8m near its SE corner, lies across the approach to Norfolk Bay, between the N end of Sloping Island and Carlton Bluff. Isle of Caves lies on the NE corner of Bass Shoal and derives its name from two caves in the cliff at its SW corner.

The E side of the approach to Frederick Henry Bay, extending from Outer North Head 4.5 miles N to North West Head, is a bold, broken up shore, on which the sea always breaks heavily, rendering landing practically impossible. It is steep-to all along and in places lined with kelp.

Outer North Head (43°04'S., 147°38'E.) is a yellow, bold, and cliffy point. Flat Rock, on which the sea always breaks, lies about 0.2 mile SW of the head. Foster Rock, which breaks in heavy weather, lies 0.3 mile W of Outer North Head. Storm Cove, with a least depth 10m, lies 2.7 miles N of the head and is surrounded with kelp, behind which fishing boats obtain shelter from W winds.

North West Head (43°00'S., 147°38'E.) lies 4.5 miles N of Outer North Head and forms the E entrance point to Frederick Henry Bay. Sloping Main, a white sandy beach with a small pier near its S end, lies about 2.5 miles NE of North West Head. Sloping Island lies 2.5 miles NNW of Sloping Main. The island is about 1 mile long and partly wooded. A small islet lies off its SW side.

Green Head (42°56'S., 147°40'E.), a yellowish cliffy point, forms the N extremity of the Tasman Peninsula. The approach to Norfolk Bay lies between Green Head and Renard Point, about 2.2 miles N. Hog Islet lies about 0.5 mile SW of Green Head.

Flinders Channel, the main channel into Norfolk Bay, is entered from Frederick Henry Bay close N of Sloping Island and S of Bass Shoal. The channel is about 0.5 mile wide and contains no known dangers. The channel between the N end of Bass Shoal and Carlton Bluff has a least depth of 10m; to the E it joins Flinders Channel.

3.70 Norfolk Bay (42°58'S., 147°47'E.) is bound on the W and S sides by the Tasman Peninsula and on the E side by the Forestier Peninsula. It is perfectly landlocked, clear of dangers, and affords anchorage, in depths of 12.8 to 18.3m, good holding ground. A marine farm, best seen on the chart, has been established in Norfolk Bay.

From Renard Point, the coast extends to the E in a succession of small bays and low grassy points for 5 miles to Dunalley Bay. A range of well-wooded hills extends along the coast with occasional cleared patches and farm houses. Fulham Island lies on the W side of Dunalley Bay and has been reported to be a good radar target for up to 18 miles.

Dunalley Bay (42°55'S., 147°47'E.), which is fronted by a drying sand bank, lies between the point about 0.4 mile NNE of Fulham Island, and Dunhabin Point, about 2.2 miles SSE, and has depths of less than 5.5m extending about 1.5 miles offshore. Smooth Island lies on the SW end of the shore bank in Dunalley Bay.

There is good anchorage, in depths of 7.3 to 9.1m, under the SE part of Smooth Island.

The **Denison Canal** (42°54'S., 147°48'E.), which is spanned by a swing bridge near its SW entrance, is only used by small vessels with local knowledge. The canal should be transited only at high tide. A superintendent is in charge of all traffic passing through the canal. The canal will only be used between the hours of 0800 and 1700. There is a minimum depth of 2.2m in the canal. A depth of 1.1m has been reported (2006) over a shallow area close NE of the E entrance.

Traffic signals are shown on the W side of the canal, about 0.1 mile within the SW entrance. Green or red leading lights are shown on the W side of the SW entrance, and in line bearing 024°, lead through the SW approach channel.

The approach channels to the canal and the dredged cut are all marked by beacons.

Traffic signals for outbound vessels are shown from the N side of the canal. Two red lights, disposed horizontally, indicate the channel is obstructed. A green directional light bearing 264° indicates that vessels may proceed, and marks the channel.

Information regarding the Denison Canal and the Marion Narrows can be found in the Publications section of the Marine and Safety Tasmania web site.

Marine and Safety Tasmania

http://www.mast.tas.gov.au

3.71 Dunalley (42°53'S., 147°49'E.), a small town, is situated close N of the NE entrance to the canal. Two piers front the town, and two small piers lie 0.2 mile NE. The piers are used mainly by fishing boats.

King George Island lies on the E shore of Norfolk Bay, about 1.5 miles E of Smooth Island. Between the island and Chronicle Point, about 0.5 mile SW, is the entrance to King George Sound, a shallow inlet at the head of which is the village of Murdunna. There is a ruined jetty about 0.4 mile NW of the village; several small jetties front the shore to the W.

Flinders Bay (42°59'S., 147°50'E.) lies 1 mile S of King George Sound. There are depths of 12.8m in the entrance; the depths gradually decrease to the head of the bay. From about 0.7 mile S of the S entrance point of the bay, **Flinders Reef** (43°01'S., 147°50'E.), a foul spit, extends about 0.3 mile SW.

Eaglehawk Bay lies about 2 miles SSE of Flinders Bay and is entered between Heather Point and Dart Island. The bay narrows from its entrance into a long inlet; its inner 1.5 miles is shallow. At its head is Eaglehawk Neck, a narrow isthmus, which is only about 20m wide in one place. This neck connects the Forestier Peninsula with the Tasman Peninsula and separates Eaglehawk Bay from Pirates Bay, on the E coast of Tasmania. There is a ruined jetty on the N shore near Eaglehawk Neck.

Little Norfolk Bay (43°02'S., 147°51'E.) is entered between Dart Island and Mason Point and lies on the S side of Eaglehawk Bay. The bay is a shallow inlet, apart from a narrow channel of somewhat deeper water in its center. There is good shelter for one vessel, in a depth of 7.3 to 9.1m, during heavy NW weather, under Dart Island. On its E shore near the head of the bay is the village of **Taranna** (43°03'S., 147°52'E.), off which there is a ruined pier. Another ruined jetty lies on the W

side of the bay.

Cascades Bay lies about 1.5 miles SW of Little Norfolk Bay. The village of Koonya stands in a shallow cove in the SW part of the bay. The village is fronted by a ruined jetty. Impression Bay lies 2 miles W of Cascades Bay. Prices Bay lies close NW of Impression Bay. Two jetties stand at the head of Prices Bay. **Ironstone Point** (42°58'S., 147°45'E.), a low point covered with trees, lies about 1.2 miles SSE of Whitehouse Point.

3.72 Storm Bay (43°08'S., 147°41'E.) is bounded W by the E side of North Bruny Island from Cape Queen Elizabeth to Cape de la Sortie. Cape Direction to North West Head forms the N end of the bay; Outer North Head to Cape Raoul forms the E coast of the bay.

Wedge Bay (43°07'S., 147°42'E.) lies about 3.5 miles SE of Outer North Head and is entered between Lory Point and Low Point, about 2.2 miles S. The head of Wedge Bay is divided into two smaller bays by Apex Point, located about 2.5 miles NE of Low Point. At the head of the S bay is White Beach, behind which are thickly-wooded hills. Brother and Sister, two islets, lies close off the beach.

Small vessels can find secure anchorage, in depths of 5.5 to 7.3m, about 0.5 mile S of Brother and Sister.

Parsons Bay, the N bay in Wedge Bay, is entered between Apex Point and a point about 0.5 mile NW. There is well-sheltered anchorage for small vessels in the inner part of the bay, in depths of 7.3 to 14.6m.

Nubeena (43°06'S., 147°45'E.), a small village, lies at the head of the bay. There is a pier off the village available to small vessels drawing up to 3m.

Wedge Island (43°08'S., 147°40'E.) lies about 0.5 mile WNW of Low Point. The W side of the island is composed of sheer basaltic cliffs rising to an elevation of 95m.

Quoin Channel, between Wedge Island and the mainland, has a fairway with a least depth of 10m over a width of about 0.2 mile and is clear of dangers, but during heavy S gales the sea often breaks across it.

Dart Bank (43°12'S., 147°42'E.) lies about 4.5 miles SSE of the S extremity of Wedge Island. The bank has a least depth of 21.9m near its center. With a S wind there is always a heavy swell over the bank.

Three Beach Bay is 0.6 mile wide and recedes 0.5 mile, with depths in the entrance of 29 to 33m and a depth of 14.6m about 0.1 mile off its shores and 0.2 mile off a pebble beach at its head. There are two more pebble beaches on the SE side of the bay. The SE shore is cliffy and kelp extends out to depths of 9.1m off the beaches.

Tunnel Bay (43°12'S., 147°44'E.) is entered between Tunnel Point and a bold, yellow, cliffy point about 0.5 mile to the NW. There are depths of 25.6m in its entrance and 18.3m midway inside, then the depths decrease gradually toward its head, which is formed by a number of large boulders. Midway between the beach and the N entrance point, which is a round bold yellow cliff, is a point, 100m SW of which is a rock that always breaks.

3.73 Raoul Bay (43°13'S., 147°46'E.) is entered between South West Point and Hill Rock, 2 miles SE. There are depths across the bay of more than 36.6m off Hill Rock, decreasing gradually to 23.8m off South West Point. Bartlet Rock and Burton Islet lie in the S part of the bay about 0.1 mile offshore.

Cape Raoul (43°14'S., 147°48'E.) is a cliffy headland that forms the S extremity of the Tasman Peninsula. Mount Raoul, a good landmark, rises about 2 miles N of the cape. Formed of high basaltic columns, the cape presents a very remarkable appearance; it falls in sheer cliffs from a plateau covered with dense scrub. About 0.2 mile NW of the cape these basaltic columns are separated from the cliff by a deep crevasse. Between the first column and Cape Raoul, there is a narrow neck of land composed of more columns which become more separated towards the cape. North of Burton Islet, the basaltic formation of the cliffs ceases.

Basket Bay (43°12'S., 147°51'E.) lies 3.5 miles NE of Cape Raoul and on the NW side of Maingon Bay. On the SW side of the W entrance point of the bay, there is a square cave which is conspicuous from the S and SW. From this point, a cliffy shore trends about 2 miles SW to a point, immediately S of which is a cliffy gully with caves at its head; about midway between these two points is a remarkable waterfall.

Black Rock, 9.1m high and steep-to, lies about 0.2 mile S of a point 0.5 mile W of West Arthur Head. Between Black Rock and the above unnamed point is an isolated rock, which always breaks.

3.74 Port Arthur (43°09'S., 147°52'E.), at the head of Maingon Bay, is entered between West Arthur Head and Budget Head, about 1.2 miles NE. Kelp extends off most of the points inside Port Arthur to depths up to 18.3m; it always grows from a rocky bottom.

The E shore of the inlet is generally steep-to, but the W shore is indented by bays and coves, most of which afforded anchorage.

The entrance to the port is easily identified by Mount Brown, a long, flat, precipitous hill above West Arthur Head, which appears as an island against the land behind. On Budget Head, there is a remarkable pillar rock, which stands out alone when seen from the S, and above it is Arthurs Peak. The Budget, a small rock, 1.5m high, lies close offshore about 0.1 mile NW of the pillar rock.

Crescent Bay, on the W side of the entrance between West Arthur Head and Welch Point, about 0.5 mile N, always has too much swell in it to permit anchoring. Safety Cove lies about 1 mile NW of Welsh Point.

Anchorage may be obtained in the middle of the cove, in depths of 9.1 to 21.9m, but there is always a certain amount of swell.

The town of Port Arthur stands at the head of Mason Cove. There are two jetties and a slipway on the N side of the cove; another jetty is situated about 0.5 mile SSW of Commandants Point. A seaplane pontoon is also situated in the cove.

Carnarvon Bay (43°09'S., 147°51'E.), the best anchorage in Port Arthur, lies between Isle of the Dead and Frying Pan Point, about 0.5 mile NW. The bay has depths of 11 to 21.9m, sand and mud. Vessels anchor, in depths of 12.8 to 21.9m, off Mason Cove, a shallow inlet on the N side of Commandants Point.

Stewarts Bay lies between Frying Pan Point and Garden Point, the extremity of a peninsula with a long, flat, cleared top, about 0.4 mile NE.

A small vessel could find anchorage in this bay, in depths of 11 to 14.6m, but a rocky ledge and a shoal bank extend about 0.1 mile NNE from Frying Pan Point.

A submarine cable crosses the bay N from a point 0.1 mile W of Frying Pan Point. Its landing place on each shore is marked by a beacon.

3.75 **Long Bay** (43°08'S., 147°52'E.), at the head of Port Arthur, is entered between Garden Point and Evandons Point, and extends N for about 1.5 miles. For about 0.7 mile above its entrance, Long Bay has depths of not less than 9.1m; above this distance it becomes shallow and its head dries. Small craft can get within 0.5 mile of its head, where the village of Oakwood stands.

Denmans Cove lies on the E side of Port Arthur, about 3 miles N of Budget Head. Stinking Bay, at the head of which is a sandy beach, is entered between the N entrance to Denmans Cove and Evandons Point about 1 mile WNW. Stingaree Bay lies on the W side of Port Arthur, 1.2 miles W of Denmans Cove.

Cape Pillar (43°14'S., 148°02'E.) lies 10 miles ENE of Cape Raoul. The cape forms the SE extremity of the Tasman Peninsula and is the most remarkable headland on this coast, being formed of vertical columns of basalt rising to an elevation of 278m, and there forming a flat surface, the high land near the cape being for the most part without trees. According to determinations obtained in 1968, the coastline and topography in the vicinity of Cape Pillar lie about 2 miles W of their charted positions.

Tasman Island, close S of Cape Pillar, is rocky, bare, rugged, and flat-topped. At its SW end is a remarkable semi-detached rock with two peaks, the gap between this rock and the island being perfectly straight and square. On one of the peaks is a large stone resembling a lighthouse on an E or W bearing. A light is shown on the SE side of Tasman Island.

Courtesy of http://www.adagiomarine.com

Tasman Island and Point Pillar from NE

Cape Pillar to Cape Tourville

3.76 The N side of Cape Pillar is cliffy, and cliffs continue round Munroe Bight, an indentation that is entered between Cape Pillar and Cape Hauy, about 5 miles to the N. Cathedral Rock lies close off the former cape. The Lanterns, a group of prominent rocks off the latter cape.

Hippolyte Rocks (Hippolite Rocks) (43°08'S., 148°03'E.) lie about 2.2 miles ENE of Cape Hauy. They are comprised of two above-water rocks and some sunken patches. The passage between these rocks and between them and the coast is foul and should not be attempted.

Fortescue Bay, entered between Cape Hauy and a point about 1.5 miles NNW, recedes about 1.5 miles to a white sandy beach. It affords shelter only with offshore winds, as the Hippolyte Rocks in its approach are insufficient to protect it from seaward.

Pirates Bay (43°01'S., 147°56'E.) lies 6.5 miles NNW of Fortescue Bay. The bay recedes about 0.7 mile and has two sandy beaches, a small one in its S bight and a larger one along its W shore, the latter beach forming the E side of Eaglehawk Neck. The Clyde Islets lie about 1.5 miles NE of the neck.

From the N entrance point of Pirates Bay, the coast trends about 3.7 miles NE to **Cape Surville** (42°57'S., 148°00'E.). About 0.5 mile SE of this cape are The Sisters, a group of rocky islets. Mount Macgregor, with its double summit, lies behind this coast about 3 miles SW of Cape Surville. Between Cape Surville and High Yellow Bluff, about 1.7 miles N, the coast is steep and bordered by high rocks, and then for about 2 miles NW to Humper Bluff, it is bordered by above-water rocks and sunken rocks, and affords neither anchorage nor shelter as the sea breaks heavily on every part of it.

Lagoon Bay (Wilmot Cove) (42°53'S., 147°58'E.), which extends about 1.2 miles to the W, is entered between Humper Bluff and Cape Frederick Hendrick, about 0.7 mile to the N. The S shore of the bay is fronted by several rocks and islets, the largest and farthest offshore being the Kelly Islets, which lie off Humper Bluff. Rocks also extend E from Cape Frederick Hendrick.

North Bay is entered between Cape Frederick Hendrick and Cape Paul Lamanon, about 2.5 miles N. The bay recedes about 1.2 miles to a lagoon at its head. Visscher Island, which lies in the entrance to the bay, is too small to afford any protection from seaward.

3.77 **Blackman Bay** (42°52'S., 147°51'E.) is an extensive but shallow inlet which almost separates the Forestier Peninsula from the mainland and which is connected with Norfolk Bay by the Denison Canal.

The bay is entered by way of Marion Narrows, on a lighted range bearing 207.5°; these beacons may not necessarily indicate the deepest water. The channel from Marion Bay to Blackman Bay is marked by beacons. Important places in the channel are marked by lighted beacons. Local knowledge of the channel is necessary. The channel from Marion Bay through Blackman Bay to the E end of Denison Canal had a least depth of 0.3m in 2005 in the vicinity of the Beacon No. 3.

Cape Bernier (42°44'S., 147°57'E.) forms the N entrance point to Marion Bay. The cape is high and is remarkable on account of its conical shape. The S and E sides of the cape are

steep-to.

Maria Island (42°40'S., 148°04'E.) lies off the mainland between Cape Bernier and Cape Bougainville, about 13 miles N, with Cape Peron, its S extremity, located about 3.5 miles E of Cape Bernier. The island is about 11 miles long and is nearly divided into two parts by Riedle Bay on the E side and Oyster Bay on the W, with only a low sandy isthmus between them. The village of Darlington stands at the N end of the island.

Cape Peron, the SW extremity of Maria Island, is a bold headland, off of which lies three rocks. The outer rock, known locally as the Boy in the Boat, is a small steep-to pinnacle, 0.6m high, lying about 0.4 mile S of Cape Peron; the middle rock is 1.8m high. Pyramid Rock, the inner rock, is 36m high and lies close to the cape.

Riedle Bay (42°41'S., 148°05'E.) is about 2 miles wide at its entrance, from which it recedes about 1 mile. The bay affords indifferent anchorage for vessels remaining any length of time, being entirely exposed to the wind and sea from NE to S. There are depths of 16.5 to 27.4m in its SW part; in its NE part, the depths are from 9.1 to 11m.

Mistaken Cape forms the E extremity of Maria Island and lies about 3.5 miles ENE of Riedle Bay. According to determinations made in 1968, the cape lies about 2 miles W of its charted position. The cape has been reported to give good radar returns up to 13 miles.

3.78 North Islet (42°34'S., 148°04'E.) lies about 0.5 mile N of the N extremity of Maria Island. Bird Rock and foul ground lie between the islet and the island. A light is shown from the summit of North Islet.

Oyster Bay lies on the W side of Maria Island and is about 1.2 miles wide at its entrance. The greatest depth in the bay is not more than 6.4m and it generally does not exceed 3.6 to 5.5m. The bay is separated from Riedle Bay by a narrow isthmus.

Mercury Passage (42°40'S., 148°00'E.), between Maria Island and the mainland, is only available to vessels with local knowledge whose draft does not exceed 6.4m. The passage is about 3.5 miles wide at both its S and N entrance, but midway it is narrowed to a width of about 1 mile between Lachlan Islet and the rocks around it. There are depths of 14.6 to 16.5m in midchannel off Oyster Bay, 12.8m about 2 miles N of Lachlan Islet, and 34.7m in the N entrance channel.

Lachlan Islet (42°39'S., 147°58'E.) lies in the middle of Mercury Passage, near its N entrance. The islet is triangular in shape and covered with grass. There is a small reef of rocks about 0.1 mile to the NW of the island. The channel W of the islet has a least depth of 2.1m and only small vessels should attempt it. A light is shown on the summit of the islet.

Prosser Bay indents the mainland for 1.2 miles between Luther Point and **Meredith Point** (42°33'S., 148°55'E.), about 1 mile NNE. The bay is shallow and useless for any but small vessels.

A vessel may find anchorage off its entrance, in a depth of 14.6m, but would not be sheltered from S winds which, in this locality, are violent. East gales cause a dangerous sea in this bay.

There is a jetty, with a depth of 2.4m at its head, on the S side of the bay about 0.5 mile WSW of Luther Point.

The Prosser River, which flows into the middle of the head of the bay, is obstructed at its mouth by a bar with a depth of 0.6m. On the S side of the entrance to this river is the village of Orford. A bridge spans the river about 0.4 mile above its entrance.

3.79 Spring Bay (42°33'S., 147°56'E.) (World Port Index No. 54725), so called from a spring on its E side, is entered between Meredith Point and Freestone Point, about 1 mile E.

Depths.—Limitations.—There are depths in the bay of over 11m from its entrance to nearly 1.5 miles within the bay, which has good holding ground of mud and is completely sheltered from wind and sea.

Spring Bay Wharf is situated about 0.2 mile NNW of Freestone Point. It extends 137m WSW to a T-head, 244m in length, with a least depth of 11.5m alongside. It is used exclusively to load wood chips.

Aspect.—A light is shown from the head of a jetty, situated about 0.4 mile N of Meredith Point.

Pilotage.—Pilots board incoming vessels 1.5 mile S of **Point Home Lookout** (42°33'S., 147°57'E.) in 23m of water. Pilotage is compulsory for ships 35m in length or over. Ships requiring a pilot should notify the Harbormaster, Hobart, at least 24 hours in advance, confirming or amending the ETA at least 6 hours before arrival at the pilot boarding position.

Regulations.—A restricted area, with a radius of 300m, is declared around any vessel engaged in, or assisting with, the shipment of wood chips, when within the limits of the port of Spring Bay.

Spring Bay is a first port of entry. The quarantine line lies across the entrance to the bay; the quarantine anchorage is within 0.3 mile of a position 0.5 mile W of Freestone Point.

Anchorage.—There is a very good anchorage at the entrance to Spring Bay, in depths of 11 to 14.6m, sand. Lights, in line bearing 359°, lead up the bay to the wharf. The channel to the N end of the bay requires local knowledge.

A submarine pipeline crosses the bay from close N of Aliginates Jetty to Paddy's Point. Anchoring is prohibited 50m on either side of the pipeline.

3.80 Okehampton Bay (42°32'S., 147°58'E.) lies 2.5 miles E of Spring Bay and is entered between Point Home Lookout and Lords Bluff, 2.2 miles NE. Sunken rocks extend about 0.7 mile from the bluff. A light is shown on Point Home Lookout.

Cape Bougainville (42°31'S., 148°00'E.) lies 3 miles NE of Point Home Lookout. The cape is a double point about 1 mile wide, projecting 1 mile to the SE from the coastline.

From Cape Bougainville, the coast trends N for about 5 miles to the SE entrance point of Grindstone Bay, a small inlet trending to the W. Between the bay and **Point Bailly** (42°21'S., 148°01'E.), about 6 miles N, the coast forms a bight across which there are depths of from 25.6 to 29.3m. On the S side of Point Bailly are some above-water rocks extending about 0.7 mile SE, with depths of 18.3m close outside them.

Iles Des Phoques (White Rock) (42°25'S., 148°10'E.), lying about 7 miles ENE of Grindstone Bay, is a sterile rock with depths of 21.9m close S of it and from 43.9 to 47.5m between it and the shore. Schouten Island lies about 11 miles E of Point Bailly. A light is shown on the S side of the island.

Schouten Passage, which separates Schouten Island from the

S point of the Freycinet Peninsula to the N of it, is about 0.5 mile wide across its narrowest part, with apparently no dangers other than a small above-water rock, close off the S point of the peninsula. A shoal, with a depth of 9.1m, was reported to lie 1.5 miles WNW of the S extremity of the peninsula.

3.81 Great Oyster Bay (42°12'S., 148°10'E.) is formed on the E side by Schouten Island and the Freycinet Peninsula and on the W side by the coast extending N from Point Bailly. Depths in the bay are from 12.9 to 20.1m. Little Swanport, the entrance to which lies on the W side of the bay about 2 miles N of Point Bailly, is only available to boats.

Swansea (42°09'S., 148°05'E.) lies on the W side of Great Oyster Bay, about 1.5 miles S of the head of the bay. The port consists of a jetty, with a depth of 2.4m alongside its head. The head of the bay is made up of a low tongue of land, with an opening at its E end, which leads into a shallow lagoon.

Promise Bay (42°11'S., 148°16'E.) lies on the E side of Great Oyster Bay and is entered between Weatherhead Point, the W extremity of the Freycinet Peninsula, and Fleuieu Point, about 4 miles N. Refuge Islet lies about 0.7 mile S of Fleuieu Point on the edge of a spit of foul ground. Good anchorage may be found S of the islet.

The Freycinet Peninsula is 6 miles long, S to N, and 3.5 miles wide at its broadest part; it then gradually narrows to Cape Degerando, its S point. Cape Forestier, the N end of the peninsula, has been reported to give good radar returns up to 18 miles. An isthmus connects the Freycinet Peninsula to a small one called The Hazards, about 1 mile NNW.

Cape Tourville (42°07'S., 148°21'E.) lies 3.5 miles N of Cape Forestier and shows a light. The cape is high and projects 0.5 mile SE from the coast. Sleepy Bay lies on its S side and The Nuggets, a group of islets and rocks, extend about 1 mile NE of it.

Cape Tourville to St. Helens Point

3.82 Bluestone Bay is an indentation about 2 miles NNW of Cape Tourville. About 3 miles NNW of this bay there is a double headland with a small islet on its W side, and about 1.2 miles NW of this islet there is a larger islet, between latter and Moulting Lagoon the land rises to Mount Peter. About 5 miles N of the above N islet, Butler Point projects about 0.5 mile SE from the coast and between this point and Cape Lodi is Courland Bay.

Bicheno (41°52'S., 148°18'E.), a small town, lies about 2.5 miles NNW of Cape Lodi. There is a wooden jetty off the town, with a least depth of 3m alongside. Waubs Harbor lies close N of the town; Diamond Islet lies about 1 mile farther NNW.

Maclean Bay is entered between the E entrance point of Waubs Harbor and Long Point, about 7.2 miles N. The Douglas River enters the sea about 2.5 miles SSW of Long Point.

Long Point (41°45'S., 148°18'E.) is a small peninsula with a small bight on either side of the isthmus which connects it with the mainland; about 0.5 mile NW of the extremity of this peninsula there is an inlet which has a narrow entrance and which trends N parallel with the coast. The village of Seymour is situated at the point. There is a coaling jetty here, with a least depth of 7.3m alongside.

Between Long Point and **St. Patricks Foreland** (41°35'S., 148°20'E.), about 10 miles N, are Picaninny Point and Saltwater Inlet, about 3 and 5 miles N of Long Point. St. Patricks Foreland and the coast for about 2 miles N of it are bordered by a reef. There are depths of 18.3m close N of the foreland. St. Patricks Head, 678m high, is a conspicuous mountain.

3.83 Paddys Islet (41°24'S., 148°18'E.) lies about 10 miles N of St. Patricks Foreland and 0.5 mile offshore. Depths of less than 9.1m extend about 0.7 mile E from the islet. Pulfers Bank, with a depth of 7.3m, lies about 3.5 miles SE of Paddys Islet. St. Helens Island lies about 3.5 miles NNE of Paddys Islet. Rocks, awash, lie close N and S of its E extremity. In case of necessity, a vessel might anchor, in a depth of 21.9m, between this island and the coast. Middle Ground, with a depth of 8.8m, lies 1 mile S of St. Helen's southernmost rocks.

St. Helens Point (41°17'S., 148°21'E.) is the N end of a long and comparatively narrow tongue of land, on which there is a continuous ridge of hills, extending NNE to Bare Top Hill, which is about 0.5 mile within the point. Brooker Rocks lie on the seaward end of a spit of foul ground which extends about 1.2 miles SE from St. Helens Point. Merrick Rock, with a depth of 3.7m, lies about 1 mile E of the point. A buoy is moored 1.5 miles SE of Merrick Rock. A light is shown on Bare Top Hill.

Georges Bay (41°19'S., 148°17'E.) is an extensive harbor with deep water inside a shallow entrance channel, which lies on the W side of a tongue of land terminating in St. Helens Point. The outer part of this channel is mostly obstructed by shallow banks which extend from either shore and form a bar, the channel across which is liable to change and is only available to small vessels with local knowledge. The channel is marked by beacons and buoys, which are moved as the bar changes. Georges Bay is divided into three parts. Its main basin lies immediately W and S of the inner end of the entrance channel, and into its W side, N of McDonald Point, about 2 miles SW of Atkins Point, flows the Georges River, a shallow stream. Moulting Bay, the N arm of the bay, extends N from W of the inner end of the entrance channel. The SW arm of the bay extends about 2 miles W of the SW end of the main basin to the Jasons Gate Bridge. Drying mud flats front the shores of these water areas, and Oyster Patch, with a least depth of 1.8m, lies in the SW arm, about 1 mile SSW of McDonald Point. The existence of this patch is doubtful.

St. Helens (41°19'S., 148°15'E.) lies on the N side of the SW arm of the bay. A wharf and two small T-headed jetties front the village, and another T-headed jetty is situated about 0.2 mile E of the Jasons Gate Bridge.

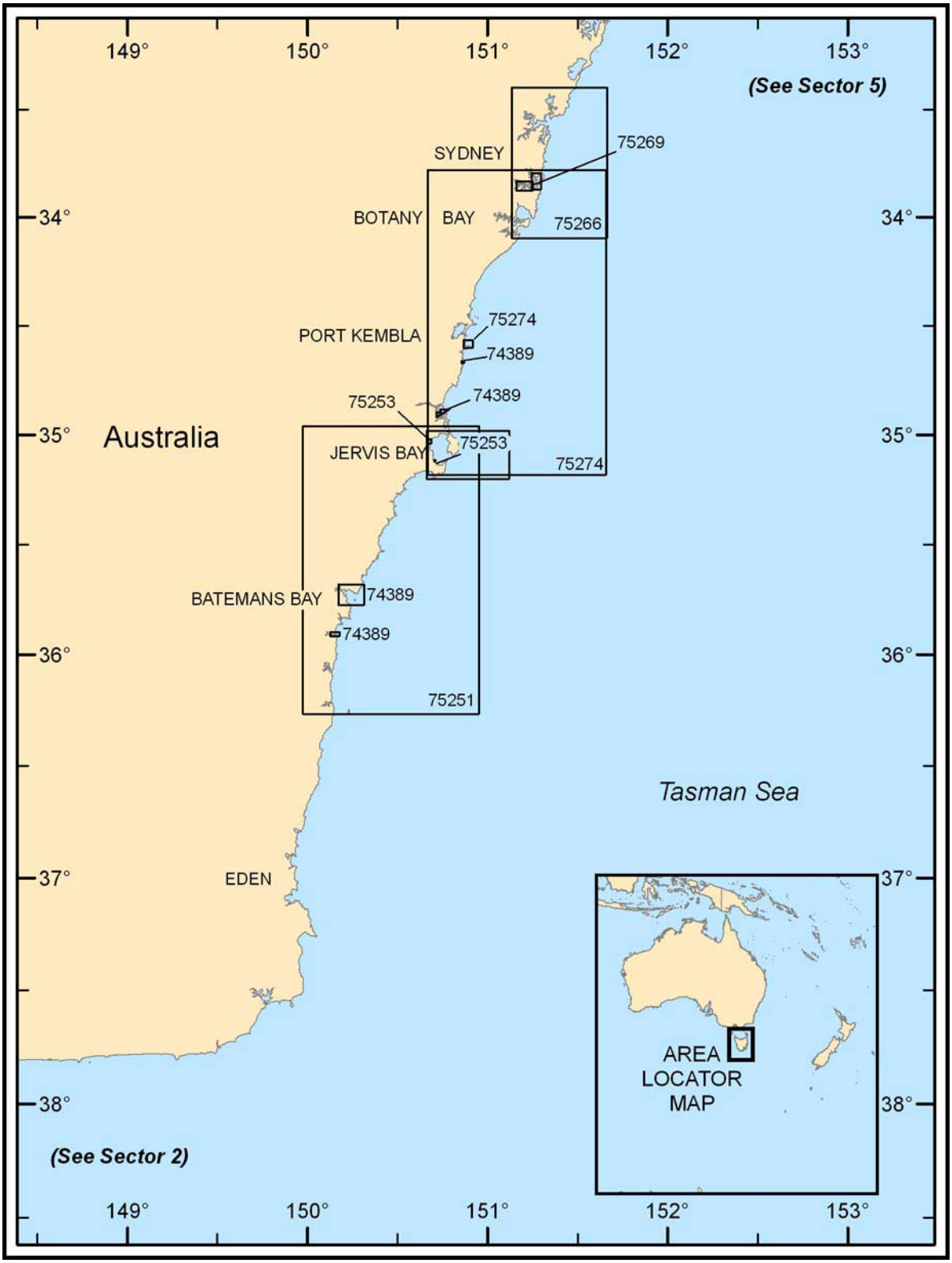
St. Helens Point to Eddystone Point

3.84 Grant Point (41°16'S., 148°20'E.) lies about 1.5 miles NW of St. Helens Point and forms the N entrance point of Georges Bay. The point is rocky and about 0.3 mile NE of it is Elephant Rock. From Grant Point, the coast trends about 3.5 miles W and N to a point, close off of which lies an above-water rock. The entrance to Binalong Bay, which branches SW and W, lies about 1.7 miles W of Grant Point, with Skeleton Bay between it and that point.

The Gardens are some sunken patches lying near the coast and about 5 miles N of Binalong Bay. Garden Lagoon, a small inlet, lies about 1 mile NNW of The Gardens. From the lagoon, the coast trends about 5 miles N to the entrance to Anson Lake, in the S part of Bay of Fires. Depths of less than 9.1m extend about 0.6 mile ENE from the entrance to the lake. The entrance to the lake is so narrow that it cannot be seen from seaward and it scarcely permits passage of a boat at HW. Outside the entrance to the lake, a heavy dangerous surf generally pounds the beach.

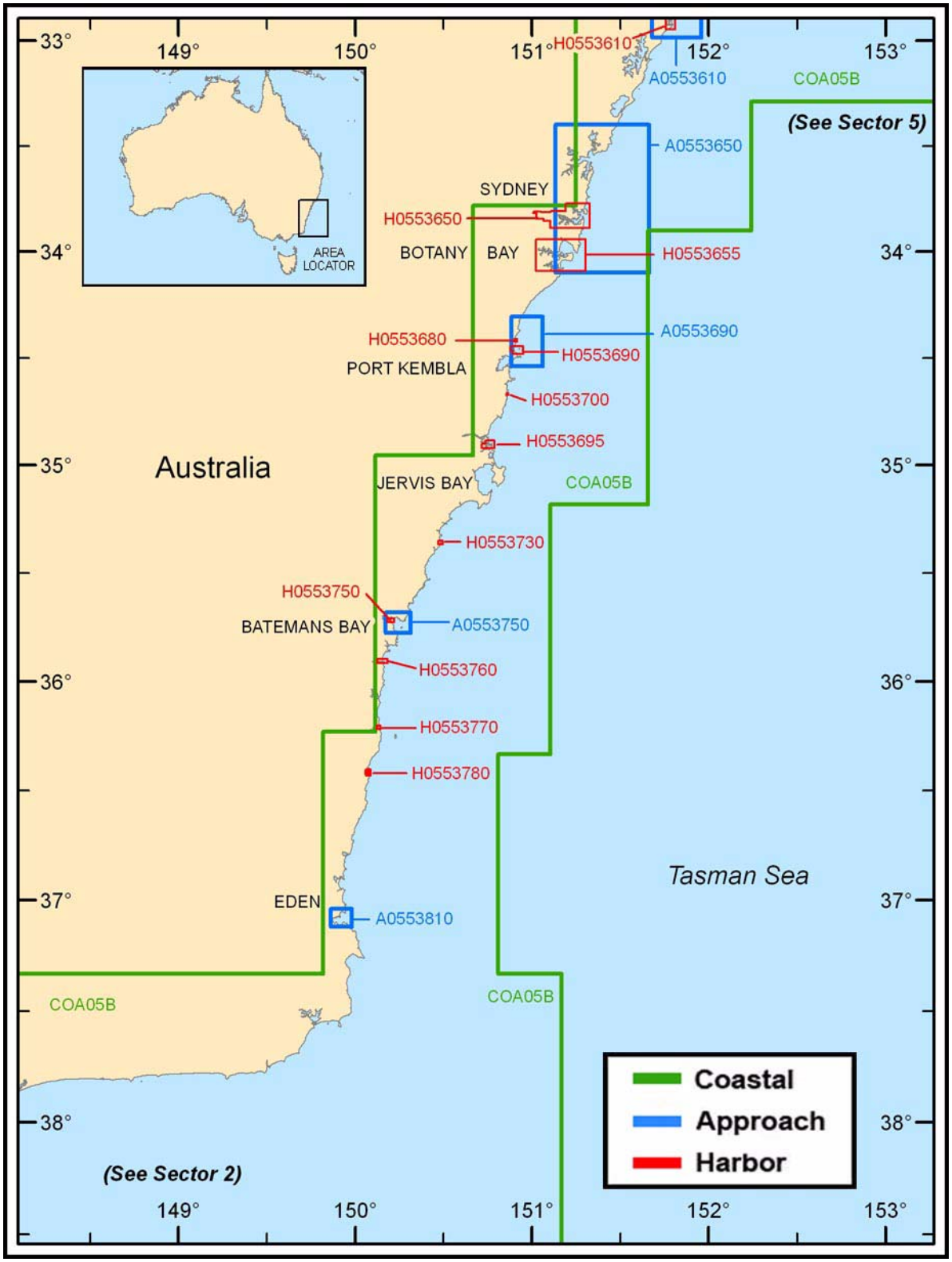
Bay of Fires (41°02'S., 148°20'E.), with a depth of 9.1m about 0.3 mile offshore, extends from the entrance to Anson Lake to Eddystone Point, about 4.5 miles NNE. An 11.9m rocky patch lies about 1.2 miles SSE of Eddystone Point.

Anchorage may be obtained, in a depth of 18.3m, near the center of the Bay of Fires, which affords good shelter when the wind is steady from the W, but should be left immediately if the wind shifts to the SE.



Additional chart coverage may be found in NGA/DLIS Catalog of Maps, Charts, and Related Products (Unlimited Distribution).

SECTOR **4** — CHART INFORMATION



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SECTOR 4 — DNC LIBRARY INFORMATION

SECTOR 4

AUSTRALIA—COAST OF NEW SOUTH WALES—CAPE HOWE TO PORT JACKSON

Plan.—This sector describes the E coast of New South Wales between Cape Howe, which is located approximately on the boundary between the States of Victoria and New South Wales and Port Jackson, NNE. The sector includes the ports of Kembla, Botany Bay, and Sydney, the principal Australian port. The descriptive sequence is from S to N.

General Remarks

4.1 The coast of New South Wales between Cape Howe and Port Jackson is penetrated with a series of recesses. This coastal region is well-watered by rivers, although many are short, swift, and unnavigable. Moderate-sized vessels may find shelter in Twofold Bay and Batemans Bay. Deep-draft vessels will find anchorage along the coast, but the more important is at Port Kembla, Botany Bay, and Port Jackson.

There are some areas within 1 mile of the coast of New South Wales that lack detailed surveys. It is also possible there may be uncharted obstructions.

Caution is also advised when in the vicinity of Jervis Bay, where submarines exercise frequently in the approaches. A good lookout must prevail in this area, as firing practices and other naval exercises also take place.

Winds—Weather.—The section of the Australian coast described in this sector is dominated by an area of high pressure.

The prevailing winds between Cape Howe and Port Jackson are from the NE from October to April and from the W from May to September. Very oppressive hot winds from the NW sometimes prevail from November to February, and are usually followed by a sudden shift from between the SE and SSW, and against which vessels near the coast should be particularly guarded, as the gust is generally very violent. There are also frequently sudden changes from the NW to S, from September to February, without warning, and these are well-known as the southerly busters. The effect is so great that the thermometer at Port Jackson descends from 38° to 18°C in less than 30 minutes. These storms may last only a few hours or for several days, and average 32 in number during the season.

Land and sea breezes are frequent from November to February; the NE wind springs up from a calm in the morning and subsides about midnight.

Fog is rare except in the summer months and then seldom lasts longer than from dawn to mid-morning.

Tides—Currents.—The East Australian Coast Current sets S throughout the year along the New South Wales coast from the S coast of Queensland to the vicinity of Cape Howe. The current here is less strong and constant than the N part. This effect occurs due to water branching off from the seaward side of the current between 32°S, and 34°S, turning SE and passing into the open ocean.

Cape Howe to Bass Point

4.2 **Cape Howe** (37°30'S., 149°59'E.) is low, formed of stones and sand, and covered with tea trees; sunken rocks project 0.3 mile E from the cape. The prominent feature on this part of the coastline is in Howe Hill (37°31'S., 149°53'E.), 4 miles W of Cape Howe, rising abruptly from low land to a summit shaped like a haystack. Northwest of Cape Howe, at about 5 miles on the tree-cleared boundary between the States of Victoria and New South Wales, is Mount Carlyle, rising to 362m, part of the Howe Range. Generally, the whole aspect of the land about Cape Howe is that of a mountainous district, as the Table Hills NNW of the Howe Range runs to Disaster Bay, and similar hills border the coast which consists of steep rocky spikes and indentations of sand.

Disaster Bay (37°16'S., 149°58'E.) indents the coast, providing 3.5 miles of sandy beach. The NE side of the bay is marked by a light at Green Cape, which is steep-to with no outlying dangers. There is a signal station at Green Cape providing a telephone communication link to Gabo Island and Twofold Bay. Communication to Green Cape can be made by International Code, but there is no special monitoring at night. Green Cape has given good radar returns up to 18 miles.

Anchorage.—Anchorage is available, in depths of 21.9 to 31.1m,sand bottom, under Skelton Hill (Green Hill), during NE winds.

The coastline from Green Cape to Twofold Bay is bold and continues with rocky points and sandy beaches, where depths of 27.4 to 36.5m can be found 0.5 mile off the shore. The back country is hilly where Haycock Hill, 251m high, dominates, but about 11 miles W of Haycock Hill is the remarkable wooded peak of Mount Imlay, 887m high. Mowarry Rock, lying close in at Mowarry Point, is quite conspicuous from the S.

4.3 **Twofold Bay** (37°04'S., 149°56'E.) is entered from seaward between **Red Point** (37°06'S., 149°57'E.), on which stands Boyds Tower, and Worang Point, about 2.5 miles further N. The bay offers depths of 18.3 to 40.2m between the entrance points, shoaling gradually towards its head. The bay is generally free of dangers, except for Seahorse Shoal a group of steep-to patches, with depths of less than 6.4m, lying up to 0.6 mile NNE of Red Point.

Mount Imlay, bearing 240°, is an excellent mark for entering the bay.

The S shore of Twofold Bay between Red Point and Honeysuckle Point forms an exposed bay where depths of 7m will be found off the points, but depths of 14 to 20m will exist between them. Characteristic of the coastline between Honeysuckle Point to Munganno Point (Munganoa Point), the NE point of East Boyd Bay is that of a rather bold, cliffy shore which extends WSW for 0.6 mile.

East Boyd Bay indents the coast about 2 miles S of Lookout Point, and is entered between Munganno Point and Brierly Point, about 1 mile SW.

Nullica Bay forms the W bight of Twofold Bay; it offers 7.9 to 9.3m of water throughout its extent, but shoals rapidly within 0.1 mile of the shore. From Nullica Bay to Snug Cove, shoals and rocks extend up to 0.1 mile offshore.

Anchorage.—Vessels greater than 3,000 gt should not anchor inside the port limits, inshore of a line joining Worang Point and Red Point, without the express permission of the harbormaster.

Eden (37°04'S., 149°56'E.)

World Port Index No. 53810

4.4 Eden is situated on the N shore of Twofold Bay. It is comprised of the jetties W of Lookout Point (Snug Cove), the tanker mooring W of the same point, and the dry bulk berth situated on the S side of the bay at Munganno Point. The port limits are designated by a line drawn from Worang Point S to Red Point.

Port of Eden

http://www.edenport.com.au

Tides—Currents.—The tidal rise at Eden is 1.6m at MHHW.

Depths—Limitations.—Eden East Breakwater, situated about 0.3 mile WNW of Lookout Point, has a berth along its inner face.

Breakwater Wharf is 104m long, with depths of 3.0 to 8.8m alongside.

Eden Jetty (Multipurpose Jetty), directly NW of Breakwater Wharf, is 200m long with alongside depths of 2.0 to 7.3m.

The next pier directly NW is Moorings Jetty, which is used exclusively by fishing vessels. It is a private jetty, with a length of 145m and depths of 2 to 5m alongside.

Munganno Point Woodchip Berth is T-shaped and composed of five sets of mooring dolphins, in addition to four mooring buoys. It can handle vessels up to 230m in length and 50,000 gt. The maximum allowable draft is 11.3m.

Navy Wharf lies 0.3 mile SW of Munganno Point and is used for loading and unloading munitions. This berth is 200m long, with a depth of 12m alongside. It can handle vessels up to 100m in length with a maximum draft of 10.5m.

Aspect.—Lights are shown from Lookout Point and from the end of the breakwater. Range lights, in line bearing 321.5°, lead clear of the tanker mooring.

Pilotage.—Pilotage is compulsory for all commercial vessels over 30m long for Twofold Bay and should be requested in advance. The pilot will board incoming vessels about 1.5 miles E of Lookout Point. The pilot will respond to calls for "Eden Maritime" on VHF channel 16.

Regulations.—The Quarantine Anchorage is best seen on the chart. Vessels requiring medical or emergency assistance should communicate with the pilot station via Radio Sydney, giving ETA and requirements. The pilot acts as the customs agent.

Signals.—The Signal Station is situated on Lookout Point. No regular watch is kept, but signals will be answered if seen. A VHF communication watch is kept only when a vessel is expected.

Anchorage.—Anchorage can be taken off Snug Cove, in about 10m, sand and mud, but the anchorage in East Boyd Bay offers better protection in E and SE gales. Vessels over 3,000 gt are not allowed to anchor inside the port limits without the expressed permission of the Harbor Master.

Caution.—The quarantine anchorage is not safe for large vessels in a strong E wind or heavy E swell.

4.5 **Calle-Calle Bay** (37°04'S., 149°56'E.) is entered between Lookout Point and West Orange Point, about 1.7 miles NE. This bay is not desirable as an anchorage at any time, as a ground swell almost always sets into it and is exposed to the S and SE.

The coast N of Worang Point passes Bullara Island (Lennard Island), from which a reef projects a short distance from its N extremity. From the island the coast curves to the red Quoraburagun Cliffs, then to Haycock Point. Haystack Rock, a remarkable rock 15m high, lies off Haycock Point and is connected to the shore by a rocky reef. A succession of rocky points from Haystack Rock sweeps around NW to the entrance of Pambula Lake.

Good anchorage, sheltered from SW and S winds, is available off the entrance of the Pambula River, in 10.9m, with the N part of Haycock Point bearing 100° and Merimbula Point bearing 021°.

Merimbula Bay is a sandy indentation lying between Haycock Point and Merimbula Point. It penetrates the coast 1.8 miles, with depths of 29.3 to 31.1m, shoaling gradually to 14.6m within 0.3 mile of the beach. Merimbula Point is a steep, cliffy headland.

The coast N forms a bight between Tura Head and Turingal Point, which is divided midway by Bowinda Island. From Turingal Point, an uneven line of granite and pipe-clay cliffs, with grassy land over them, extends to **Tathra Head** (36°43'S., 149°59'E.).

Aspect.—The land between Mogareka Inlet and Bunga Head N is generally poor, consisting of high scrubby hills. Again, this part of the coast is well-watered by rivers. Inland, a thickly timbered range of mountains rises N and S to Mount Townsend (Mount Mumbula). This summit, 804m high, lies 10 miles W of Bunga Head. There is a peaked summit at Bunga Head, 125m high, and sunken rocks fringe its base from 100 to 200m distant.

The coast to **Barragga Point** (36°30'S., 150°04'E.) from Bunga Head appears to be a series of small rocky points fringed with sunken rocks.

4.6 **Bermagui Inlet** (36°25'S., 150°04'E.) is a small sandy inlet into which flows the Bermagui River. A conspicuous tank stands on this coastal point. A light marks each side of the Bermagui Inlet which is navigable for small craft only. The entrance is spanned by a bridge with a vertical clearance of 2.9m.

The coast in the vicinity of Bermagui Inlet consists of thick scrub and forest and then breaks into a low sandy beach backed by a swamp curving N to Murunna Point. Close W of the N part of Murunna Point is salty Walluga Lake.

The coast from the lake area to **Cape Dromedary** (36°18'S., 150°08'E.) consists of a sandy beach with good pasture and plenty of fresh water. Shoal water extends over 0.5 mile off the shore, 1.5 miles N of Murunna Point. Cape Dromedary lies about 5 miles E from the mountain of the same name. Mount Dromedary is the most remarkable mark on this part of the

Eden

coast. In clear weather, the mariner will sight this double mountain from 60 miles. Its NW peak is 809m high, with the SE summit rising to 794m. Between this mountain and Cape Dromedary, Ajungagua Hill rises to 214m.

Caution.—A wreck lies about 3.2 miles E of Cape Dromedary.

Montague Island (Barunguba Island) (36°15'S., 150°14'E.) lies 3.8 miles ENE from Nugget Point. It is two islets, as a deep rocky chasm divides its center through which the sea breaks heavily with strong E winds. The island has been reported to give good radar returns up to 22 miles.

A reef of rocks, with depths of 9.1 to 16.4m, extends from the SW extremity of the island where the sea breaks frequently in heavy weather. Aughinish Rock, with a depth of 5.5m, lies 1.5 miles S of Montague Island Light; and two more rocks, with depths of 4.6 and 4.9m, lie close together, about 2.5 miles S of the light. Care should be taken to avoid the area, as other dangers may exist.

A light is shown from the summit of Montague Island. The light is in radiotelephone communication with Norah Head Light at fixed intervals. Visual signals will be answered if seen, but no special watch is kept.

Anchorage.—Anchorage may be found for small vessels, with E and S winds, in a small bight on the W coast formed by the two parts of the island, but it can not be recommended for large vessels. Anchorage is prohibited within 100m of submarine cable laid across the Clyde River in close proximity of the bridge in position 35°42.3'S, 150°10.7'E.

When navigating this part of the coast, vessels bound N are recommended to keep inside Montague Island and about 2 miles off the mainland all the way N to avoid the S current usually found outside.

Caution.—Caution should be exercised to clear the dangerous wreck charted E of Cape Dromedary.

4.7 The coast to Wagonga Head is a succession of granite and ironstone points, all bordered with reefs, with sandy beaches in between. The promontory on the S side of the entrance to Wagonga Inlet is marked by a signal station where a vessel can communicate by International Code. The coast to Yellow Head, and farther N to Marka Point, continues with high points, reefs, and sandy beaches. A fire tower stands at about 2.5 miles WSW of Yellow Head.

Marka Point, 30m high, is fringed with rocks, and located

about 0.5 mile N of Jamisons Point, the N entrance point of Lake Tarouga.

The coast to Tuross Inlet is formed by a low tongue of land. A sunken rock and shoal lie about 0.2 mile off the mouth of the inlet. A sandy beach, with scrubby land behind it, near Tuross Inlet at Coila Lagoon continues to **Binge-Binge Point** (36°01'S., 150°10'E.). From this point, the coast takes on a succession of small bays and rocky points curving around N to Mullinburra Point and on to Congo Point.

The sea always breaks on Black Rock with strong SE gales; it breaks heavily on some patches of a ledge that extends N to Congo Point from Petro Head.

From Congo Point, the beach continues in a N direction to Yowaga Point and then to Moruya Head, the headland forming the S side of the entrance of the Moruya River. On the W point or inner S head of this peninsula, is a signal station where signals are made by International Code or Morse code by flashing lamp. From the NW side of the entrance to the Moruya River, the coast consists of a sandy beach backed by dunes to a head with reefs projecting from it.

Broulee Island (35°52'S., 150°11'E.) lies about 0.3 mile E of the coast and is enclosed by a reef of dry and covered rocks. The N coast of the island forms a bay which provides good anchorage for small vessels, in about 5m, as indicated on the chart.

Burrewarra Point is a rocky headland, 57m high, closely fringed by a reef, and projects about 0.5 mile off the coastline. The point has been reported to give good radar returns up to 19 miles. A light is shown from Burrewarra Point.

4.8 **Batemans Bay** (35°44'S., 150°12'E.) (World Port Index No. 53750) is entered between South Head and North Head and runs in a NW direction from the Tollgate Islets to the bar of the Clyde River.

Depths in Batemans Bay decrease gradually from 16m at the entrance to 7m at a point 0.4 mile off Square Head, then shoaling to the Clyde River.

The SW shoreline of Batemans Bay is made up a series of rocky points and small sandy bays to Observation Head. The remainder of this part of the coast consists of a series of reefs as it meets the SW entrance point of the Clyde River.

North Head, the N entrance point of Batemans Bay, rises to 38m and is surrounded by rocks. Between North Head and Three Islet Point, there is a sandy beach. Other bays appear W of Three Islet Point with the projection of headlands between Three Islet Point and Reef Point, where depths do not exceed 7.3m.

Tides—Rise.—The spring rises at Batemans Bay varies from 1.4 to 1.8m.

Anchorage.—The recommended anchorage for large vessels in Batemans Bay is in 9.1 to 10.9m, sand bottom, about 0.3 mile WSW of **Acheron Ledge** (35°44'S., 150°15'E.). Deep-draft vessels anchor, in 16.5m, about 2 miles N of South Head. The mariner should be cautioned that a heavy ground swell may be experienced at the anchorages, and the sea will break in the bay under the influence of strong E of SE winds.

Caution.—The **Tollgate Islands** (35°45'S., 150°16'E.) are connected by a ledge of rocks and reefs extending nearly 0.5 mile NE and SE, closely fringed with rocks, and having depths of 11 to 16m about 0.1 mile outside these islands. From the Tollgate Islands, a ledge of rocks with depths of 3.7 to 4.6m extends NW, N, and NE for about 0.2 mile. The bottom is rocky, with depths of 5.5 to 9m, deepening suddenly to 16.5 to 18.3m, sandy bottom.

Trennant Rock, with a depth of 4m, lies 0.3 mile S of the Tollgate Islands.

Black Rock, about 1 mile SE of Trennant Rock, is 10m high and has depths of 11 to 18m surrounding it. A depth of 5.4m lies 0.3 miles S of Black Rock.

4.9 The coast N from North Head to Point Upright consists of a series of small points and sandy beaches. Point Upright becomes the termination of a ridge of hills extending from the W. The land recedes nearly 1 mile at the point, forming a bay about 2 miles long, concluding in a sandy beach. Close above Point Upright, at Grasshopper Islet, there is a ledge of sunken rocks on which the sea breaks heavily. The coast forms a bay N of Grasshopper Islet at 1.5 miles. About 0.5 mile W of the N entrance point of this bay is Pebbly Beach, off which small vessels can find shelter except with S and SE winds, but the holding ground is very poor, being sand over rock.

The coast curves N and NNE to a point at the base of Mount O'Hara, which rises close behind to a height of 285m. The **Dawson Islets** (35°35'S., 150°21'E.), two in number and 3m high, lie on the reef extending about 0.5 mile E of this last mentioned point.

O'Hara Head is 2.2 miles NE from the Dawson Islets and O'Hara Island, 4.5m high, lies near the shore at 0.5 mile N of Dawson Islets. Robbie Shoal, with a depth of 5.5m, lies about 0.6 mile E of O'Hara Head. The 20m curve is seaward of the shoal.

Brush Island (35°32'S., 150°25'E.), lying 0.1 mile off Murramarang Point (First Sandy Point), is 43m high and about 0.5 mile across. A light is shown from the summit of Brush Island.

About 0.4 mile NE from the E extremity of Brush Island is a dangerous rock which breaks only with a heavy swell; in the channel between the island and the mainland there is an above-water rock. A shoal with a reported depth of 12.6m (1974) lies 0.7 mile SE of Brush Island. Vessels bound N and keeping inshore to avoid the current should be careful when passing this island and give it a berth of at least 1 mile.

Anchorage.—Anchorage, sheltered from S winds, may be obtained off the NW side of Brush Island, in about 11m, sandy bottom. The anchorage is made when O'Hara Head is in line with Murramarang Point and the N end of Brush Island bears 100°.

Bawley Point is located near the above anchorage and is the name of a small township. From this point, the coast extends NW in and out to the narrow mouth of Muroo Lake.

Stokes Island, NE of Muroo Lake, is surrounded by reefs apparently connected with the shore to the N of the island. Crampton Islet is located on a reef which extends across the mouth of a narrow inlet trending N about 2 miles, and separated from the sea by a narrow tongue of land. Between Crampton Islet and Lagoon Head NNE, there is a sandy beach nearly 0.5 mile long. The coast then becomes rocky with a bordering reef; these characteristics continue to the narrow opening of Burrill Lake NW. A sandy beach extends NE from this lagoon to a prominent rocky point off which a narrow ledge of rocks

projects 0.7 mile SE. The sea breaks all the way between the outer rock and the shore. From this ledge, rocky points extend NE to Warden Head, which has a reef projecting nearly 0.5 mile from its SE extremity.

Warden Head Light (35°22'S., 150°30'E.) is shown from a circular white lighthouse.

Sullivan Reef lies nearly across the fairway of the entrance to Ulladulla Harbor, forming a natural breakwater, and tends to break the heavy sea rolling in toward the artificial breakwater at the head of the harbor during E winds.

4.10 Ulladulla Harbor (35°22'S., 150°30'E.) (World Port Index No. 53730) is 0.4 mile wide NW and SE between the rocky shelf which projects 100m from Warden Head and the detached rocks which extend nearly the same distance from North Head. It is a fishing harbor for vessels up to 45m length, with a draft of 3.6m. The shores are fringed with rocks which extend about 0.1 mile offshore on the S side, but at its head there is a sandy beach.

The entrance is marked by two breakwaters, where lights mark their seaward extremities. The width between the breakwater heads is 85m.

Tides—Rise.—The tidal rise at Ulladulla Harbor is 1.2m at MHHW, and 1.1m at MLHW.

Depths—Limitations.—In mid-channel between the entrance heads, there are depths of about 10m, sand, which shoal gradually toward the breakwater entrance. Depths of 3.6 to 5.5m extend up to 0.2 mile N from the S shore E of the breakwater head.

Range lights shown from on the beach at the head of the bay lead into Ulladulla Harbor.

Pilotage.—An unlicensed pilot, with extensive local knowledge, employed by the Marine Services Board of New South Wales is reported to be available if required. The harbor is not easy to access and caution is advised when making the approach, as the heads are difficult to distinguish.

Directions.—The best mark for making Ulladulla Harbor is the Pigeon House, a prominent isolated mountain, 730m high, bearing 272°, which leads to the entrance of the harbor; when within 5 to 6 miles, the white houses at the head of the harbor and the sandy beach under them will be distinguished. When abreast of North Head, the depths about 9m, Pigeon House will be lost from sight and the leading marks will lead to abreast of the inner harbor entrance.

4.11 Between the north head of Ulladulla Harbor and the entrance of Narrawallee Inlet (Nurrawhirra Inlet), about 3 miles N, the coast divides into two sandy indentations, with Bannister Point midway between the two. Care must be taken to avoid the rock, with a depth of 1m at LW, lying N of the point.

Preservation Rock lies on a reef about 0.2 mile E of the S entrance of Narrawallee Inlet. The N half of this bay, where the inlet indents, is a sandy beach; the coast trending NE meets a low point forming the SE side of the opening of Conjola Lake, close in front of which is Green Island. It appears that Green Island is fringed by a reef connected with the bar across the mouth of Conjola Lake behind it. A shoal, with a least depth of 7m, lies about 1 mile E of Green Island.

Red Point, NE of Green Island, is fringed with rocks and projects 0.7 mile E of the coastline. Above Red Point, the narrow mouth of Swan Lake indents the coast and there is a bay, 1 mile deep, the irregular shore of which is intersected by two small streams. From the entrance to Swan Lake, a sandy beach curves ENE to the W point of Wreck Bay, the point of which forms the S side of the narrow mouth of Sussex Inlet. This inlet, following a N direction, travels into St. Georges Basin.

Overhead and submarine cables and pipes cross Sussex Inlet at various points and are usually indicated by warning notices on the shore. Caution should be exercised at all times while navigating or anchoring in the vicinity of these crossings.

4.12 Wreck Bay (35°12'S., 150°42'E.), between Sussex Inlet and St. George Head (35°12'S., 150°42'E.), is 5 miles in length and recedes 2.3 miles in the E part. The N shore from the mouth of Sussex Inlet consists of a sandy beach, fronted by rocks, and backed by sand dunes for about 3.5 miles. This part of the coast has depths of less than 11m extending out to about 0.5 mile.

Anchorage.—Anchorage in Wreck Bay is restricted to the summer season and the best anchorage then is in 13m, with the S extreme of St. Georges Head bearing 145° and the center of three rocky points (points of three small bays) in the NE corner of the bay bearing 045°. This anchorage also insures immediate exit should a S squall come up.

Caution.—Vessels are cautioned of the dangers of navigating near this stretch of coast during bad weather with E or SE winds, as there is a good possibility of being set into Wreck Bay. To insure a vessel's safety at night, the mariner should keep Perpendicular Point Light in sight and ensure a position well to the E of Wreck Bay.

Three areas off Wreck Bay, bounded in each case by a circle with a radius of 0.5 mile, have been designated as dangerous areas, and anchoring, trawling, or fishing is dangerous in their vicinity. The centers of the circles lie bearing 207°, 3.5 miles, bearing 232°, 5.6 miles, and bearing 270°, 4.4 miles from St. Georges Head.

Between the headlands of St. George Head and Cape St. George, there is a small exposed bay; the cape is surrounded with numerous sunken rocks.

A cliffy coast trends N from Cape St. George to Governor Head. Inclusive in this stretch of coast is a measured mile, the start and finish of which is best seen on the chart.

4.13 Jervis Bay (35°07'S., 150°48'E.) (World Port Index No. 53710) is entered between Bowen Island, which lies close N of Governor Head, and Point Perpendicular.

Tides—Rise.—The tidal rise at Jervis Bay is 1.5m at MHHW, and 1.2m at MLHW.

Depths—Limitations.—Within its entrance, Jervis Bay extends 8 miles N and S, and from 3 to 5.5 miles E and W, with regular depths gradually decreasing from 36m in the entrance to 16 to 11m within 0.5 mile of the greater portion of the shores of the bay.

Middle Ground, consisting of a rocky patch about 100m across, with a depth of 14m, lies about 0.7 mile N from the N point of Bowen Island in the fairway of the entrance to Jervis Bay.

The entire bay has been designated as Naval Waters, the limits of which are given below:

1. On the E—By a line drawn from Longnose Point to the N end of Bowen Island.
2. On the S, W, and N—By the HW line of Jervis Bay.

The following areas are reserved for merchant shipping:

1. South part of the bay—That part of Darling Road enclosed by meridian of 150°46'00"E and the parallel of 35°06'50"S.
2. West part of the bay—Waters enclosed by the meridian of 150°43'30"E.

Aspect.—Bowen Island, rising to 40m, is fronted by a formation of high vertical cliffs, from which the land slopes gradually and irregularly towards the Jervis Bay.

Darling Road is located in bight in the S part of Jervis Bay between Governor Head and Captain Point. In the bight a sandy bay curves S and W to a low point fringed with a reef close W of Governor Head, and continuing on to a conspicuous white cliffy projection with an opening in it, known as Hole-in-the-Wall.

Captain Point is identified by red-tiled buildings; from this point a breakwater runs out in a NW direction forming a small boat harbor, within which is a small jetty.

A naval college situated at Captain Point. A conspicuous clock tower, white with a red roof, is located at the college.

Plantation Point (Lamb Point), about 3 miles N of Captain Point, has some sunken rocks close-to, one of which breaks 0.2 mile E of the point and a 5.5m rocky patch, which breaks occasionally at 0.5 mile NE from it. Vessels should not pass between this patch and the point; inside the 4m curve the ground is foul.

The W bight of Jervis Bay, from Plantation Point to Callala Point (Flora Point), forms a bay, the S part of this coast fringed with rocks and the W part, sandy beach. Dent Rock, a pinnacle with depths of 0.6m, lies about 0.1 mile offshore and 0.8 mile WNW of Plantation Point. An obstruction is charted 0.1 mile NE. At a distance of 1.5 miles NW of Plantation Point, the mouth of Moona Creek enters the bay, from which a ledge of sunken rocks extends 0.1 mile, with shoal water about 0.5 mile from it.

Currambene Creek enters the bay N of Moona Creek, with the village of Huskisson just inside it. Shoal water extends 0.5 mile off these creeks. The entrance to Currambene Creek is marked by leading beacons, which lead over the 1.2m bar. Callala Point and the shore for 0.5 mile to the W and 0.2 mile N is bordered by rocks, with a depth of about 5.5m.

Hare Bay, the N bight of Jervis Bay, is divided into two bights by Red Point. Seaward of the 5.5m patch, nearly 0.5 mile off **Flora Point** (35°00'S., 150°43'E.) and the rocks off Green Point, the bay has depths of 7.5 to 11m.

Anchorage.—Montagu Road, on the E side of Jervis Bay, provides secure anchorage, in depths of 11 to 14.8m, hard sand, about 0.9 mile S of Montagu Point. This is the limit at which a large vessel should anchor off the shore, as with a heavy S sea rolling in, the vessel would be exposed to its full effect.

The shore between Longnose Point and Dart Point forms an irregular bight, with a reef projecting nearly 0.3 mile from Longnose Point and with Bumbora Rock, about 100m in extent with a depth of 3.6m, on which the sea breaks in bad weather, lying 0.3 mile S from the point. Between the reef off Longnose Point and Bumbora Rock, there is a depth of 11m, with 20.3m close to the rock.

Caution.—Naval gunnery, bomb, mine, and torpedo practices, along with submarine exercise may be carried out in the Military Exercise Area within and adjacent to Jervis Bay.

4.14 Point Perpendicular (35°06'S., 150°49'E.) is a conspicuous feature of the coast, standing on a bold, cliffy headland without trees or scrub. This cliffy headland extends NE to Crocodile Head (35°05'S., 150°51'E.), 110m high, and then to a small bight in the coast, where there are three small islands known as the Drum and Drumsticks Islands. From the N point of this bight, a continuation of a line of cliffs reaches to Beecroft Head, the E extremity of Crookhaven Bight. There are depths of about 55m within 1 mile of the shore between Point Perpendicular and Beecroft Head.

Kiama

4.15 Sir John Young Banks, consisting of two rocky patches lying NE of Beecroft Head, should be given a wide berth as the current, when it is strong, causes heavy overfalls, even during smooth water.

There is a channel between the SW end of Young Banks and Beecroft Head, with depths of 20 to 36m, but in the vicinity of these banks, as previously stated, strong currents cause a rip, which even in smooth water has been observed to break. Point Perpendicular Light, bearing about 232° and open of Crocodile Head or Point Perpendicular Light, leads SE of Young Banks and the 642m summit of the Cambewarra range bearing 292°, open S of **Coolangatta Mount** (34°51'S., 150°43'E.), 301m high, an outstanding isolated conical hill on the low land NW of the entrance to the Shoalhaven River, leads about 1 mile N of the NE patch. In addition to serving as a mark for clearing Sir John Young Banks, Mount Coolangatta, which is the highest land near the coast, is also a good guide when entering Shoalhaven Bight.

Crookhaven Bight (35°00'S., 150°49'E.) provides good anchorage in Crookhaven Bight, after rounding the projecting low rocky N point and avoiding a rock with a depth of 0.6m, about 0.1 mile off the point and the shoal depth of 8.5m further out. The anchorage is in 11m, sandy bottom, with the N extremity of Beecroft Head bearing 078°, distant 0.5 mile.

Vessels should, during the prevalence of bad weather, keep outside Shoalhaven Bight, which extends from Beecroft Head to Black Head. The strong outgoing tidal currents from the Crookhaven River and the Shoalhaven River, setting across the S The ocean current, cause heavy rips in Shoalhaven Bight.

Shoalhaven River, between which and Sydney there is communication by vessel three times a week, are separated from each other by Comerong Island. With the exception of a hillock on the N point of Comerong, this island appears to be low and flat, with its S coast mostly lined with mangroves covered at high tides.

A sandy beach extends from the Northern Shoalhaven River, curving NNE to a small double creek at about 0.5 mile ESE to Black Point (34°47'S., 150°51'E.) and Black Rock. From Black Point to the S point of Geering Bay (Gerringong Bay), the coast indents with a series of small bights and projecting reefs. Geering Bay consists of a sandy beach at the N end, but reefs

extend out in the S portion. The bay is an open roadstead and it is not recommended as an anchorage.

From Red Cliff, a small inlet at Geering Bay, the coast N to the SE entrance point of Kiama Harbor is marked with small bights, separated by rocky points, some of which have ledges of sunken rocks projecting from them.

4.16 Kiama Harbor (34°40'S., 150°53'E.) (World Port Index No. 53700), a small port available only for vessels of light draft, is sheltered by a peninsula. Any swell running off the coast rounds the point and renders this harbor untenable.

Depths—Limitations.—The basin is about 140m long and 75m wide, with about 61m of berthing space available. Alongside depths range from 3.3 to 3.4m.

Pilotage.—There is no pilot or tug available.

The coast from Kiama curves irregularly N to a projecting head, and then NNW to the Minamurra River, where close off is Stack Islet, an island surrounded by a reef having a depth of 27m, gravel bottom, 0.5 mile SE of it, and a 18m patch 0.7 mile ENE. Other reefs extend into the bay to the NW. From the Minnamurra River, two small sandy bays extend 1.2 miles NE to a line of cliffs running to Bass Point, which is 28m high.

The coastline to Shell Harbor from Bass Point is low in profile. There is a narrow entrance to this small cove, which is enclosed by an artificial breakwater. Range lights lead into this harbor, which is fit for small craft only.

From the N point of Shell Harbor, the low coast makes into two exposed bays to Windang Island (34°33'S., 150°53'E.), where immediately behind this island is the shoal entrance to Lake Illawarra. The entrance is spanned by a wood bridge, with a vertical clearance of only 3.7m.

From the entrance to Lake Illawarra, the coast formed by Perkins Beach turning NE is backed with sand hills, 15 to 18m high and is cliffy, culminating in a point composed of four hillocks, which present the form of a saddle, dull red in color. This coastal feature, known as Red Point, may also be readily identifies by Mount Kembla, a prominent hill rising to 534m, 6.5 miles NW.

Caution.—There are two groups of low rocky islets in the approach to Port Kembla, the entrance to which lies 1.7 miles N of Red Point. These groups are known collectively as the Fine Islands and are best seen on the chart.

Port Kembla (34°28'S., 150°55'E.)

World Port Index No. 53690

4.17 Port Kembla, an artificial harbor situated about 1 mile N of Red Point, provides good radar returns up to 19 miles. With the construction of the N and E breakwaters and an inner harbor, Port Kembla forms a commodious harbor with accommodations for large ocean-going vessels. It is a port of entry and the third largest port in the state.

Port Kembla Port Corporation

http://www.kemblaport.com.au

Winds—Weather.—Coastal winds are complicated by local topography and the land-sea breeze effect. In general, there is a tendency toward S and E winds in summer, with N and NW winds becoming frequent in the winter.

The port is well-sheltered from all winds, except those between the N and NNW. During the months of July and August, prevailing winds are from NE to SW and W

Tides—Currents.—The tidal rise at Port Kembla is 1.5m at MHHW and 1.2m at MLHW.

Depths—Limitations.—The Inner Harbor and the Outer Harbor, although entered from the SW, are aligned on a NW-SE axis. The Inner Harbor terminates into two extensions known as Eastern Basin and Western Basin. The entrance channel to the Outer Harbor has a depth of 16.7m and provides access to the berths there. The channel transiting the Outer Harbor for the Inner Harbor is dredged to a depth of 15.2m.

Situated in the Outer Harbor are the Inflammable Liquids Berth and No. 3 Jetty, No. 4 Jetty, and No. 6 Jetty. The Bulk Liquids Berth is situated at No. 4 Jetty, just W of the root of East Breakwater. The Inflammable Liquids berth lies on the S side of North Breakwater. This berth is also referred to as the Oil Berth.

The Inner Harbor, dredged into the flat coastal land behind the outer harbor, sports facilities and deep-water berths for the handling of bulk commodities, and ro-ro traffic. The Product and Discharge Berths are also referred to as the BHP Berths. The Eastern Basin has grain, a ro-ro, and bulk coal berths.

Port Kembla—Berthing Information

Berth	Berth Length	Max. LOA	Depth Alongside	Remarks
Outer Harbor				
201	200m	225m	10.5m	Bulk flammable liquids
202	210m	200m	10.5m	Bulk and break-bulk cargo
203	210m	200m	10.5m	Bulk and break-bulk cargo
204	100m	80m	6.1m	Bulk and break-bulk cargo
205	90m	80m	10.5m	Bulk and break-bulk cargo
206	80m	180m	11.2m	Bulk liquids
Inner Harbor				
101	200m	225m	11.5m	Coal. Maximum air draft of 17.4m
102	300m	300m	15.0m	Coal. Maximum air draft of 22.4m
103	190m	260m	12.3m	Car import terminal
104	300m	315m	15.0m	Grain
105	215m	190m	15.1m	Breakbulk cargo
106	215m	190m	14.5m	Ro-ro

Port Kembla—Berthing Information				
Berth	Berth Length	Max. LOA	Depth Alongside	Remarks
107	290m	260m	12.3m	Ro-ro
109	220m	200m	12.2m	Steel
110	180m	160m	11.4m	Ro-ro
111	310m	300m	15.6m	Iron ore
112	278m	280m	12.8m	Iron ore
113	192m	200m	11.0m	Steel

The approach channels to the new Multi-Purpose Terminal and coal-loading berth are dredged to 15.3m. An extension to the Multi-Purpose Terminal was completed in June 2005, adding a third berth.

The largest vessel to have entered the port was 206,306 dwt. The port allows vessels with a maximum length of 300m. However, vessels with a length exceeding 300m, or a vessel with a beam width that exceeds 50m, will require prior approval from the harbormaster.

Outbound vessels, with a length exceeding 265m and a draft of less than 12m, will also require an approval from the harbormaster.

Aspect.—There are several chimneys and buildings which provide for good landmarks. There is a large conspicuous waterfall, near Flagstaff Hill, located 2 miles W of the town. Close S of the root of the East Breakwater is a signal station, situated on the roof of a conspicuous building, which serves as a good landmark.

The channel is marked by two sets of ranges. Caution is necessary as the rear marker, an orange daymark appearing to be on top of a red roof just to the right of a large satellite dish, of the 213° range has been reported (1998) to be difficult to distinguish.

Pilotage.—Pilotage is compulsory and available 24 hours. The pilot boards, as follows:

1. Pilot Boarding Station Outer B—(34°24.2'S., 150°57.6'E.). Embarkation inbound for deep draft vessels, and also for vessels arriving from the N or the anchorages. Compulsory for vessels with of 226m in length and greater.
2. Pilot Boarding Station Inner A—(34°25.2'S., 150°56.9'E.) Embarkation inbound for barge trains and small vessels. Also used for disembarkation outbound.

Regulations.—Vessels are considered to have arrived at Port Kembla once they have crossed the arc, with a radius of 5 miles, centered on position 34°24.7'S, 150°57.1'E. A VTS is in operation and is controlled from the Port Kembla Vessel Traffic Center (VTC). There are three reporting points which the VTC will instruct vessels to pass through as they arrive or depart, as follows:

1. Vessels approaching from the N are to report in position 34°20.5'S, 151°05.0'E.
2. Vessels approaching from the E are to report in position 34°25.2'S, 151°03.2'E.
3. Vessels are approaching from the S are to report in position 34°29.4'S, 150°59.2'E.

Vessels may also be instructed to pass through the port limits arc at some other point.

Vessels should signal their ETA to Port Kembla Harbor on VHF channel 16 at least 4 hours in advance, confirming the ETA 2 hours before arrival. Vessels should utilize VHF channel 11 to advise their ETA to Port Kembla Signal Station 1 hour prior to arrival at the 5-mile reporting arc. The center at the signal station is in continuous contact with the pilot, the pilot tender, tugs, and launches.

Vessels are prohibited from passing in the harbor entrance. Mariners are cautioned that outbound vessels have the right-of-way within the port limits.

Vessels are required to maintain an underkeel clearance of 10 per cent of the available water depth at all times.

Signals.—Signals are displayed from the signal station. Storm signals should be watched for, and upon the hoisting of the flag signal XT (heavy weather approaching) and at night two red lights are displayed vertically, when vessels must be ready to leave their berth with 1 hour's notice.

When the port is closed, the code flag UM is hoisted during the day; at night, three red lights are displayed vertically.

Anchorage.—Anchorage is available, in 15 to 24m, well clear of the main leads, between Flagstaff Point and North Breakwater. Anchorage is prohibited within the harbor, except to obtain pratique.

There are two sets of anchorages. Anchorage W1 through Anchorage W6 are positioned to the W of the approach channel; Anchorage E1 through Anchorage E9 are positioned to the E of the channel. Anchorage W1 through Anchorage W5 are generally used by smaller coastal vessels. Anchorage W6 and Anchorage E1 through Anchorage E9 are used by larger capesize and panamax vessels.

Foul ground, with a radius of 0.4 mile, is centered in position 34°24.8'S, 150°57.2'E; anchorage is not recommended in this area during strong SE winds due to poor holding ground and the existence of old anchor chains

It has been reported that good anchorage can also be obtained outside the harbor, 6 miles NE of Flagstaff Point Light.

Anchoring is prohibited in the approach to Port Kembla.

Caution.—When making the port, care must be taken to reduce speed early, especially at night, as the lights of vessels at anchor are difficult to distinguish against the many powerful lights of the numerous factories, etc. Under no circumstances should a vessel be anchored in such a position that it will be across the line of the main leads.

Vessels are advised to pass at least 1 mile E of **Bass Islet** (34°28'S., 150°57'E.), if approaching from the S, and follow the ranges into port.

A waverider buoy has been established off East Breakwater.

Mariners are advised that silting occurs within the harbor. Depth information is available from the harbormaster by contacting the Vessel Traffic Information Center on VHF channel 11 or by telephone (2-4275-0159).

4.18 The coast forms a slight indentation N to Flagstaff Point (formerly Wollongong Head) from the Port of Kembla. The 200m curve, from 15 miles E of Black Point, extends N to about 17 miles off Flagstaff Point, about 20 miles E of Kiama Head, where there are depths of 510m, fine, dark sand bottom.

Flagstaff Point (34°25'S., 150°55'E.) is a rocky peninsula projecting 0.2 mile E from the coast. The N side of the penin-

sula is fronted by a sea wall; on the summit of the headland stands a signal station and lighthouse. The head has been reported to give good radar returns up to 17 miles.

Wollongong Harbor (32°25'S., 150°54'E.) lies about 3 miles N of Port Kembla and is used by smaller vessels only. Depths in the fairway to the port range from 3.6 to 6.0m, and to less than 3.0m at the docks. Range lights mark the entrance channel, which is generally free of dangers except for Para Reef, a shoal on which the sea breaks. Para Reef lies about 0.3 mile N of the W breakwater head and should be watched for when approaching the port.

Pilotage is not available, but the Officer-in-Charge will assist vessels as necessary; the signal station will bear no responsibility for the actions of vessels assisted in this manner.

Caution.—In bad weather it is impossible to enter or leave Wollongong Harbor.

From the W side of the entrance to Wollongong Harbor, a sandy beach extends N to **Towradgi Point** (34°23'S., 150°55'E.), whose conformation is that of blue stone boulders and a rocky spit extending from it. From Para Creek behind the point, a coast range of low sand hills extends close behind the stretch of beach to Towradgi Point.

4.19 Bellambi Point (34°22'S., 150°56'E.) is low and consists of rock with a surface of sand. Bellambi Reef, which partially dries at LW and always breaks, extends nearly ESE 0.5 mile from Bellambi Point.

Flagstaff Hill (34°28'S., 150°52'E.), appearing as a long double summit hill, barren at each end and thickly wooded in the center, and in line with the center of Flagstaff Point bearing 218°, leads 0.5 mile E of the reef, in a depth of 14m. Wollongong Head Light shows red over Bellambi Reef. From 150m N to 0.3 mile NW of Bellambi Point, there are depths of 5.5 to 10.9m, from which depths decrease somewhat irregularly to 3.8m, to within 100m of the shore in a little bight extending 0.3 mile W from Bellambi Point, and forming the sea frontage of Bellambi village.

From Flat Rock, the NW point of Bellambi Bay, the coast extends N to Bulli Point (34°20'S., 150°57'E.), which has a reef of rocks, dry at LW, projecting from it. South from the point about 1 mile stands the Bulli Coal Station. This N suburb of Wollongong is a mining town. There is a jetty at Bulli and a light is shown from the flagstaff on the jetty.

From Bulli Point, the coast which is low, works N to Brickyard Point. At Brickyard Point, the coast becomes faced with cliffs to the village of Coalcliff (34°15'S., 150°59'E.). These cliffs form the NE extremity of the Crown Mountains. A mark useful to the mariner on this part of the coast is the conspicuous radio tower standing about 1.5 miles SW of Coalcliff.

A sounding of 18.3m, with deep water all around, was obtained about 2.5 miles E of Coalcliff.

The coast from Stanfield Bay, the bay being merely the N of two small bights lying between Coalcliff and a point 1.5 miles N, consists of a line of cliffs, with the exception of a beach lying nearly midway between Coalcliff and Wattamolla. Wattamolla serves as a boat harbor, with shelter from all winds except those from S and E.

Ranges of hills extend close along the coast from Bellambi to Port Hacking Point, and diminish in elevation at Port Hacking Point. Southwest of the point, prominent Jibbon Hillock (Table Hillock) rises to 90m.

From Wattamolla, the coast NE is irregular in and out to **Port Hacking Point** (34°05'S., 151°10'E.), and is predominantly fringed with dry and sunken rocks not too far offshore. Hacking Point protects Port Hacking from S and SE gales.

Jibbon Bumbora is a detached patch of rocks lying about 0.5 mile to the SE of Hacking Point. The sea will always break on these rocks, which have depths of 27m 0.5 mile to the E and 13m close to the N of them.

4.20 Port Hacking (34°04'S., 151°09'E.) is entered between Hacking Point and Glaisher Point, and is 0.5 mile wide, with depths of 5.5 to 7.3m between the ledges of rocks which project from both points of the entrance. From Hacking Point, the port extends nearly 1 mile in a WSW direction to a bar with a depth of 0.9 to 1.8m, stretching across an opening between two rocky points lying N and S about 0.4 mile from each other, and forming an inner entrance, leading from Port Hacking into the shallow, but extensive inlet to the W.

The S side of Port Hacking contains two small sandy bights consisting of Jibbon Beach and Bundeena Bay.

From Glacier Point, the N shore tends SW for 0.5 mile to Hungry Point, the S end of a Hilly Promontory. Depths in the outer portion of the port range from 11 to 20m; but from a depth of 9m in the entrance channel, the inner portion shoals rapidly. Dredging operations reportedly commenced in 2012 to remove material from channels across the mouth of Gunnamatta Bay, from Bundeena to Burraneer Point, across the mouth of Burraneer Bay, south of Turriel Point between Lilli Pilli and little Turriel Bay, and between Lilli Pilli Point and Goggerleys Point.

Overhead and submarine cables span Port Hacking at several places, which are best seen on the chart.

Anchorage.—The best anchorage is in 7m, sand, with Port Hacking Point bearing E, and the two points, lying 0.2 to 0.7 mile N of Gaisher Point, in line bearing N.

A light is shown on Burraneer Point; three beacons NE of the point have been fitted with lights.

Glaisher Point Light is shown from a white mast on the point.

4.21 Bate Bay (34°03'S., 151°11'E.), an exposed bight of no value as an anchorage, is entered between Glaisher Point and Potter Point, the S extremity of a peninsula which forms the S side of Botany Bay. The W shore of Bate Bay winds irregularly nearly 1 mile N from Glaisher Point, and is cliffy to a point fringed by a reef on the NW side of which is the S extremity of Curranulla Beach.

There are depths of 18.3m in the middle of the entrance of Bate Bay, and 16.5m at a distance of 0.8 mile offshore; abreast of it, there are irregular depths of 12.8 to 20.1m.

Osborn Shoal, with a depth of 8.7m, lies near the center of Bate Bay.

A cliffy coast extends to Cape Baily from Potter Point, where a more elevated line of cliffs extends to Cape Solander. A sand hill is prominent N of Cape Baily as it stands over the cliffs between Capes Baily and Solander. There is a light shown from Cape Baily, and at about 0.7 mile W of Cape Solander, an oil refinery gives off two conspicuous gas flares. There are also a number of chimneys and towers in this refin-

ery complex.

Caution.—Masters and others responsible for their vessels are required, when passing the entrance to Botany Bay and not intending to enter, to keep at least 1 mile to the E of an imaginary line drawn between Cape Banks and Cape Baily.

Botany Bay (34°00'S., 151°14'E.)

World Port Index No. 53655

4.22 Botany Bay lies 12 miles S of the entrance to Port Jackson and Sydney Harbor. The entrance to the bay lies between Cape Banks (34°00'S., 151°14'E.) and Cape Solander, 1.25 miles SW. Port Botany, on the N side of the bay, has been developed into a major port complex. Botany Bay's port complex includes six bulk liquid berths to serve the petrochemical industry in New South Wales and an expansion to the Brotherson Dock facility; this expands the container facility to have a total of 12 container berths. Berths that support the oil industry at Kurnell are situated on the S side of the bay. The combined facilities between Port Botany and Kurnell establishes Botany Bay as Australia's principal oil port and the largest container port in the southern hemisphere.

Port Botany (Sydney Ports)

http://www.sydneyports.com.au

Winds—Weather.—In Botany Bay, the sea breeze in summer and the land breeze in the winter months are predominant during settled weather. The "Southerly Buster," of short duration and reaching gale force in bursts is an important feature in the summer months. In winter and early spring, Botany Bay will experience strong W winds. The bay is also exposed to SE swells and rather rough conditions may be raised by strong winds from any quarter.

Visibility is generally good, but fog and mist sometimes occur and occasionally dust or smoke may impair the field of view.

Sudden changes in sea and weather conditions should put the mariner on the alert, should it be necessary to vacate the port at short notice.

Courtesy of Sydney Ports Handbook

Botany Bay from N

Tides—Currents.—The tidal rise at Botany Bay is 1.5m at MHHW and 1.3m at MLHW.

The currents set in and out of the entrance at a rate of 1.5 knots.

Depths—Limitations.—The main channel, leading from seaward, extends NW to Port Botany and lies on the NE side of the bay. The main channel to Molineux Point is 213m wide with a minimum depth of 17.9m. The swinging basin and

approaches to berths at Kurnell, have a minimum depth of 12.2m, in sand.

The Bulk Liquids Berth, a T-head jetty, situated near the entrance to Brotherson Dock, has a piled approach roadway and pipe support structure with mooring and berthing dolphins. The depth at the berth is 18.3m and can accommodate vessels 230m long, up to 75,000 dwt (vessels up to 243m in length or 90,000 dwt can be accommodated upon approval of the Harbor Master); a maximum draft of 14m is allowed. Bulk liquid chemical cargoes are piped to nearby industries and to storage tanks in an adjacent tank farm area.

The swinging basin at Brotherson dock has a minimum depth of 15.5m. Brotherson Dock consists of DP World Container Terminal which is situated on the S Quay with berthing numbers 10, 11, and 12. Patrick Container Terminal lies on the North Quay with berth numbers 6, 7, 8 and 9. North Quay has been expanded and is in operation as Sydney International Container Terminal which operates container berth numbers 1, 2, 3, 4 and 5. The minimum depth in the berth space between the S Quay and the approximate corresponding length from shore on the N Quay is 14.4m. The berths alongside S Quay are dredged to a minimum depth range of 14.0 to 14.8m and can best be seen on the chart.

Kurnell Oil Installations, on the S side of the bay, has a jetty with two berths (Kurnell No. 1 and Kurnell No. 2) and a multi-buoy mooring berth (Kurnell No. 3). Kurnell No. 1 has a length of 200m, with an alongside depth of 11.5m; the maximum permissible vessel length is 185m. Kurnell No. 2 has a length of 200m, with an alongside depth of 11.2m; the maximum permissible vessel length is 200m. Kurnell No. 3 is a multi-buoy mooring, with a submarine pipeline and a depth of 12.3m alongside the berth; the maximum permissible vessel length is 275m.

All sea-going vessels must maintain a minimum under keel clearance of 0.5m at all times when alongside in Botany Bay.

Aspect.—Botany Bay is entered between Cape Solander and Cape Bank; from its entrance, the bay extends about 4 miles W. Its shores are generally low and considerably built over. Botany Bay is Australia's premier oil port. Residential and commercial buildings ring the bay. About 0.5 mile NW of La Perouse Point, Bunnerong Electric Powerhouse, with its extensive buildings and coal yards, is situated along the foreshore close N of Bumbora Point. Two shallow sandy coves, from which several submarine pipelines extend, indent the shore between La Peronse Monument and Bumbora Point.

A conspicuous radar scanner is situated about 4 miles NW of Henry Head and there are obstruction lights on the scanner.

The S shore of Botany Bay from **Inscription Point** (34°00'S., 151°13'E.) sweeps around SW to Kurnell, taking in a sandy beach to Bonna Point. The S shore of the bay is formed by the N end of a low flat peninsula, named Towra Point, extending from the S and separating a shallow lagoon (Weeny Bay) on its E side from the estuary of the Georges River on the W.

Pilotage.—Pilotage is compulsory for Botany Bay; pilots should be ordered through the ship's agent in advance. Pilot boards in the vicinity BA position 34°01'S, 151°19'E, about 4 miles E of Cape Slander. Vessels should e-mail their ETA at least 4 hours in advance, confirming by radio 2 hours and 1 hour before arrival.

Vessels may not proceed W of the pilot boarding ground without the permission of the harbormaster. The pilot will remain on board vessels berthed at Kurnell No. 3.

Regulations.—The port limits of Botany Bay are defined by the circumference of a circle about 4 miles in radius, centered on Endeavor Light (34°00'S., 151°14'E.). The harbormaster exercises control over the movements of vessels in shore of this line and has established traffic regulations for entry into the port. Foul ground, with a radius of 0.4 mile, is centered in position 34°24.8'S, 150°57.2'E; anchorage is not recommended in this area during strong SE winds due to poor holding ground and the existence of old anchor chains.

Inbound vessels must not enter Area B or Area D; outbound vessels must not enter Area A or Area C. All areas are best seen on the chart.

Quarantine.—The quarantine line for the port is drawn from the tip of **Molineux Point** (33°59'S., 151°13'E.) 210° to the NW corner of the quarantine area N of Kurnell, then parallel to the W boundary of this area to its SW corner; then 151° to the pier at Kurnell. Two quarantine areas have also been established in Botany Bay, the first of which has been identified. The second is centered on the SPM.

Traffic Regulations.—Anchorage is prohibited within the limits of the port.

Signals.—Radio communication may be established on VHF channel 12 with Sydney Maritime for vessels more than 5 miles from Botany Bay. For vessels within 5 miles of the port, Harbor Control may be contacted on VHF channel 13.

Anchorage.—There are no recommended anchorages off the coast for vessels waiting to enter Botany Bay. Anchorage is prohibited within the limits of the port.

Directions.—A directional light, situated on the end of the runway extension, leads into the bay. This directional light leads clear of all dangers to the quarantine anchorage. Range beacons WNW of the head of Kurnell Oil Pier lead into the dredged tanker terminal anchorage and turning basin. Also, ranges in the bay lead from the entrance to the dredged area to the Kurnell Oil Pier and for the approach to the Brotherson Dock Complex.

Cape Banks to Port Jackson (Sydney)

4.23 From Cape Banks, the coast, the N part of which is cliffy, extends to Long Bay whose entrance is about 0.5 mile wide. There are sunken rocks lying a short distance NE of the head of the bay. Visible on this part of the coast, in addition to the Bunnerong Power Station chimneys mentioned earlier, is the Long Bay Penal Establishment and the Prince Henry Hospital, the latter at the head of Little Bay 0.5 mile off Long Bay.

From the projecting NE head of Long Bay, the cliffy coast extends to Marouba Bay, indenting the coast for about 0.5 mile. Between the cliffy headland which forms the N point of Marouba Bay and a projecting point 1.8 miles to the N of it is Coogee Bay.

An aeronautical lighted beacon is occasionally shown from a tower about 4 miles WSW of Coogee Bay. An aeronautical radiobeacon transmits from a radio tower about 1 mile W of the bay.

From the N point of Coogee Bay, a double bight extends NNE 1.5 miles to Ben Buckler (33°54'S., 151°17'E.). A point

0.5 mile SW of the bluff separates Grama Gramma Bay, on its SW side, from Bondi Bay, NE of it.

A prominent tower, 184m high, stands about 1.5 miles WSW of Ben Buckler. Two water towers exhibiting obstruction lights are situated near Ben Buckler.

About 14 miles E of Port Hacking Point, there are depths of 165m, dark sand bottom, off which the 200m curve extends N and NE to a position 19 miles E from the outer S head of Port Jackson. From this 200m curve, the soundings decrease with regularity toward the shore, which, from 4 miles S of Hacking Point to the entrance of Port Jackson, may be generally approached to a distance of about 1 mile, in 36.6 to 54.9m, sand bottom. Detached dangers beyond 0.3 mile off this part of the coast are best seen on the chart.

Aspect.—The characteristic features of the coast N and S of Port Jackson assume somewhat different aspects. North Head and its immediate vicinity presents a high flat-topped precipitous appearance and the coast farther N of this point consists of high undulating hills, thickly covered with trees. The striking contrast is the sterile table-topped cliffs which extend S of the port. If the lighthouses did not present a conspicuous feature, the coastal description first mentioned would indicate whether the land seen is to the N or S of the entrance to Port Jackson.

Approaching Port Jackson from the E, the summit to the N of Sydney Heads will, in clear weather, be seen considerably higher than the adjacent coast. Closer in, it will be identified by the lighthouse and signal station on Dunbar Head and the bold, perpendicular profile of Outer North Head.

On the E approach to the port, a naval vessel reported its radar landfall was not well defined until under 30 miles. Macquarie Light was visible from a great distance and was observed after the vessel was well inside Sydney Harbor. The S portion of the Sydney skyline was partially visible prior to entering the harbor.

Sydney (33°52'S., 151°12'E.)

World Port Index No. 53650

4.24 The Port of Sydney is situated in Sydney Harbor (Port Jackson) and is the premier port of Australia. The shores of the port consist of a series of bays and coves which are harbors themselves. This port, commodious and secure, is under the jurisdiction of the Maritime Services Board of New South Wales. Vessels may enter or leave in complete safety at any state of the tide, both day and night, being guided by the buoys and lights.

Sydney Ports

http://www.sydneyports.com.au

The limits of the greatest commercial activity extend, with the exception of Farm Cove, from Woolloomooloo Bay to Glebe Island; the great natural advantage of deep water, generally continuing to the shore, being fully utilized, and artificially improved, so that from Bennelong Point W, the frontage is skirted by an almost unbroken line of wharves and quays. About half of Sydney's general cargo traffic is containerized.

Winds.—Weather.—At Sydney, at 0900, W winds are predominant in the winter months, but the winds are variable in summer. At 1500, they are variable in winter but E or NE in summer. Mean wind speeds are 6 to 7 knots in all months at 0900, but at 1500 the average values vary from 7 knots in May and June to 12 knots in December and January. Gales occur, on the average, on 2 days per month in July and from October to January, but less frequent in other months.

The NE winds in summer, for the most part, are associated with good weather. Stronger NE winds generated from a high pressure system over the Tasman Sea and lower pressure inland, changes the weather to overcast conditions with rain and is referred to as the "black northeaster." Thunderstorms are more frequent in the vicinity of Sydney than in any other coastal region of Australia.

Gales from the E raise a heavy sea upon this coast, breaking with great violence not only upon Sydney Heads, but also occasionally right across the entrance and within the entrance on to Middle Head. These gales are frequently attended by banks of haze which might prevent the lights being seen at night.

When a heavy sea is running between Sydney Heads, a red square flag with a diamond shape below it will be displayed at Dunbar Head Signal Station and at the flagstaff at **Fort Denison** (33°51.4'S., 151°13.5'E.).

Tides—Currents.—The mean spring range for Port Jackson is 1.3m. During the summer months, the daytime tides are usually higher than the nighttime tides; with the reverse occurring in the winter months.

Offshore, in the vicinity of Port Jackson, the current sets parallel to the shore, with the ebb current setting to the S and the flood setting to the N. Within the entrance channel, the current sets across the sound, then close along the shore from Inner North Head to Outer North Head. This tends to leave most of the channel in SW on the ebb.

Between Bradley's Head and South Head, the ebb and flood current run generally parallel with the dredged channels, at a drift approaching 1 knot. From Bradley's Head to the Sydney Harbor Bridge, the set of the current is generally E-W at less than 1 knot; the current in this portion of the bay is affected by the numerous coves and points that make up the coast of the area. These features create weak eddies at various places across the bay.

Depths—Limitations.—The bar, with Sow and Pigs Shoals, formerly extended nearly across Port Jackson between South Head and George Head. Western Channel, the main channel which is generally used by vessels both entering and leaving, has a controlling depth of 13.7m deepening gradually to 15.8m at its NE end. Eastern Channel is dredged to 12.2m on the range and it is reported the depth in the harbor entrance is 24.3m. A wreck, with a least depth of 12.1m, lies just SW of South Head in Eastern Channel.

At times, a heavy swell sets into the harbor, which requires an additional draft allowance of 2m for the potential pitching of the vessel (scend) in the entrance; this must be duly considered by vessels with drafts close to the minimum depth allowed.

Ships underway within Port Jackson and Sydney Harbor are required to maintain an under-keel clearance of 10% of the ship's draft plus 0.2m. All sea-going vessels must maintain a minimum under keel clearance of 0.5m at all times when alongside.

The Port Operations and Communication Center is housed in a tower, 87m above sea level, which is situated at Millers Point and provides for port traffic management, operating and information services, and radio navigational information services on a continuous watch, maintained on VHF channel 16. Traffic movements and approval to enter or leave a berth are controlled from this center.

The **Sydney Harbor Bridge** (33°51'S., 151°13'E.) spans the channel just W of Sydney Cove. The vertical clearance at the center of the span is 51.3m, reducing to 48.8m a distance of 183m from center. The center is marked by a diamond shape, which is bordered in red neon lights at night, with a yellow strip.

The **Pyrmont Bridge** (33°52'S., 151°12'E.) spans the S end of Darling Harbor and is of a swing span type. The navigable width is 21.3m through the spans. The bridge will open only on special occasion or with prior arrangement.

The **Glebe Island Bridge** (Anzac Bridge) (33°52'S., 151°11'E.) spans the entrance to Rozelle Bay; it is a fixed span, with a vertical clearance of 27m. The old swing span, standing close N of the fixed span, is permanently open to shipping and has a navigable width of 18m in the E channel; the W channel is permanently closed to shipping.

Garden Island and Woolloomooloo Bay have ten berths, which includes the Fleet Base East. Together this forms Australia's largest naval base. The Oil Wharf, the Cruiser Wharf, the East Wall, Captain Cook Graving Dock, the West Wall, and the Fitting Out Wharf are all situated here.

Courtesy of Sydney Ports Handbook

Glebe Island from W

Sydney Cove, with three berths, is a passenger terminal. The cove is a restricted area; unauthorized vessels are not permitted to enter the restricted area, which is best seen on the chart.

Walsh Bay has nine berths; all have cargo sheds. The largest is No. 8, with a length of 207m and alongside depths of 9.1 to 12.5m. the berths are no longer used for commercial traffic.

Darling Harbor has 21 berths and has undergone extensive port development. The largest berths are Berth No. 4 and Berth No. 5, with a lengths of 313m and 295m, respectively, and depths of 11m at Berth No. 4 and 10.8m at Berth No. 5. Berth No. 39 is the location of Sydneys first inner-city heliport. All commercial operations have been moved to Port Kembla. Only passenger operations are conducted at Darling Harbor.

Pyrmont has 14 berths. All commercial operations have been moved to Port Kembla.

Rozelle Bay has six berths, with 672m of total wharfage and depths of 2.7 to 6.1m alongside. Commercial operations no longer take place at these piers.

Glebe Island Container Terminal Complex consists of two berths, 468m long. Depths at the berths and in the approach channels are 11.8m. At Glebe Island, Johnson's Bay, wharves have been constructed, with a length of 312m and depths of 11.6m alongside.

White Bay Container Complex has three berths. There are

Courtesy of Sydney Ports Handbook

The Glebe Island Bridge, White Bay, and Blackwattle Bay from W

depths of 11m in the approach channel to these facilities. Berth No. 5 and Berth No. 6 are the largest berths, 405m long, with depths of 11m alongside. Berth No. 3 was under construction, which has a length of 278m and a depth of 10.5m alongside. Berths No. 2 and Berth No. 4 have lengths of 141m and 264m, respectively, and alongside depths of 11.0m

The A.N.L. Terminal at Mort Bay contains two ro-ro berths, with a length of 133m. There are depths of 6.8 to 9.7m alongside. The ro-ro berths are no longer used commercially.

CalTex Oil, situated at Ballast Point, can accommodate a vessel to 213m in length. There is a depth of 8.1m at the berth. All commercial operations have been transferred to Port Kenbla.

Snails Bay Dolphins has four berths, each with a length of 215m and depths alongside of 10 to 11m.

Gore Bay contains three Shell Oil berths. Berth No. 1 can accommodate vessels up to 265m long, with an alongside depth of 13.7m, but a depth of 13.2m has been reported just NE of the berth. Berth No. 2 and Berth No. 3 have depths of 8.5m in the approaches and will accept vessels up to 190m in length. Depths at the berths range from 9.4 to 10.4m.

Balls Head Coal Loading Jetty offers two berths; the N side of the pier has a length of 146m, a depth of 6.6m, and is used as a lay-up berth. The S side of the pier has a length of 146m and alongside depths of 10.6m. These piers are no longer used commercially.

The Balmain Coal Loading Berth is 333m long, with a depth of 11.6m. The maximum length of a vessel using this berth is 198m; the maximum beam allowed is 29.5m.

Berrys Bay contains two berths belonging to BP Australia. No. 2 Berth can accommodate vessels up to 183m long. No. 1 Berth can accommodate vessels up to 160m long. Depths alongside range from 9 to 10.1m. The berths are no longer used commercially.

Chowder Bay is a Naval Base. A fuel wharf is situated on its NE side. There is a charted depth of 12.1m alongside. Naval authorities should be consulted before attempting to berth here.

Aspect.—Outer North Head and its immediate vicinity appear high, flat-topped, and precipitous, but the high, undulating, and thickly-wooded hills which rise from the coast farther N contrast strikingly with the bare table-topped cliffs extending S of the port; thus these hills or cliffs, when sighted, will indicate whether the land seen is N or S of the port, even if Macquarie Light does not present a distinctive feature.

The entrance to Port Jackson and Sydney Harbor lies between Dunbar Head and South Head, 1 mile NNW, on the S side and Outer North Head (33°49.5'S., 151°18.0'E.), 1.7 miles NNE of Dunbar Head, and Inner North Head 0.7 mile WNW, on the N side.

Pilotage.—Pilotage is compulsory except for vessels holding exemption certificates for the port. Vessels approaching Port Jackson are advised to contact "Harbor Control" on VHF channel 13, and listen for the pilot vessel, or to exchange visual signals with the signal station just S of Hornsby Light (33°50'S., 151°17'E.).

The pilot boarding ground is situated 4 miles due E of Hornby Light; vessels are not permitted W of this position without the consent of the harbormaster. Vessels are not to exceed a speed over 8 knots while boarding or discharging the pilot. Vessels are to maintain an underkeel clearance equivalent to 10

per cent of its draft.

Regulations.—The vessel's ETA should be sent to Sydney Harbor Control at least 4 hours in advance by e-mail, confirming 1 hour prior to arrival. When within 5 miles of the pilot boarding ground, "Harbor Control" should be contacted for instructions.

Port limits.—The port limits of Port Jackson are defined by the arc of a circle 4 miles in radius, centered on Hornby Light.

Quarantine.—The quarantine line for the port is drawn from Darling Point to Bradley's Head; vessels are not to cross this line until pratique is granted. The quarantine anchorage is not defined, but is usually **Spring Cove** (33°49'S., 151°17'E.).

Traffic regulations.—A Prohibited Anchorage and Restricted Area for the control of traffic within Sydney Heads has been established, as follows:

1. A line drawn from Outer North Head 090° to the port limit line.
2. A line drawn 130° from Hornby Light to the port limit line.

Additionally, the entrance range has been designated as a Traffic Separation Line. The body of water N of the line has been designated Area A; the area S of the line has been designated Area B. Entering vessels may transit area A only, and departing vessels may transit Area B only.

Entering vessels must contact "Harbor Control," as stated previously, and may not proceed W of the pilot boarding ground without the permission of the harbormaster.

Several areas within the approaches to, and the waters of Port Jackson, have been designated as Prohibited Areas and Naval Waters and are best seen on the chart.

Masters should procure a copy of the port regulations from the Maritime Services Board of New South Wales upon arrival.

Traffic Reporting Points	
Place Name	**Position**
North Head (inbound only)	33° 49.8'S, 151° 17.7'E
Junction Buoy	33° 49.9'S, 151° 16.3'E
Bradley's Head	33° 51.4'S, 151° 14.9'E
Fort Denison	33° 51.3'S, 151° 13.5'E
Longnose Point	33° 50.8'S, 151° 11.2'E
Looking Glass Point	33° 50.7'S, 151° 07.4'E
Wentworth Point	33° 49.4'S, 151° 04.9'E

Speed limits.—Vessels must not exceed a speed of 12 knots between Inner North Head and Bradleys Point, and a speed of 10 knots between Bradleys Point and Balls Head.

Fleet Base East.—Pilotage is compulsory for foreign warships. Naval Pilot is transferred via Sydney Sea Pilot launch. The pilot boards in position 33°50'S, 151°21'E approximately 4 miles due E of Hornby Light.

Ships entering Sydney proceeding to Fleet Base East, Garden Island, or Man-of-War Anchorage should call Harbor Control when 5 miles from the port. Ships should maintain a listening watch on VHF channel 13 and report when passing North Head (inbound only), Junction Buoy, and Bradley's Head.

Anchorage.—Merchant vessels can anchor N of a line joining Bradley Head to Kirribilli Point, and in Double Bay clear of the Naval anchorages which lie E of Garden Island and in Farm Cove. The Sound is immediately within the entrance occupying almost 1.5 square miles, with regular soundings in 14.6 to 16.5m, branching N to Spring Cove North and Middle harbors, but the area is exposed to the ocean swell and therefore offering only temporary anchorage with offshore winds. Vessels may wait here for a tug or a favorable opportunity for entering the port.

Anchorage is prohibited within 0.1 mile of any wharf, jetty, bridge, or in such a position as shall obstruct the approach to these facilities including in the vicinity of a submarine cable or a pipeline.

Explosives anchorage.—Vessels with explosives aboard must not anchor W of a line joining Darling Point and Bradley's Head.

Directions.—The following approach directions are provided for reference:

From the S.—Vessels approaching Sydney Heads from the S will probably sight the entrance to Botany Bay, which lies 10 miles to the S.

From the N.—Macquarie Light should be left open of North Head to clear Long Reef, 5 miles N of it. The suburb of Manly, with its fringe of pine trees as well as the buildings of the Cardinal's Palace, are prominent features before getting up with the North Head.

Inbound—Western Channel.—From the pilot boarding ground, enter the Heads just N of the entrance range line and steering about 294°. Keeping along the N shore, about 400m off, steer for Western Channel when nearly abreast of Inner North Head. Keep to the starboard side of the channel until Western Channel Light is astern, then alter course to pass between Bradley's Head Light, and the buoy SE of it. Take care to avoid a 10.3m patch about 0.3 mile E, and the wreck 0.3 mile SE of the light. Round Bradley's Head, and steer for the N pylon of the Sydney Harbor Bridge, keeping N of **Fort Dennison** (33°51'S., 151°13'E.).

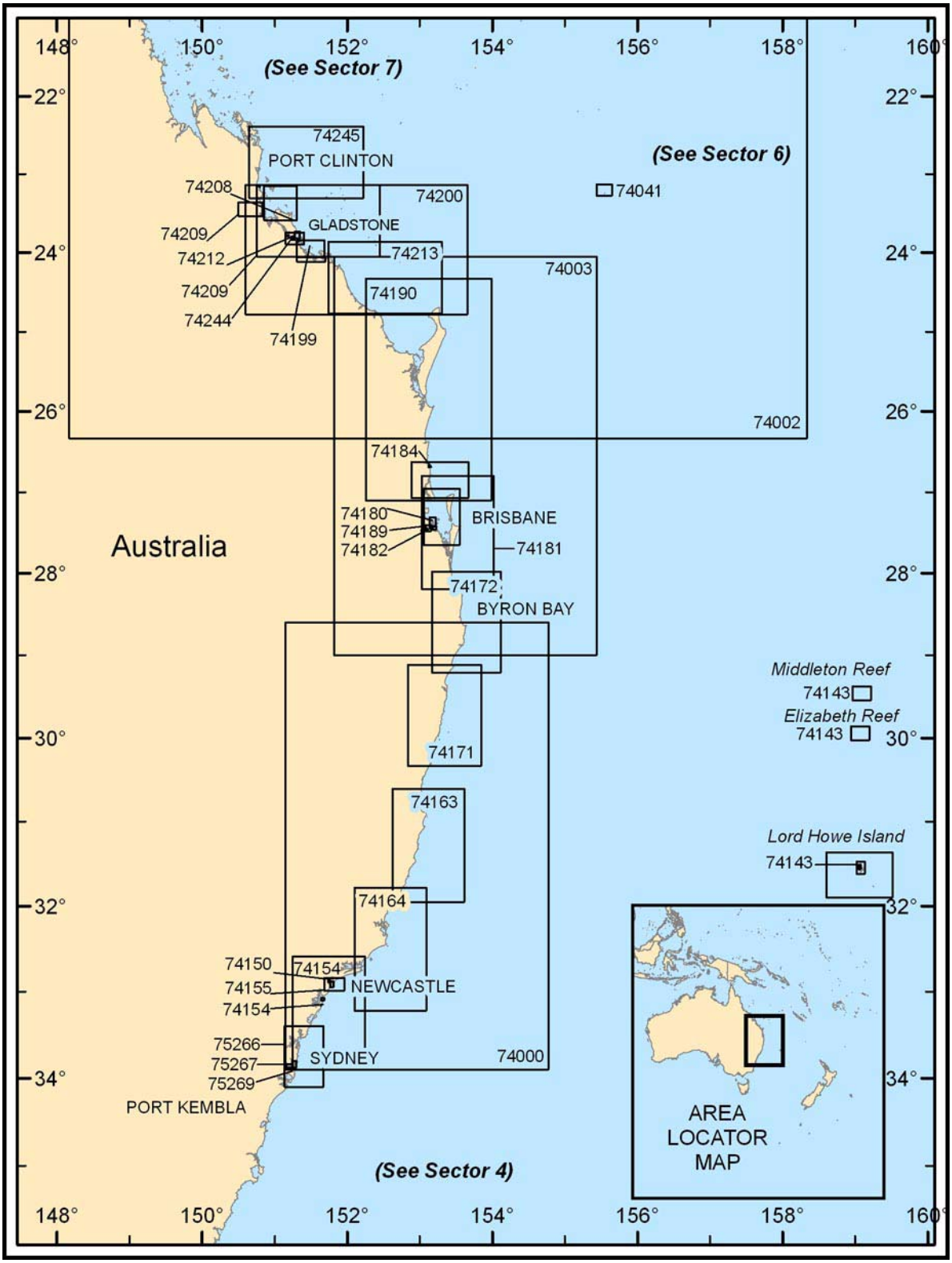
Inbound—Eastern Channel.—From the pilot boarding ground, enter the Heads as previously directed. When nearly abreast of Inner North Head, change course gradually S to bring the Eastern Channel Range Lights into alignment, and enter the channel. When clear of the shoals on the W side of the channel, steer for Bradley's Head and proceed as previously directed.

Outbound—Western Channel.—Keeping a good lookout for ferry traffic from Sydney Cove, pass S of Fort Dennison. Steer to pass S of the buoy SE of Bradley's Head. When clear of the buoy, change course for Western Channel, keeping a good lookout for inbound vessels using Eastern Channel. When free of South Head, proceed to sea, keeping S of the entrance range.

Outbound—Eastern Channel.—Steering as previously directed, change course for Eastern Channel Light when clear of the buoy off Bradley's Head. Round the light about 200m off and pick up Eastern Channel Range Lights in line astern. A good mark in clear weather is to keep **Manley Pier** (33°48'S., 151°17'E.) open of **Manley Point** (33°49'S., 151°17'E.). When clear of the channel proceed to sea, keeping S of the range line.

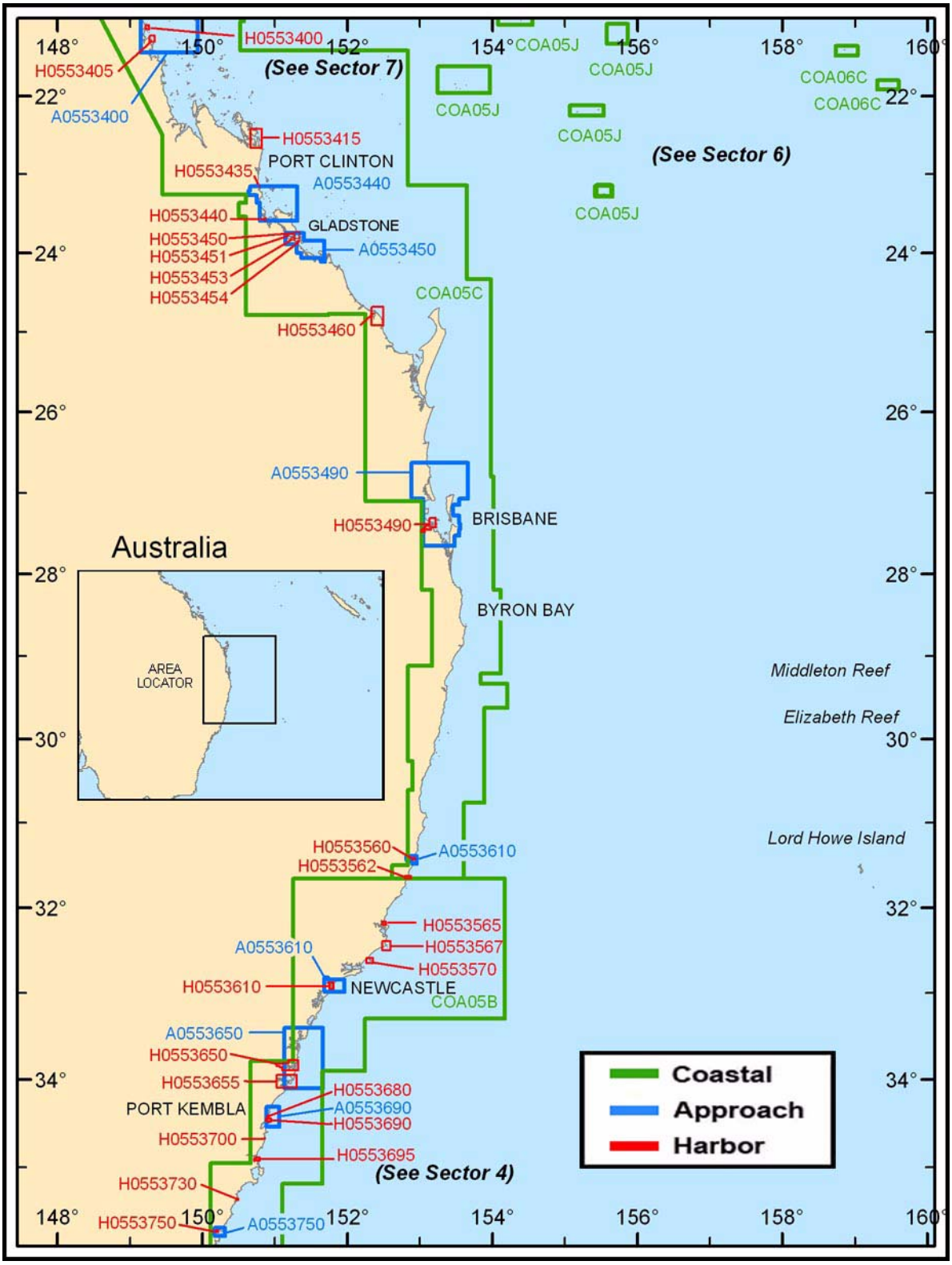
Caution.—Hazardous operations involving explosives are conducted regularly in Naval Waters. Vessels are warned not to remain in the vicinity of warships and ammunition barges displaying the International Code Flag B.

Vessels transiting Deviation Cut are cautioned that unexploded ordnance in position 33°50.9'S., 51°16.3'E allows for safe surface navigation only. The area is not safe for anchoring, trawling, or seabed activities.



Additional chart coverage may be found in NGA/DLIS Catalog of Maps, Charts, and Related Products (Unlimited Distribution).

SECTOR **5** — CHART INFORMATION



Additional DNC library coverage may be found in NGA DNC 5 (Limited Distribution) disc within the README\GRAPHICS folder.

SECTOR 4 — DNC LIBRARY INFORMATION

SECTOR 5

AUSTRALIA—NORTH POINT (SYDNEY HARBOR) TO CAPE TOWNSHEND

Plan.—This sector describes the E coast of Australia from the N entrance point of Sydney Harbor to Cape Townshend, including the off-lying islands and dangers as far E as Norfolk Island. These islands and dangers are described first and are arranged from E to W and from S to N. The arrangement of the coastal description is N from Sydney Harbor.

General Remarks

5.1 From North Point, on the N side of the entrance of Sydney Harbor, the E coast of Australia trends about 104 miles NE to Sugarloaf Point and then about 95 miles NNE to Smoky Cape. It then trends more to the N for about 141 miles to Cape Byron, the easternmost point of Australia. From Cape Byron the coast trends N and NNW for about 238 miles to Sandy Cape.

Between Sandy Cape and South Head, about 47 miles W, Hervey Bay indents the coast about 33 miles to the S. From South Head the coast trends about 187 miles NW to Cape Townshend, with Cape Capricorn lying a little more than halfway between. Bustard Head lies about 56 miles NW of South Head.

A number of bays and bights indent the coast and numerous rivers discharge from it. Much of this coast is low and sandy; however there are numerous headlands and in the vicinity of Cape Townshend the coast becomes high and rugged.

Newcastle and Brisbane are the important ports on this coast, but vessels call at Port Stephens, Coffs Harbor, Clarence River, Richmond River, Maryborough, Port Curtis for Gladstone, and Rockhampton. Vessels also call at Bundaberg.

Norfolk Island is the easternmost of a number of off-lying islands and dangers located between about 210 and 790 miles E of the coast described in this sector. Lord Howe Island and dangers S and to the W of it are the southwesternmost of these dangers. Kelso Bank is the northwesternmost of these dangers.

The principal headlands and harbors are well lighted. Visibility may be reduced by occasional fog in the fall and winter by haze which sometimes accompanies the SE trade winds and occurs most often in September and October, or by heavy rains.

Restricted areas.—The Commonwealth of Australia has established a system of regulated zones within the waters comprising the Great Barrier Reef. These areas, established as the Great Barrier Reef Marine Park, are designed to control the movement of all vessels within specific size categories and geographic locations. The limits of these areas, accompanied by amplifying information, are seen on the appropriate chart.

Great Barrier Reef Marine Park Authority

http://www.gbrmpa.gov.au

Further information can be found in Pub. 120, Sailing Directions (Planning Guide) Pacific Ocean and Southeast Asia. Complete information regarding the Great Barrier Reef Marine Park Zoning Plan, which includes Designated Shipping Areas and Particularly Sensitive Sea Areas, can be found on the Authority's web site.

Regulations.—Information relating to the Australian Maritime Rescue Coordination Center (MRCC), Search and Rescue (SAR), and the Modernized Australian Ship Tracking and Reporting System (MASTREP) may be found in Pub.120, Sailing Directions (Planning Guide) Pacific Ocean and Southeast Asia.

For information regarding the mandatory ship reporting systems and vessel traffic service which cover the Torres Strait region and the Inner Route of the Great Barrier Reef, see paragraph 7.2.

Fishing.—Commercial and recreational fishing vessels operate along the E coast throughout the year, especially between Newcastle and the Evans River (29°08'S., 153°28'E). Trawler fleets operate and are dominant, especially off the coast of New South Wales.

Winds—Weather.—The climate of this region is quite warm, and because of the anticyclonic storms in summer and then depressions over the ocean during the winter, wind and weather are variable.

Offshore and S of 30°S, the winds tend to be from the SW from June to August and from the E from January to March. There is no predominating wind direction in any season. Gales are most frequent from May to September, during which time they occur on an average of about 6 days per month.

Offshore between 25°S and 30°S the winds are variable, but from December to May, the Southeast Trade Winds predominate. West of 155°E, these trade winds are not well developed until March and in May the wind tends to be from between the SE and SW. In June, they tend to be S to SW. Gales are most frequent from February to July, during which time they occur about 3 days per month.

On the coast, land and sea breezes are well developed with the sea breeze most prevalent in summer and early fall, when it is strengthened by the Southeast Trade Winds. In the vicinity of Brisbane and further S, the sea breeze is NE, usually occurring between 1300 and 1900. The land breeze is prevalent in winter, with its direction influenced by the coastal mountains.

When W winds prevail at sea, strong squalls from the highlands may be expected on the coast.

Black Northeasters, strong NE winds which may be encountered on the coast and at sea, are associated with a steep pressure gradient between an anticyclone over the Tasman Sea and a monsoonal low pressure over New South Wales. They are sometimes accompanied by dense clouds, heavy rain squalls, and occasionally by thunder.

When Black Northeasters are reinforced on the coast by the NE sea breeze, a gale may result which usually reaches its maximum velocity by mid-afternoon. These winds are sometimes persistent before a Southerly Buster.

Southerly Busters, heavy rain squalls with gusts of 17 to 35 knots, are particularly violent on the coast of New South Wales S of Port Macquarie.

The Southeast Trade Winds prevail throughout the year off this part of the coast. Southwest winds occur 4 to 5 days a month from May to July; NW or N winds occur about 6 to 7 days a month from September to December. The wind is usually moderate, but attains force 7 or more about 20 or 30 days a year. Brief squalls, sometimes of gale force, are fairly frequent with the Southeast Trades.

Land and sea breezes, strengthened by the trade winds, are often strong in the afternoon and may cause a considerable sea. At such times, the wind often shifts to NE.

Tropical cyclones, called Queensland Hurricanes, occur about 4 or 5 times a year. They are most frequent from December to April, but have occurred in every month except August.

Fog is almost unknown 20 miles or more off the coast, and visibility is good except during heavy rain. At times, there may be some haze with the trade winds. Along the coast, fog or mist sometimes develops at night, but usually disperses soon after sunrise. Such fogs occur 2 or 3 times a month from May to September and sometimes in other months.

Storm warnings and weather information are broadcast by radio.

Tides—Currents.—The East Australian Coast Current originates in the sea area E of Swain Reefs and flows S along the Australian coast as far as Cape Howe. It occupies a broad belt that extends 20 to 60 miles offshore and has a rate that varies from about 0.5 knot to more than 3 knots. Its greatest strength is found near the 200m curve, which varies in position from about 10 to 30 miles offshore and near which, at 31°S, a rate of about 4.5 knots was observed. The strength of current is first felt in the vicinity of a position about 12 miles NE of Sandy Cape.

The set of this current, which is mainly between SE and SW, is not a very constant one. It is subject to interruptions throughout the year by sets in other directions, notably reverse sets, and there is also a considerable seasonal variation, both in the S and N flows.

Close inshore and in the bights, particularly N of Cape Moreton, there is a N countercurrent with a rate of 0.2 to 1 knot. In general, the strongest S set is found between 26°S and 32°S, particularly between 28°S and 30°S, where several observations of about 4 knots were recorded in the months of February to April. The current is apt to be strong off projecting points; off Danger Point, a S set of about 4 knots was observed.

Between Danger Point and Sydney Harbor, during the months of November to April, a considerable number of currents setting between SE and SW exceed the rate of 2 knots. From February to April, the number of S currents exceeding a rate of 2 knots increases to 12 per cent of all currents observed, and currents exceeding a rate of 3 knots may be experienced. The S current may sometimes cease and set N, but it lasts a day or two and may be attributed to local causes, such as strong S winds.

In the same area during the months of May to October, the number of currents exceeding a rate of 2 knots occurs at less frequent intervals than during the summer months. From August to October, a rate of 3 knots may be occasionally met. From May to July, the S current is neither regular nor strong, as during the remainder of the year. At this time, N currents reach their greatest strength, approximately 1 knot, and increase in frequency of occurrence.

Between Port Stephens and the coast S of Sydney Harbor, the current sometimes sets toward the land. In a SE gale in December it has been known to set SW.

The outer part of this S current, when about abreast of Port Stephens, curves to the E and ENE, sometimes running with considerable velocity. Abreast of Sydney Harbor, the outer part of this same current will be found diverted from its course to a SE and E direction as it leaves the land, the rate being 1 to 2 knots; it has been found to completely reverse and run strongly in the opposite direction.

Farther S, in the vicinity of Cape Howe, the current may set in either direction at a rate of 1 to 1.5 knots.

Off-lying Islands and Dangers

5.2 Most of the off-lying islands and dangers lie within a 100 mile radius of a position about 30 miles N of Lord Howe Island, which lies about 310 miles ESE of Smoky Cape. Norfolk Island and the dangers in its vicinity lie about 500 miles ENE of Lord Howe Island.

Norfolk Island (29°02'S., 167°57'E.) lies about 900 miles ENE of Sydney. It is about 4 miles long from N to S and about the same distance wide. The island is not self-supporting and relies on imports of supplies to augment its own resources. The main source of revenue is tourism, with approximately 40,000 annual visitors. Mount Pitt and Mount Bates rise near the NW end of the island. Aeronautical lights are shown from the summit of each mountain. The island is fairly steep-to, but fringing reefs and rocks lie up to 0.5 mile offshore.

Kingston (29°04'S., 167°57'E.) (World Port Index No. 55500) lies on the S side of Norfolk Island at the head of Sydney Bay. The harbor is fronted by an almost continuous detached reef, outside of which there are usually heavy breakers. Pilots are not available. There are facilities for mooring and the port can be contacted on VHF channel 16.

A historic wreck, protected from unauthorized interference, lies on the bank about 0.1 mile to seaward of the reef.

There is a boat harbor at the W end of Kingston, but the approach to it is sometimes dangerous, owing to the W end of the off-lying reef, which must be rounded. There is a wharf, 183m long, on the SE side of the boat harbor.

Anchorage.—Anchorage is available, in depths of 18 to 22m, 0.5 mile WSW of Point Hunter. Vessels may also anchor on the S part of Norfolk Island. Leading lighted beacons, each with a white triangular daymark, point up, stand at the W end of Kingston, and in line bearing 016°, lead to the anchorage.

There is no protected anchorage at Norfolk Island. Cascade Bay, on the NE side of the island, is the normal winter anchorage and is moderately secure, even in strong SW winds. Vessels anchor 0.4 mile NNE of Landing Rock. Anchorage is also afforded 1 mile N of Landing Rock, in depths of 31 to 37m. Anchorages are clearly shown on the chart.

Anchorage is prohibited in Anson Bay. Submarine cables are laid SW from a position 0.5 mile ESE of Anson Point. There are tanker moorings in Ball Bay, with a pipeline to the storage tank ashore.

Nepean Island (29°07'S., 167°56'E.) lies about 0.5 mile S of Norfolk Island. The island is about 0.2 mile in extent, and fringed by reefs up to about 0.5 mile offshore. An obstruction, the depth over which is unknown, was reported to lie about 0.2

mile SE of the SE extremity of the island.

Philip Island lies about 3 miles SSW of Nepean Island. The island is about 1 mile in extent and fringed by reefs and rocks up to 0.3 mile offshore. Landing is possible at times in a small bay on the N side of the island. A number of above-water rocks lie on the N side of the island.

Lord Howe Island

5.3 Lord Howe Island (31°33'S., 159°05'E.), crescent shaped, mountainous, and wooded, lies about 430 miles ENE of Sydney Harbor. It is about 6 miles long and about 1 mile wide. Mount Gower rises at the S end of the island and Mount Lidgbird lies about 1.5 miles NNE of Mount Gower. The island lies on and near the middle of a bank, about 22 miles long and 12 miles wide, with depths of less than 200m.

The N and E sides of the island, although fringed by foul ground, rocks, and islets, are fairly steep-to. Most dangers are contained within the 20m curve, which lies about 0.5 mile off this part of the island.

The W side of the island is a bight formed by the crescent shape of the island and indents it about 1.5 miles ENE. Coral reefs, lying up to 1.2 miles offshore, extend across the bight from the NW end of the island to a position about 1.2 miles N of the S end of the island. The lagoon inside these reefs has depths of 2.1 to 2.4m at HW, but it is barely navigable by boats.

Winds—Weather.—Sudden and violent squalls are common off the SE coast of the island. In summer, NE winds prevail, but during a thunderstorm the wind may shift to the S or SE for a short time. In the winter, the wind is variable from the W, but the SW wind prevails and is frequently strong. When the mountains are capped with clouds, a NW wind may be expected.

Tides—Currents.—The mean tidal range at Lord Howe Island is 1m; the spring range is 1.2m. The ebb current begins to set S at HW; the flood sets N beginning at LW.

Pilotage.—Prior advice of intention to visit Lord Howe Island is advisable. Vessels anchoring in the open roadstead are subject to pilotage advice and direction.

Signals.—Radio contact on VHF channel 16 can be established with the port and guidance for anchorage may be requested. The harbormaster maintains around the clock watch on VHF.

Signals are made from a flagstaff on the SE side of Hunter Bay as follows to indicate the assigned anchorage:

Signal	Anchorage
White flag	Southwest Roadstead for Townside Anchorage.
Red flag	Northeast Roadstead for Ned's Beach.
Red flag and white flag	No landing either side.

Anchorage.—Although there are moderate depths at convenient distances around the island, anchorage is not good due to a bottom fouled by rocks and coral, and also because of violent and shifting squalls. During SW gales, anchorage may be found in Northeast Roadstead, between Mutton Bird Island and Admiralty Islets, in 18 to 29m, coral, about 1 mile E of North Peak, the NE end of the island. Anchorage may be taken closer to shore, however, there are depths of 8.2m and less up to a little over 0.2 mile offshore, E of North Peak. Landing can be made at Ned's Beach, in a bight S of North Peak.

During NE and E gales, anchorage may be taken, in 18m, in Southwest Roadstead, located off the reefs on the W side of the island. In winter months, vessels using these anchorages should be prepared to get underway at short notice. Landing can be made in Hunter Bay, a small bight on the S side of the N end of the island.

5.4 The **Admiralty Islands** (31°30'S., 159°05'E.) lie between 0.5 and 1.5 miles NNE of the NE extremity of Lord Howe Island; all are cliff-faced. Two patches of 5.5m and 6m lie about 0.2 mile S and about 0.3 mile SSW, respectively, of the summit of North Islet.

Mutton Bird Island and Wolfe Rock, surrounded by foul ground up to a distance of about 0.1 mile, lie about 0.7 mile offshore N and E, respectively, of the E extremity of Lord Howe Island.

Ball's Pyramid (31°46'S., 159°14'E.) lies about 13 miles SE of Lord Howe Island. This islet is about 0.5 mile in extent and lies on and near the N central part of a bank, which is about 11 miles long, 5 to 10 miles wide, and has depths of less than 200m. A number of detached dangers fringe the islet. Observatory Rock and Wheatsheaf Islet lie about 0.5 mile WNW and 0.5 mile WSW, respectively, of the W extremity of Ball's Pyramid.

Southeast Rock is a dangerous pinnacle lying about 2.2 miles SE of Ball's Pyramid. A 16.4m patch is located 1.5 miles S of the rock. A shoal, with a depth of 8.8m, lies 1.3 miles SSE of the same point. Heavy breakers have been seen about 5 miles S of Ball's Pyramid. Vessels should not approach within 7 miles of that side of the islet.

Caution.—In 1990, Ball's Pyramid and Southeast Rock were reported to lie 0.3 mile NE of their charted positions.

5.5 Elizabeth Reef (29°56'S., 159°02'E.), a dangerous, oval-shaped reef about 5 miles long and 3 miles wide, lies about 95 miles N of Lord Howe Island and 300 miles off the Australian coast. In 1988, the reef was reported to extend 1.5 miles farther E than charted. Several shipping lanes pass close to this vicinity. The reef, which encloses a lagoon, may under favorable conditions, be seen at a distance of 5 miles, but most of it covers at HW. In 1983, the stranded wreck on the W extremity of the reef was reported to be a good radar target.

At HW, with E and SE winds, there is little break on the W and NW sides of the reef. When approaching from the W, great care is necessary, especially in the morning, with the sun ahead, when breakers on the E side may not be seen until too close to avoid danger. A depth of 46m lies 3 miles SE of Elizabeth Reef.

The lagoon, with the exception of the center of the N part, is studded with coral patches, most of which dry and none have a depth of more than 2.7m. With an E wind, boats can cross the reef at half-tide on either side of the sand cay.

Anchorage.—Anchorage may be obtained, in a depth of 18m, 0.4 mile NW of the sand cay, with shelter from the pre-

Ball's Pyramid

vailing E and SE winds. Small vessels can anchor within the entrance on the NE side of the reef, in depths of 4 to 7m, broken coral, with shelter from all but the NE winds. The entrance is difficult and dangerous with E winds.

5.6 Middleton Reef (29°28'S., 159°04'E.), about 30 miles N of Elizabeth Reef, is crescent-shaped, about 5 miles long, and about 3 miles wide. The entire perimeter dries at LW; heavy breakers and surf mark the S and W sides. The relative positions of several wrecks which lie stranded on the reef can best be seen on the appropriate chart.

Anchorage.—Anchorage can be taken in The Sound, which indents the N side of the reef about 1 mile SSE. The best anchorage is in Herald Haven, about 0.2 mile S of the NW horn of the reef, in depths of 9 to 11m, 0.1 mile S of the point, sheltered by the reefs.

Gifford Tablemount, with depths of 261m and 330m, lies between 26°40'S and 27°00'S on the meridian of 159°20'E.

Capel Bank (25°16'S., 159°27'E.), about 250 miles N of Middleton Reef, has depths of 46 to 144m, but it has not been examined nor are its limits defined. A depth of 10m has been reported in position 25°09'S, 159°45'E. There are depths of 60 to 80m about halfway between Capel Bank and Kelso Bank.

Kelso Bank (24°16'S., 159°27'E.), about 70 miles N of Capel Bank, has been defined but not examined. There is a least charted depth of 14.6m over its S end. The bank is sometimes marked by tide rips.

Argo Bank, with a depth of 263m, lies in position 23°10'S, 159°35'E.

Nova Bank, with a depth of 22m, lies in position 22°34'S, 159°14'E. A depth of 30m lies 20 miles S of the 22m depth.

North Point to Newcastle

5.7 North Point (33°48'S., 151°19'E.) is the NE point of the high precipitous North Head promontory on the N side of the entrance to Sydney Harbor. The point is steep-to and clear of dangers and has depths of 7.3 to 18.3m about 0.1 mile offshore. The Cardinal's Palace, a large building on the NW end of the promontory, is prominent.

Cabbage Tree Bay lies on the N side of the North Point headland. It indents the coast about 1 mile to the W. The bay provides anchorage for small craft, sheltered from S winds. A conspicuous tower stands on the S shore of the bay.

Long Point (33°45'S., 151°19'E.) lies about 4 miles N of North Point. The point is fringed by reefs up to about 0.5 mile offshore, over which dangerous rollers sweep. A prominent water tower stands about 1.2 miles NW of the point. Bungan Head, also fringed by reefs up to about 0.5 mile offshore, lies about 4.7 miles N of Long Point. A shoal, with a depth of 11.2m, lies 1 mile SE of Long Point.

Barranjoey Head, a promontory 103m high, lies at the N end of a low neck of land and forms the S entrance point of Broken Bay. A light is shown on the head.

Broken Bay (33°34'S., 151°22'E.) is entered between Barranjoey Head and Box (Hawke) Head. About 1.5 miles within the entrance, the bay narrows to a width of about 1.2 miles at Middle Head, located on the N side of the bay, about 2 miles WSW of Box Head. An inlet indents the N side of the bay about 1.5 miles NNW between Box Head and Middle Head. The town of Ettalong lies on the N end of this inlet, about 2 miles N of Box Head. Small craft may enter Brisbane Water, a sheltered inlet off the town, but sometimes there are depths of less than 1.2m over the bar. A bridge spans Brisbane Water.

Pitt Water, an inlet about 0.7 mile wide, indents the S side of Broken Bay about 5 miles S between Barranjoey Head and West Head (First Head), about 1 mile W. A bar, with a depth of 2.7m in the fairway, extends across the entrance, but within there are depths of 12.8 to 18.3m. There are several small villages on the shore of the inlet.

The Hawkesbury River, the largest of the rivers on this coast, discharges into Broken Bay between Juno Point and Eleanor Bluffs, about 0.7 mile SW. The river is about 330 miles long and navigable by small craft for 70 miles from the sea. The current runs at a rate of 4 knots in the mouth of the river.

Navigable channels and bays in the Hawkesbury River, Pitt Water, and Brisbane Water are marked in places by lighted beacons.

Caution.—This area is frequently used by divers, by day and night, undergoing diving instruction. Appropriate signals are displayed when divers are in the water. Mariners should navigate with care when in the vicinity of Taylors Point

Anchorage.—Inside Middle Bank, anchorage in Broken Bay is protected. Good sheltered anchorage can be taken, in 11 to 13m, sand and mud, in Flint and Steel Bay, close SW of Flint and Steel Point, with the point almost in line with Middle Head and Juno Point, bearing 290°. The best anchorage in Broken Bay is reported to be in Cowan Creek, in about 8.2m, about 1 mile inside the entrance of the creek.

Anchorage can be taken in Refuge Bay, on the S side of Challenger Head, in 4.5m. In the entrance of the Hawkesbury River, anchorage can be taken E of the second sandy bay, in 12.8m, with Croppy Point bearing 005° and Juno Point bearing 086°.

Naval port.—The port lies W of a line between Barranjoey Head and Box Head, and E of a line between West Head and Middle Head. It includes Pitt Water, but not Brisbane Water. The villages of Palm Beach and Newport have small craft piers and a small pier lies just inside Pitt Water.

Submarine cables.—Cables are laid in Pitt Water across the entrance and the central part of the inlet. A cable is laid across Cowan Creek about 2.7 miles above the entrance, and also in the Hawkesbury River from Dangar Island to the E bank. Additional cables are laid from time to time and are generally indicated by notice boards on the shore.

Broken Bay to Nobbys Head

5.8 Between Broken Bay and Nobbys Head, 45 miles NNE, the coast is formed by sandy beaches, separated by rocky points backed by Tuggerah Lake and Lake Macquarie, behind which there is mountainous country. Warrawalong, a conspicuous peak, rises 20 miles W of the entrance to Lake Macquarie (33°05'S., 151°40'E.).

First Point (33°29'S., 151°27'E.) lies about 8 miles NE of Barranjoey Head. The point forms the NE extremity of Cape Three Points. Two towers, each at an elevation of 260m, stand 5.5 miles NNW of First Point.

Tuggerah Reef, with a depth of 5.5m, lies about 2 miles offshore and 9 miles NNE of First Point. The narrow shallow entrance of Tuggerah Lake. The narrow shallow entrance of Tuggerah Lake indents the coast WNW of Tuggerah Reef. The entrance to the lake is frequently shoaled and the depth over the bar is generally about 1m. A tower stands near the E shore of the lake, about 1.5 miles SW of the entrance.

Norah Head (33°17'S., 151°35'E.) is a prominent point which is fringed by dangers up to 0.1 mile offshore. A light stands on the head. The point has been reported to be a good radar target up to 16 miles. Several detached rocks lie awash about 0.5 mile offshore and 3.2 miles NNE of Norah Head.

5.9 **Catherine Hill Bay** (33°09'S., 151°38'E.) lies about 8 miles NNE of Norah Head. The bay indents the coast for about 0.5 mile on the N side of Hales Bluff, a point about 0.7 mile N of Flat Island. The coal mine was closed in 2002.

A coaling jetty (disused as of 2002), with depths of 6.1 to 9.1m alongside at its head, extends about 325m ENE from the SW shore. A mooring buoy lies NW of the jetty's head. A 0.6m patch and a 4.9m patch lie about 30m E and about 0.1 mile ENE, respectively, from the head of the jetty.

An old wreck, with a depth of 2.1m, lies 0.1 mile NW of the head of the jetty.

Lake Macquarie, the entrance of which lies 4.5 miles NNE of Catherine Hill Bay, is a coal exporting center. The bar at the entrance, for which local knowledge is necessary, has depths of 1.2 to 1.8m, but is subject to change.

Moon Islet (33°05'S., 151°40'E.) lies 0.5 mile E of the entrance to Lake Macquarie and acts as a breakwater to it. A light is shown from Moon Islet.

Between Moon Islet and the mainland there is a channel with a depth of 4.3m. Local knowledge is necessary owing to the rocks fringing the mainland and off the SW side of the islet.

Lake Macquarie is entered between two breakwaters, but the channel is narrowed by sand banks on each side. The channel is approximately 30m wide and has a depth of 1.7m as far as Swansea Road Bridge, which spans the channel at the town of Swansea, 1 mile within the entrance.

Tidal currents at Swansea and **Pelican Islet** (33°04'S., 151°38'E.), at the inner end of the channel, attain a rate of 4 to 5 knots.

There is no pilot, but the District Officer, Swansea, while taking no responsibility, will assist. Entry or departure should only be made on the flood tide, which will be indicated by signal at the signal station. A red light indicates that the bar is dangerous and should not be approached. A green light indicates that the bar is safe to cross.

Swansea Road Bridge, with a navigable width of 14m, will open for traffic. Two fixed red lights indicate the span is closed; two fixed green lights indicate the bridge is open and vessels may proceed.

5.10 **Redhead** (33°01'S., 151°44'E.), a high bluff, lies about 5.5 miles NE of the entrance to Lake Macquarie and has been reported to give good radar returns up to 27 miles. The intervening coast consists of a sandy beach backed by sand dunes. A conspicuous water tower stands at an elevation of 136m at the N end of the town of Dudley, 1.7 miles NNW of Redhead Point.

Nobbys Head, about 6.5 miles N of Redhead, rises abruptly from a narrow peninsula extending about 0.5 mile NE from the mainland. It lies on the S side of the entrance to Newcastle Harbor and has been reported to give good radar returns up to 15 miles. The S breakwater extends about 0.3 mile NE from this head. Reefs, rocks awash, and other dangers fringe Nobbys Head up to about 200m off its SE side and 260m off its E side. The N breakwater lies about 0.2 mile NW of and about parallel to the S breakwater.

A light is shown from Nobby's Head. A signal station stands on the head. Lights are shown from the breakwater heads.

Flagstaff Hill, a prominent 35m high hummock, on which there is a flagstaff, lies 0.6 mile SW of Nobbys Head.

Anchorage.—Anchorage may be taken with Nobbys Head light bearing 306°, distant 2.6 miles.

Caution.—A spoil ground, with sides approximately 1 mile long, is centered 2.5 miles SE of Nobbys Head.

Newcastle Harbor (32°55'S., 151°47'E.)

World Port Index No. 53610

5.11 Newcastle Harbor, one of the important harbors in

Australia, lies at the mouth of the Hunter River, which discharges between the breakwaters extending from Nobbys Head and Pirate Point, about 0.5 mile to the W. The river is about 300 miles long and is navigable by smaller vessels for 23 miles above the port. Although somewhat narrow, the harbor is well protected and has excellent berthing and other facilities.

Newcastle Port Corporation

http://www.newportcorp.com.au

Winds—Weather

During severe SE winds, a confused sea builds up in Newcastle Bight. The port has been closed for up to 3 days by heavy swells from the SE.

Tides—Currents

Signals describing the height of tide and direction of the current are displayed from the signal station on Nobbys Head. Currents within the harbor generally flow at 1 or 2 knots, but have been known to reach a speed of 6 knots on the ebb during freshets. Strong cross currents can be expected in the Horseshoe, as well as on the outer range.

Depths—Limitations

Vessels up to 290m long and over 90,000 gt may be accommodated at Newcastle.

Mariners are warned of the heavy breakers during SE winds on the 9.1m depth about 0.2 mile E of the N breakwater. A rocky patch, with a depth of 5.2m, lies about 0.2 mile SSE of the S breakwater head and is the easternmost of the dangers.

A wreck lies 2.4 miles NE of the head of the S breakwater. Depths of 16.5m and 15.5m are located 3.4 miles bearing 043°, and 3.1 miles bearing 056°, respectively, from the same breakwater head. A 15.1m depth is located 2.9 miles, bearing 063°, from the same head.

As of 2005, the entrance channel to Newcastle Harbor had a depth of 15m from seaward to the Horseshoe, a deep basin from which all parts of the harbor are accessible. Basin Cut, the channel leading W from the Horse Shoe to The Basin, has a depth of 12.3m. The Steelworks Channel, leading N from the Horseshoe, has a depth of 15m to the Swinging Basin. The Swinging Basin has a depth of 15.1m.

Throsby No. 1 Berth, includes a transit shed and is designed to accommodate heavy container-handling equipment. It has a length of 183m and a depth of 11m.

The Basin, just N of the Tug Company Wharves (charted as Lee Wharf), is divided into Eastern Basin and Western Basin. The Eastern Basin berths, No. 1 and No. 2, each have an alongside depth of 11.6m and service a variety of cargo, including timber, aluminum and steel products.

The Western Basin offers three berths. No. 4 Berth is a roro/container terminal, with a length of 250m and a depth of 11.6m. No. 3 Berth, with a length of 258m and a depth of 11.6m, handles bulk grain cargo. No. 1 Berth is used as a lay-up berth; it has a length of 155m and a depth of 9.1m alongside.

The Dockyard Berths lie on the SW end of Steelworks Channel. The deepest berth provides a length of 262m and a depth of 8.2m.

The area N of the Horse Shoe is known as the North Harbor. The Dyke Berths, just N of the Dockyard Berths complex, are five in number. No. 1 Berth is a tie up berth, with a length of 238m and a depth of 11.8m alongside. No. 2 Berth is a bulk loading facility for ore concentrates; with a length of 238m and a depth of 12.4m alongside. No. 4 Berth and No. 5 Berth function as a coal loading area, with a total length of 540m, and a depth from 16.2 to 16.5m alongside. No. 6 Berth has a length of 68m and a depth of 7.9m alongside; coal is landed at this berth.

Port Warrath, the termination of Steelworks Channel, comprises a turning basin, and divides into two arms at its N end. The E arm has the three Kooragang Berths, of which the bulk berth offers facilities for handling liquid dangerous cargo. The bulk berth (Kooragang 2) has a length of 274m and a depth of 11.6m. The alumina berth (Kooragang 3), also a bulk facility, offers a length of 190m and a depth of 13.2m. Kooragang 5 and Koorargang 6 have depths of 16.2 and 16.3m alongside respectively.

The W arm of Port Warrath offers six berths. BHP Steelworks No. 1, No. 2, No. 3, and No. 4 handle steel products in bulk, the largest of which provides a length of 152m, with a depth of 9.6m. BHP Steelworks No. 5, a bulk discharge berth, will accept a vessel with a length of 274m and has an alongside depth of 12.3m. BHP Steelworks No. 6, a coke-loading facility, has a length of 213m and an alongside depth of 7.0m. BHP Steelworks ceased production in 1999. The area is being considered for development as a multi-purpose terminal.

Aspect

The approach to the harbor is easily identified, as it lies at the SW end of a long sweep of beach and low sandhills trending to the NE, while the coast to the S is higher. The tall chimneys behind Redhead are very conspicuous. Nobbys Head and Fort Scratchley, a high hill about 0.5 mile SW, are prominent from offshore, and the city of Newcastle and ships in the harbor are obvious on closer approach. Nobbys Head has a flagpole on its summit. Shepherds Hill, near which there is a tall water tower, lies about 1.5 miles SW of Nobbys Head and is conspicuous. A conspicuous radio tower stands on a hill 13 miles W of Nobbys Head.

Pilotage

Pilotage for Newcastle Harbor is compulsory for all vessels over 30m and is available 24 hours. Pilots may be ordered through the signal station or via VHF channel 6 or 9. A helicopter is used to embark and disembark pilots in approximately 80 percent of pilot transfers. Helicopter use is not possible for tankers, container vessels, woodchip carriers, and vessels where there is not a clear circular area of 20m or where weather conditions make it impossible for the helicopter to fly. A pilot launch is used for transfers when the use of a helicopter is prohibited.

Vessels approaching from the W will be boarded by the pilot

in position 32°57.1'S, 151°53.7'E or if approaching from the E, in position 32°57.1'S, 151°51.4'E. These positions can be best seen on the chart. The assigned pilot boarding location will be communicated to the vessel by the Vessel Traffic Information Center (VTIC) with the confirmation of the pilot booking. The assigned location will be based upon the sequencing of vessels entry to the port and to maintain a safe separation between vessels maneuvering to pick up their pilot.

Vessels should maintain a continuous listening watch on VHF channels 9 and 16 and inform the VTIC when the pilot boards.

Regulations

The Port Limits for Newcastle are delimited by the arc of a circle, 3 miles in radius, centered on Nobbys Head Light.

Additionally, a Restricted Area and Prohibited Anchorage has been established within the port area by a line drawn 057° from North Breakwater Light to the Port Limit Line, and a line drawn 127° from South Breakwater Light to the port limit line. The Restricted Area represents a fairway for commercial shipping and vessels should neither anchor in this area or hamper the navigation of commercial shipping in any way. Vessels must not transit the area without the permission of the harbormaster.

Arriving and departing vessels are controlled via a Vessel Traffic Service. Participation is mandatory within the port limits. The station should be contacted at least 30 minutes prior to a scheduled movement. A vessel may not enter or leave berth unless granted permission.

The vessel's ETA should be advised 24 hours prior to arrival through the agents.

When about 10 miles off of Nobbys Head (32°57'S., 151°48'E.), vessels should advise Newcastle Harbor of their ETA on VHF channel 9, then reconfirm it 4 hours before arrival.

Upon anchoring, vessels should inform the VTIC of their time of anchoring and position while maintaining a continuous listening watch on VHF channels 9 and 16.

Vessels in the vicinity of Newcastle Harbour should not use VHF channels 6, 8, 11, or 72 for intership or intraship communications as these are used for port operations.

The quarantine line for the port is drawn from North Breakwater Light to South Breakwater Light. There is no defined quarantine anchorage, but pratique is granted around the clock.

Vessel Traffic Service

A Vessel Traffic Information Service is provided from the VTIC located at the radio and signal station at Nobbys Head. Radar and AIS surveillance and vessel movement coordination is maintained 24 hours. While the primary role is to operate the ship booking system, which includes planning, booking, and coordinating vessel movements, it also provides a single point of contact to all port customers and ensures compliance with port procedures and regulations.

The Vessel Traffic Information Center (VTIC) can be contacted, as follows:

1. Telephone: 612-49858292
2. Facsimile: 612-49250611
3. E-mail: vtic@newportcorpo.com.au

Signals

Vessels proceeding E from The Basin must sound one prolonged blast of 4 to 6 seconds duration on the whistle or siren immediately before entering the channel out of The Basin.

Traffic and general signals are made from the signal station on Nobby's Head.

The state of the tide is shown from the highest mast, as follows:

Tidal Signals		
Tide	**Day**	**Night**
Flood	Black triangle	Green light
Ebb	Black circle	Red light

Flood tide is indicated by a black triangular shape by day, or a green light by night. The ebb is shown from the mast as a black circular shape by day, or a red light at night.

Unfavorable sea or swell conditions in the entrance channel are indicated by signals shown from a shorter mast, as follows:

Sea/Swell Conditions Signals		
Condition	**Day**	**Night**
Moderate	Black triangle	Green light
Heavy	Black circle	Red light

Depth signals are displayed in accordance with the uniform signals for Commonwealth Ports. See Pub. 120, Sailing Directions (Planning Guide) Pacific Ocean and Southeast Asia.

Contact Information

The Newcastle Port Corporation can be contacted by e-mail (mail@newportcorp.com.au).

Anchorage

While no anchorage can be recommended that is secure in all weathers, anchorage can be had in Newcastle Bight, 1 to 2 miles N of the N breakwater, or 2 to 3 miles S of the entrance and clear of the Restricted Area.

Directions

Keep a sharp lookout for fishing vessels, particularly within the anchorage areas in Newcastle Bight.

From a position about 2 miles E of the S breakwater, proceed NE until the approach channel range is intersected. Steer on this range, watching for a strong NW set in SE to S winds. In moderate to heavy sea conditions, waves may build to twice their normal height up to 0.8 mile off the entrance, causing problems for deep-draft vessels and small craft alike.

Once within the breakwaters, vessels are guided by the buoys and ranges to the various parts of the port.

Caution

Bombing and gunnery practice may be conducted by aircraft or artillery in the approaches to the harbor.

Depths in Newcastle Harbor have been decreased by as much as 0.6m during freshets and dredging is continually pursued throughout the harbor. Information on the latest promulgated depth for each area is available from the Harbor Master Newcastle by contacting the Vessel Traffic Information Center on VHF channel 9 or by telephone (2-4985-8292).

An underkeel clearance of 10 per cent of the vessel's draft must be maintained while in the waters of the port; a clearance of at least 0.3m must be maintained while at berth.

Newcastle to Port Stephens

5.12 Between Newcastle and Port Stephens, about 23 miles ENE, the coast is indented about 2 miles NNW by Newcastle Bight. The low sandy beach between these two points is backed by sand hills. The surf breaks continually on this shore and in bad weather heavy rollers extend a considerable distance seaward. Morna Point, 17 miles ENE of Nobbys Head, has been reported to give good radar returns up to 10 miles.

A number of wrecks lie within Newcastle Bight, on the following bearings and distances from Nobbys Head Light:

a. 033°, 4.3 miles.
b. 043°, 2.4 miles.
c. 067°, 5.5 miles.

Telegraph Shoal, with a depth of 4.5m lies about 0.2 mile W of Morna Point. A wreck, least depth 27m, lies 3 miles WSW of Morna Point. A shoal, with a least depth of 14.6m, lies about 2.7 miles ENE of Nobbys Head. Vessels should avoid this area during periods of heavy swell.

Point Stephens (32°45'S., 152°12'E.) lies about 5 miles NE of Morna Point and shows a light. The point is fringed by foul ground and detached shoal patches up to 0.3 mile offshore. The light has been reported to give good radar returns up to 9 miles.

Caution.—A submarine cable is laid from a position 0.6 mile bearing 309° from Point Stephens Light in a 305° direction to the shore. A dangerous wreck lies almost 0.5 mile offshore about 1 mile NW of Point Stephens.

South Head (Toomeree Head) lies on the S side to the entrance of Port Stephens. Three conspicuous hills mark the head and a prominent tower stands 3 miles to the SW. North Head (Yacaaba Head) lies about 1.2 miles NE of South Head and is connected to the mainland. Three small islands lie to the E of North Head.

5.13 **Port Stephens** (32°43'S., 152°12'E.), entered between North Head and South Head, extends about 11 miles to the W. The harbor is obstructed by sand banks, some of which dry in patches. South Channel, on the S side of the harbor, is the only passage through the banks for vessels other than small craft. There are a few small towns and farms on the shores of the harbor.

Anchorage.—Anchorage can be had in Fly Roads, S of South Head, in a depth of about 20m. Beware of the 8m patches, and the wreck close by, lying about 1 mile WNW of Point Stephens Light. With offshore winds and in calm weather, anchorage may be obtained, in depths of 11 to 27m, N of Nelson Head, but with SE winds, a heavy swell breaks across the entrance of the harbor making the anchorage unsafe.

Nelson Bay is a convenient anchorage for weather bound vessels. Coasters frequently take shelter in adverse weather conditions in the bay, which has depths of 7 to 11m.

Caution.—Caution is advised when proceeding through S channel, owing to the eddies occurring off the S shore. It is inadvisable for deep-draft vessels to enter Port Stephens at night.

Port Stephens to Sugarloaf Point

5.14 Between North Head and Sugarloaf Point, about 24 miles NE, the low sandy coast, on which there are numerous sandhills, trends regularly in that direction. A number of high hills stand about 8 miles inland. Most dangers are contained within 1 mile offshore, except those in the vicinity of the Broughton Islands and those off Sugarloaf Point.

The **Broughton Islands** (32°37'S., 152°19'E.), a group of islands and rocks, lie 8 miles NE of North Head. The outermost island is steep and rocky, with patches of scrub on its summit. This island is joined at LW by a chain of rocks to the larger and inner island.

Small vessels with local knowledge, can obtain anchorage sheltered from all winds between the islands. With S winds, anchorage can be obtained on the N side of the larger island, between the two reefs, 0.2 mile E of the NW end of the island, in a depth of 9m, sand. During NE or E winds, good anchorage may be taken, in depths of 11 to 20m, 0.3 mile SSW of the NW end of the larger island.

Small craft may obtain anchorage in a cove on the SW side of the larger island, 0.7 mile SSE of its NW end. A 1.5m rocky patch lies in the middle of the entrance, and should be passed on its N side when entering.

Sugarloaf Point (32°27'S., 152°32'E.) lies 15 miles NE of the Broughton Islands. A light is shown from the SE extremity of the point. A signal station situated on the point will answer signals if observed. The point has been reported to give good radar returns up to 21 miles. Seal Rocks, several steep-to rocky islets, lie about 1.7 miles SSE of the point. Edith Breaker, a 4.9m rocky patch, lies about 3 miles SW of the point.

Sugarloaf Bay, a small bight on the N side of Sugarloaf Point, affords shelter from SW and S winds. There is anchorage for small vessels, in 7.3m, about 0.2 mile WNW of the NE end of Sugarloaf Point promontory.

Sugarloaf Point to Crowdy Head

5.15 Between Sugarloaf Point and Cape Hawke, 13 miles N, the low coast trends regularly in that direction. The coast is fairly steep-to and all dangers except Black Rocks are contained up to 0.5 mile offshore.

Cape Hawke (32°13'S., 152°34'E.) is reported to give good radar returns up to 17 miles.

Between Cape Hawke and Crowdy Head, about 24 miles NNE, a bight indents the coast about 5 miles WNW. Except for a few points, this part of the coast is low. Most dangers are contained within 2 miles of the coast.

Black Rocks (Skeleton Rocks) (32°24'S., 152°32'E.), several detached above-water rocks less than 0.1 mile in extent, lie about 0.7 mile offshore, and about 2 miles N of Sugarloaf

Point.

Charlotte Head lies about 6 miles N of Sugarloaf Point. Anchorage may be obtained by small vessels with local knowledge, in a depth of 7m, on the N side of Charlotte Head, with shelter from S winds. Booti Hill rises 1.5 miles NW of Charlotte Head. Between the hill and Cape Hawke, the coast is formed by a narrow sandy strip separating Wallis Lake from the sea. The lake extends 9 miles N and enters the sea through Cape Hawke Harbor.

5.16 Cape Hawke Harbor (32°10'S., 152°30'E.), about 4 miles NW of Cape Hawke, is in the shallow entrance of Wallis Lake, a large body of water extending about 9 miles to the S. The entrance, requiring local knowledge, is on the N side of a breakwater extending 305m NE from the shore. There is a depth of 2.1m over the bar. Lighted beacons and a lighted range mark the entrance to the harbor. The village of Forster is situated on the S side of the entrance.

Anchorage, in depths of 15 to 18m, may be found about 0.8 mile NE of the village at Forster.

There is no pilot, but the harbor officer in charge will assist vessels, if necessary. There are several wharves with depths of 1 to 3m alongside.

Harrington Inlet (31°53'S., 152°41'E.) lies at the head of the Manning River, about 20 miles NNE of Cape Hawke Harbor, and is no longer available to commercial traffic.

Crowdy Head (31°51'S., 152°45'E.) is a prominent headland on which a light is shown. Depths of less than 11m extend 0.5 mile E from the head. Crowdy Bay, a small bight on the N side of Crowdy Head, affords shelter to small craft.

Anchorage may be taken off the boat harbor, in a depth of 7m. A lighted beacon stands on the shore of the boat harbor and, in line with Crowdy Head Light, leads through the entrance.

Crowdy Head to Port Macquarie

5.17 Between Crowdy Head and Port Macquarie, about 28 miles NNE, the low coast trends in that direction with several prominent headlands between. Giles Shoal, with a depth of 9.8m, lies about 1.7 miles NNE of Crowdy Head. Curphey Shoal, with a depth of 8.2m, lies 3 miles NE of Crowdy Head. Mermaid Reef lies about 5.2 miles NE of Crowdy Head. All the above shoals are covered by the red sector of Crowdy Head Light.

Indian Head (Diamond Head) (31°44'S., 152°48'E.) lies about 8 miles NNE of Crowdy Head. The head has been reported to give good radar returns up to 27 miles. Between Indian Head and Camden Head, 5 miles NNE, the coast continues as a sandy beach, backed by swampy ground. Camden Head terminates in Perpendicular Point.

Camden Haven, a narrow inlet in the estuary of the Camden Haven River, lies about 1 mile W of Perpendicular Point. The entrance channel is fronted by a bar of shoal depth, which is sounded regularly. Local knowledge is necessary and local authorities should be consulted before planning a voyage here.

The channel, marked by beacons in range, leads to Laurieton, about 2 miles above the bar. A road bridge, with a vertical clearance of 4.5m, spans the channel at Laurieton.

Tacking Point (31°29'S., 152°56'E.), from which a light is shown, lies 11 miles NNE of Camden Head. All dangers are contained within 0.2 mile off the point. Flat Rock, a dangerous submerged rock about 0.2 mile offshore, lies about 2 miles N of Tacking Point.

From Tacking Point to the entrance to Port Macquarie, 3 miles NNW, the coast is steep and fronted by rocks. An obelisk stands on Nobby Head, midway along this stretch of coast.

5.18 Port Macquarie (31°26'S., 152°55'E.) (World Port Index No. 53560), at the entrance of the Hastings River, is entered between Green Mound and Pelican Point. The town is situated on the S side of the entrance. Two towers, with elevations of 75m and 61m, stand in the middle of the town. The wharves in the port are no longer in use, and vessels berth at Hibbard, a town on the S side of the river, 5 miles within the entrance.

Pontoon berths and other facilities for small craft are situated at the NW side of the town, about 0.5 mile SW of Pelican Point.

Port Macquarie is dangerous to enter, owing to the shifting sandbanks, which are sounded regularly. Local knowledge is necessary, and the local authorities should be consulted before planning a voyage here.

A dangerous wreck, with a least depth of 2.5m, lies in midchannel in the entrance to the harbor, about midway between the lights at the heads of the N and S breakwaters.

Red triangular lighted beacons stand on the S breakwater and lead across the bar. The front light is moved as necessary to reflect changes in the channel over the bar.

Good anchorage may be obtained, in a depth of 11m, sand, 0.7 mile E of the entrance.

Bird Rock, 8m high, lies 0.8 miles SE of the harbor entrance and about 0.4 mile offshore. Patches of reef lie inshore of Bird Rock.

Port Macquarie to Coffs Harbor

5.19 The coast between Port Macquarie and Smoky Cape, 32 miles NNE, is mostly low, sandy, and covered with thick scrub, and broken at intervals by rocky points, which from the offing appear like islands. Behind the coast the land rises to tree covered peaks. A heavy surf generally breaks on the beaches.

Point Plomer (31°18'S., 152°59'E.) lies about 7.5 miles NNE of the entrance to Port Macquarie and is fringed by rocks and foul ground up to 0.2 mile offshore. A bank, with depths of 160m, was reported to lie 13 miles ESE of Point Plomer. Crescent Head lies about 7 miles N of Point Plomer.

Korogoro Point lies about 9.5 miles NNE of Crescent Head and rises to a height of 153m. A conspicuous tower stands about 6.5 miles WNW of this point. The tower shows three lights at night and is a good radar return for about 14 miles.

Smoky Cape (30°56'S., 153°05'E.), on which a light is shown, is at the SE end of a prominent headland of three hills, the southernmost of which is South Smoky Peak. Smoky Cape has been reported to give good radar returns up to 20 miles. Lagger's Point, about 2.7 miles N of Smoky Cape, is the N end of the headland. A breakwater extends in a NW direction from Lagger's Point.

Trial Bay is entered between Lagger's Point and Monument Point, 1.5 miles WSW. The towns of Arakoon and South West

Rocks are located S of the entrance to the bay. A light stands on Southwest Rocks.

Pilotage.—Pilotage may be arranged through Sydney Maritime and is compulsory. The pilot boards 1.5 miles NE of the entrance to the Macleay River.

Anchorage.—The area behind the breakwater provides good anchorage and shelter from winds from the SE through SW to NW.

5.20 The Macleay River, which flows into the sea 2 miles W of Lagger's Point, is about 100 miles long and has several towns on its banks. The river is navigable by small vessels with local knowledge, to Smithton, 15 miles above the entrance. The large town of Kempsey lies 10 miles farther upstream.

The bar, the position of which is liable to change, has a depth of 1.5m. The best time to enter the river is on the last of the flood.

Pilotage.—The pilot boards 1 mile NW of Laggers Point.

Anchorage.—Anchorage may be obtained, in a depth of 4m, 1 mile within the entrance.

Nambucca Heads (30°39'S., 153°01'E.), a low rocky point, lies about 14 miles N of the Macleay River entrance. The Nambucca River discharges into the sea on the S side of Nambucca Heads. The river is closed to commercial traffic.

Coffs Harbor (30°18'S., 153°08'E.) is a confined harbor about 0.5 mile in extent, with a town of the same name on its W side. It is formed by several islands and breakwaters and has depths of about 6.5 to 7.3m. A jetty extends from the town into the NW end of the harbor. It has been reported that the harbor is no longer used by commercial traffic.

Fishing vessels and small craft use the boat harbor which is contained within the inner breakwaters on the N side.

Depths—Limitations.—A disused commercial jetty, 460m long, with a berth on each side of its outer end, is available for vessels up to 4,000 gt. Depths alongside each berth are from 5.8 to 6.4m. A mast, on which there is a light, stands on the head of the jetty.

Vessels berth bow to seaward. Small marker buoys off each side of the head of the jetty indicate the position for letting go the anchor in order to swing before berthing.

A mooring buoy lies off the S side of the jetty for the use of vessels mooring.

Those unacquainted with the harbor should not attempt to enter at night.

Aspect.—A conspicuous tower stands 6.5 miles NW of the harbor entrance.

Pilotage.—Pilotage is compulsory; the pilot boarding ground is situated 0.5 mile E of the E breakwater light.

Signals.—A white flag shown from the mast indicates it is safe to berth. A red flag indicates it is dangerous to berth.

Anchorage.—In good weather, anchorage can be obtained in depths of 7m, sand, on the entrance range, with the outer end of the jetty bearing NNW.

Coffs Harbor to Evans Head

5.21 Between Coffs Harbor and Evans Head, 72 miles NNE, the land, although continuing low, is less regular in outline, and the coastal range of rocky hills approach near the sea. Many rivers enter the sea on this stretch of coast, the most important of which is the Clarence River, which enters the sea on the N side of Wooli Head. The off-lying islands and dangers off the S part of this stretch of coast extend 6 miles offshore, and lie within the 20m curve.

Split Solitary Island (30°14'S., 153°11'E.) lies about 4.5 miles NNE of Coffs Harbor entrance. The island is divided into two parts by a cleft. Owing to the irregular depths between the coast and the island, the passage between is not recommended.

The island is the SW island of the Solitary Islands, a scattered group of islands and rocks, which lie between 1 to 6 miles offshore, and extend 22 miles NNE of Split Solitary Island. Passage between the islands and the mainland should only be used by small vessels with local knowledge.

South Solitary Island (30°12'S., 153°16'E.) shows a light and is located about 5 miles NE of Split Solitary Island. Two above-water rocks lie off its N end, and Arched Rock off its E side. Black Rock, 1.8m high, lies 0.5 mile NW of the island.

South West Solitary Island (Grouper Islet) lies about 3.5 miles NW of South Solitary Island and 1 mile E of **Bare Bluff** (30°10'S., 153°12'E.). A reef extends 0.5 mile SW, and another the same distance S, respectively, from the island. Air bombing practice takes place at times near the island.

Stack Rock lies close offshore midway between Bare Bluff and **Green Bluff** (30°07'S., 153°13'E.). The town of Woolgoolga is situated on the latter bluff, which is a low saddleback point. A conspicuous tank stands 0.2 mile SW of Green Bluff.

North West Solitary Island (30°01'S., 153°16'E.) lies 8.5 miles NNE of South West Solitary Island. A shoal, with a depth of 2.4m and which breaks, lies 0.5 mile N of the island. Chopper Rock, lies at the N end of a bank, with depths of less than 5.5m.

Breaker Rocks lie 2.5 miles ENE of North West Solitary Island. There are depths of 15.8 and 16.5m over them. Vessels are recommended to pass at least 1 mile E of them.

5.22 **North Solitary Island** (29°56'S., 153°24'E.) is an islet lying about 6.5 miles offshore and about 8 miles NNE of North West Solitary Island. It consists of two above-water rocks with a narrow opening between. A number of detached rocks, some on which the sea breaks, lie N of the islet. North West Rock lies in the middle of a bank with depths of less than 5.5m, 0.7 mile NNW of the islet. A below-water rock was reported to lie 1 mile N of North West Rock. A light is shown from the NE side of the islet.

The **Wooli River** (Wooli Wooli River) (29°53'S., 153°16'E.), which is only navigable by boats, lies about 1.5 miles N of Tree Point. A dangerous submerged rock lies about 0.1 mile NE of the S entrance point of the river. The entrance of the river is protected by two breakwaters, which are lighted. A conspicuous tank stands about 1 mile NW of the breakwaters.

Sandon Bluffs (29°40'S., 153°20'E.), appear as white cliffs and lie about 15 miles NNE of Tree Point. Sandon Shoals, a 7.5 to 9.1m patch over which the sea sometimes breaks, lies on a bank about 2 miles SSE of Sandon Bluffs. The mouth of the Sandon River, navigable only by boats, lies on the N side of Sandon Bluffs. Plover Island is an islet in the river entrance.

Cakora Point (Brooms Head) lies about 4 miles N of Sandon Bluffs. Buchanan Rock, a 4.2m rocky patch over which the sea breaks, lies about 0.7 mile NE of Cakora Point. Freeburn Rock, with a depth of 2.7m and over which the sea breaks, lies about

6 miles NE of Cakora Point.

Courtesy of Debra Fisher

Clarence River

The **Clarence River** (29°25'S., 153°23'E.) is entered between Clarence Head Breakwater (29°29'S., 153°22'E.) and North Spit Breakwater. The river is 240 miles long and is navigable by vessels of 4m draft to the town of Grafton, 42 miles above the entrance. Only light-draft vessels can proceed to Copmanhurst, 26 miles farther upriver.

Tides—Currents.—The average rate of the tidal currents at the river entrance is from 3 to 5 knots, but after heavy rains they may attain a rate of 5 to 8 knots. For several days after freshets, the ebb current is of 9 hours duration, and there is no perceptible flood above Grafton. Slack water is usually 2 hours after HW and 2 hours 30 minutes after LW.

Depths—Limitations.—The bar, which lies between the breakwaters, is subject to frequent changes, and local knowledge is necessary for crossing it. The depth over the bar is 2.9m at LW. The river is buoyed and beaconed.

The largest vessel to have entered the port was 3,484 gt with a draft of 5m.

Several towns along the river offer berthage. The most important berth is at **Goodwood Island** (29°24'S., 153°19'E.), can will accommodate timber-loading vessels of up to 5.1m draft.

Aspect.—Mount Doubleduke (29°17.4'S., 153°11.2'E.) and **Clarence Peak** (29°34'S., 153°15'E.) are useful landmarks for approaching the river entrance. The entrance itself is easily distinguished from seaward.

Pilotage.—Pilotage is compulsory, and the pilot station on Yamba Head may be contacted via VHF or visual signals. No special watch is kept, but signals will be answered if seen. The pilot boards about 0.7 mile E of the S breakwater head.

Regulations.—The port limits extend to 1 mile E of the seaward ends of the N breakwater and the S breakwater.

Anchorage.—Anchorage may be had, in a depth of 6m, off several white piles at **Iluka** (29°25'S., 153°21'E.).

Directions.—Mount Doubleduke, steered for on a W bearing, is an excellent mark for making the river entrance from seaward. The entrance and channel above the breakwaters require extensive local knowledge, therefore no directions are given.

Between the entrance to the Clarence River and Evans Head, 18 miles NNE, the coast is formed by a low sandy beach, backed by swampy ground, covered with grass and scrub. Wooded Bluff, 3 miles N of the entrance to the Clarence River, is reported to be a good radar target up to 14 miles.

Caution—A restricted zone, with a 30m radius, is established around a diffuser riser pipe and associated infrastructure. The center of the zone is marked by a special lighted buoy in position (29°25.4'S., 153°21.2'E.). Anchoring and underwater operations are prohibited within this zone.

South Evans Reef (29°12'S., 153°26'E.) is comprised of a number of shoal patches over which the sea sometimes breaks, and lies about 5 miles SSW of Evans Head. North Evans Reef, which dries, lies on a bank with depths of less than 11m, 2 miles SSE of Evans Head. Deep-draft vessels should not approach this part of the coast within 3 miles.

Evans Head (29°08'S., 153°28'E.) is a low, sandy point. Air bombing and gunnery practice take place S and N of Evans Head. A 33m patch lies 8.5 miles ENE of Evans Head.

Evans Head to Danger Point

5.23 Between Evans Head and Danger Point, 58 miles N, the coast is bold, and in parts has a rugged aspect from offshore, although much of the intervening coast is low and sandy. Cape Byron, the E extremity of the Australian Continent, lies midway along this stretch of coast.

The **Evans River Entrance** (29°07'S., 153°26'E.) lies 2 miles NW of Evans Head. The town of Evans Head stands on the W entrance point to the river, with an airfield W of it. A water tower stands 0.5 mile WNW, and water tanks 1 mile NW, respectively, of the same point. A road bridge, with a vertical clearance of 3m, spans the river, 0.7 mile above the entrance. Breakwaters extend from each side of the entrance to the river. Lights are shown from the head of both breakwaters. The channel within the entrance is marked by lighted beacons. No attempt should be made to enter the river at night without local knowledge.

From the entrance to the Evans River, a barren, sandy, and swampy coast, covered with low scrub and a few trees, extends 17 miles NNE to the entrance to the Richmond River. This river, for 12 miles SSW from its entrance, flows nearly parallel with the coast, and is separated from the sea by a low strip of land, 1 to 2 miles wide. Two conspicuous gray tanks stand 4 miles NW of the Evans River entrance.

5.24 **South Riordan Shoal** (29°00'S., 153°30'E.), with a depth of 10.4m, lies 1.5 miles offshore, midway between Evans Head and the Richmond River entrance. North Riordan Shoal, with a depth of 9.1m, lies 2.5 miles NNE of South Riordan Shoal.

The Richmond River is approximately 120 miles long and navigable by small vessels to the town of Lismore, 70 miles above the entrance. Several towns and villages are situated on the river bank. The river is entered between two breakwaters which show lights at their heads.

Ballina Head, on the N side of the entrance, shows a light. The pilot and signal station stands close to the light. A continuous watch is not kept: night watch is not maintained, but visual signals will be answered if observed.

Tides—Currents.—Tidal currents at the river entrance attain a rate of 3 to 3.5 knots, decreasing to the head of tidal in-

fluence, approximately 35 miles upriver. The flood current sets into the river round the N breakwater in a S direction; the ebb current sets out along the channel and round the N breakwater in a NE direction.

Depths—Limitations.—All dangers E of the entrance are contained within a distance of 0.5 mile offshore. Depths over the sandy bar across the entrance are subject to change. In 1988, the minimum depth reported on the leading line over the bar was reported to be 2.5m. The bar is sounded occasionally and local authorities should be contacted for the latest information before planning a voyage here. Numerous shoals and sand flats lie in the river.

Pilotage.—Pilotage is compulsory. Vessels should pay strict attention to the signals displayed at the signal station. Pilots board 0.7 mile SE of Ballina Head.

5.25 Ballina (28°51'S., 153°34'E.) lies at the entrance to the Richmond River and comprises Ballina and West Ballina, on the N bank of the river, and South Ballina, on the S bank. It is a first port of entry for vessels arriving from New Guinea, New Zealand, and the Pacific Islands.

Courtesy of Colin Cooksex

Ballina

Depths—Limitations.—There are several berths at Ballina. The Commercial Boat Harbor has a depth of 2.7m.

It is advised that vessels use caution, as the position of the buoys can not be relied on due to tidal currents and other circumstances which may move them.

Regulations.—The port limits are defined by a line drawn between the breakwater heads.

The quarantine line for the port is drawn N-S from the W entrance point of the boat harbor at Ballina.

Vessels must not exceed a speed of 8 knots in the approaches to, or in the channel of the Richmond River. Vessels should sound a warning blast and reduce speed to slow when passing the drydock. Overhead cables cross the river and care must be taken when navigating near them.

Coastal Features

5.26 Between Ballina Head and Cape Byron, about 14 miles to the N, the coast trends about 1.5 miles ENE to Sand Point, off which a reef extends about 0.4 mile E.

From Sand Point, the coast trends about 2.2 miles N to Lennox Head. A rock, with a least depth of 5m, lies about 0.2 mile offshore E of Lennox Head. From Lennox Head the coast is lower and trends about 10 miles N to Cape Byron. Broken Head, with an above-water rock, known as Cocked Hat Rock, lying close N, is located about 6 miles N of Lennox Head.

Cape Byron (28°38'S., 153°38'E.), is a steep head which appears as white cliffs from the E. The cape extends about 2 miles ENE from the foot of coastal hills, and in the approaches from S or N it looks like an island. The cape has been reported to give good radar returns up to 14 miles. Foul ground extends 0.1 mile off its E side and a reef extends about 0.3 mile N from the NE end of the cape. A strong rip tide may be encountered off the cape.

Cape Byron Light is shown from a tower situated on the E side of the cape. A conspicuous water tank stands 1.2 miles SW of the cape, and a tower stands 4.5 miles WSW of the cape. Juan and Julia Rocks lie 1.5 miles NNW of Cape Byron. A 10.4m patch lies about 0.2 mile N of the rocks.

Byron Bay (28°38'S., 153°37'E.) lies in a bight which indents the N side of Cape Byron. The bay is a first port of entry for vessels from New Zealand only. A canning factory is situated at the W end of town, with two beacons standing close together E, and the remains of a demolished jetty 0.2 mile NW of it, respectively. The flood tidal current sets E round the bay at a rate of 0.5 knot.

Anchorage may be obtained in Byron Bay, in a depth of 13m, midway between the demolished jetty and Juan and Julia Rocks, but there is considerable swell.

From Cape Byron to the entrance to the Brunswick River, 7.5 miles NW, the coast is formed by a sandy beach, backed by low grass covered hills.

Brunswick River Entrance (28°32'S., 153°32'E.) lies between two breakwaters on the heads of which are lights. A rock, which dries 1.2m, lies close off the entrance. Inside the entrance the river divides into three arms. Training walls extend on either side of the breakwaters. A boat harbor is situated on the S side of middle arm, on the E entrance point of which there is a light.

The town of Brunswick Heads is situated at the junction of south and middle arms of the river. The village of New Brighton is situated on north arm, 1.7 miles N of the entrance to the river.

Hastings Point (Cudgera Headland), with foul ground extending about 0.5 mile E from it, lies about 11 miles N of the Brunswick River entrance. Mount Warning, 1,155m high and about 17 miles W of Hastings Point, is a prominent peak visible for about 100 miles. A conspicuous tower stands about 4 miles WNW of Hastings Point. An 8.2m patch lies about 2.5 miles S of the point.

5.27 Fingal Head (28°12'S., 153°34'E.), on which a light is shown, lies about 10 miles N of Hastings Point. Fingal Head is reported to give good radar returns up to 18 miles. A white 28-story building stands about 1 mile W of Fingal Head. A

4.2m reef lies between the head and Cook Island, located about 0.5 mile to the ENE. Cook Island is also a good radar target up to 15 miles.

Anchorage.—Anchorage may be obtained, in a depth of 13m, off the NW side of Cook Island.

Danger Reefs, three rocky patches over which the sea breaks, lie up to about 3.5 miles E of Fingal Head. Inner Reef, with a depth of 2.7m and Outer Reef, with a depth of 5.2m, lie about 1.5 miles and 3.5 miles E of Fingal Head. South Reef, with a depth of 4.9m, lies about 2 miles ESE of the head. There are several patches of shoals having depths of 9.1 to 13m between these reefs. Small craft with local knowledge use the passage between Cook Island and Inner Reef.

Danger Point (28°09'S., 153°33'E.) lies about 2.2 miles NNW of Fingal Head, on the N side of the mouth of the Tweed River. A light is shown from the N side of the point. The point is reported to give good radar returns up to 22 miles.

The Tweed River is entered between the NW end of a narrow sandy peninsula, which extends 2 miles NNW from Fingal Head, and Danger Point, 0.2 mile to the N. When waiting for the tide to enter the river, good anchorage may be obtained, in a depth of 15m, 1.2 miles NW of Danger Point. Two breakwaters, with a light shown from each head, form the entrance to the Tweed River. Within the entrance, the banks are fronted by training walls. A lighted beacon is shown from a crosswall, 0.5 mile within the entrance.

The town of Coolangatta is situated on the N side of the river entrance, with the town of Tweed Heads SW of it. There are several towns on the river banks above the entrance, but owing to shoaling, only small vessels drawing 1.4m can reach the town of Murwillumbah, 15 miles upriver.

A signal station stands on Danger Point; communications can be made by visual signals. At night, a red light indicates that the bar is dangerous and a green light indicates the bar is safe.

Depths—Limitations.—The bar, which is subject to frequent change, is exposed to the ocean swell, and can be very dangerous on the ebb tide, and in heavy weather. It should only be crossed on the flood tide, and then only by vessels with local knowledge, or advice from the District Officer. The bar, which has a depth of 2.9m, is sounded regularly. Local authorities should be consulted for the latest information before planning a voyage here.

After heavy weather, a narrow spit, know locally as Lettitia Spit, extends N from the S shore, and reduces depth and the width of the channel, which scours out again. When the channel is near Danger Point, the bar can only be crossed in a calm sea.

Pilotage.—No pilotage is available. No attempt should be made to enter the river without consulting the District Officer who, while taking no responsibility, will assist and advise as far as possible.

Danger Point to Moreton Island

5.28 The coast from Danger Point to Point Lookout, 44 miles N, may in good weather, be approached to a distance of 1 mile, except off the entrance to the Nerang River, 14.5 miles NNW of Danger Point, where a 6.4m patch, was reported to lie 1 mile ENE of the river entrance. The depths off the entrance to the river are subject to frequent changes. Jumpin Pin, between South Stradbroke Island and North Stradbroke Island, 12 miles N of the Nerang River entrance, has shoal depths extending 1 mile offshore, and is subject to frequent change.

Burleigh Heads (28°05'S., 153°27'E.), 6.5 miles NW of Danger Point, is a prominent, bold, rocky headland that is bare of trees on its seaward side. The towns of Palm Beach and Tugun front the coast for 4 miles SSE of the headland. A creek enters the sea on the S side of Burleigh Heads.

The Nerang River enters the sea between Nerang Head on the S side, and **Porpoise Head** (27°57'S., 153°26'E.), the S end of South Stradbroke Island, on the N side. The ebb current sets strongly out of the entrance, which is very shallow. Coastal steamers call at Southport, 2 miles inside the river entrance. There is a jetty at Southport with a depth of 3m alongside its head.

From the Nerang River entrance to Point Lookout, the E coasts of South Stradbroke Island and North Stradbroke Island, and the N coast of the latter island between Point Lookout and Amity Point, 6 miles WNW, are formed by sandy beaches. Broadwater, separating the S island from the mainland, is filled with low islands and sand banks, and is only navigable by small craft.

Point Lookout (27°26'S., 153°33'E.) shows a light and forms the NE extremity of North Stradbroke Island. Boat Rock, 1.3m high, lies on the outer end of a reef, which extends 1 mile NE from Point Lookout. The point has been reported to give good radar returns up to 15 miles. Shag Rock, 3m high, lies 1 mile NW of the N end of Point Lookout.

Flat Rock, 3m high, with a rock awash off its S side, lies 2.5 miles N of Point Lookout. A 7.3m patch, over which the sea breaks heavily during SE gales, lies about 0.2 mile NNE of Flat Rock, and a 19.8m patch lies about 1.2 miles NE of the rock. The passage between Boat Rock and Flat Rocks should not be used without local knowledge.

5.29 **Amity Point** (27°24'S., 153°27'E.) forms the NW extremity of North Stradbroke Island. There is a jetty 0.3 mile S of the point.

Anchorage.—Anchorage can be obtained off the coast between Amity Point and Point Lookout, in good weather or offshore winds, in depths of 11 to 15m, 0.5 to 1 mile WNW of Shag Rock.

South Passage leads into Moreton Bay through the narrow entrance between Amity Point and Reeders Point, the S extremity of Moreton Island. The entrance is considered dangerous as the bar and banks on either side are exposed to the sea. The bar is subject to such frequent change in position and depth that reliable directions cannot be given. Only light-draft vessels with local knowledge use this passage.

Tidal currents through the entrance to South Passage attain a rate of 3 to 4.5 knots. Farther W of Amity Point the rate is reduced to 2 to 3 knots. South Passage merges with Rous Channel in Moreton Bay.

Rainbow Channel (27°27'S., 153°25'E.) lies between Amity Bank and a drying mud flat lying up to about 1 mile off the W side of North Stradbroke Island. The channel is marked by beacons and buoys. The channel trends about 7 miles S from Amity Point to Peel Island, an islet about 7 miles SSW of Amity Point.

Moreton Island (27°12'S., 153°24'E.) extends about 20 miles N from South Passage. It is separated from the mainland, about 15 miles W, by Moreton Bay. The S part of the island is low and sandy, but it becomes quite hilly to the N. Mount Tempest, 310m high, lies near the middle of the island. Cape Moreton, the NE extremity of the island, shows a light. North Point lies about 0.7 mile from Cape Moreton and shows a light. Cape Moreton has been reported to give good radar returns up to 23 miles.

Henderson Rock, with a depth of 9.1m, lies about 6 miles SSE of Cape Moreton. An 18.3m rocky patch lies 3.5 miles SSE of the same cape. Roberts Shoal, with a depth of 12.2m, lies 1 mile E of the cape. Hutchison Shoal, with a depth of 6.7m, lies 5.2 miles N of Cape Moreton.

Between Roberts Shoal and Hutchison Shoal is Brennan Shoal, with a depth of 8.5m; Smith Rock, with a depth of 3m, and which breaks occasionally; and Flinders Reef, with an above-water rock on its NE end that dries 1 to 2m. The above shoals and rocks are covered by the red sector of North Point Light.

5.30 Moreton Bay (27°20'S., 153°15'E.), through which the approach channel to Brisbane passes, is a large body of water lying between North Stradbroke Island and Moreton Island and the mainland to the W. The bay is about 38 miles long from N to S and from 9 to 17 miles wide, narrowing toward its S end, where it is encumbered with numerous islets.

The main approach is from the N through the banks and shoals encumbering the entrance, the most important channel being Northwest Channel. Small vessels of light draft may enter from the E through South Passage. Local knowledge is required for this body of water.

An area through which surface navigation is permitted, but anchorage is prohibited, exists in Moreton Bay; it lies centered in position 27°14.6'S, 153°21.1'E, and is 1 mile in radius. Caution should be exercised when transiting this area.

Tides—Currents.—The tidal currents set obliquely across the channels, necessitating great caution. The general set of the flood current is S, and the ebb N, but in places the directions are varied by the shoals.

The strength of the tidal current is much less near the middle of the bay than along either shore. The tidal currents S of the shoals encumbering the N entrance are weak until S of **Mud Island** (27°20'S., 153°15'E.), located 15 miles S of **Skirmish Point** (27°05'S., 153°12'E.).

On the W shore abreast Skirmish Point, the flood current attains a rate of 3.5 knots at springs. On the E shore abreast Cowan Point, the rate is 2.5 to 3.5 knots, causing a short sea, which is dangerous to small craft during SW winds.

The flood current is felt as far S as Russell Island, which lies off the W side of the S end of North Stradbroke Island. Abreast the banks, which lie off the W side of Amity Point, the ebb sets strongly NE through South Passage. The vicinity of shallow water throughout Moreton Bay is often indicated by tide rips.

Depths—Limitations.—The 20m curve lies across the N approach to the Port of Brisbane, from Flinders Reef to a position about 1 mile E of Caloundra Head. Shoals and banks, with depths of less than 2m, extend from the NW end of Moreton Island to within about 1 mile of the coast about 1.5 miles S of Caloundra Head.

Several channels lead into Moreton Bay through the above-mentioned shoals and other shoals and banks S. The fairways through the bay are subject to frequent change and the buoyage marking these channels is altered accordingly.

North West Channel, which is the main approach from seaward, has a maximum depth of 15.0m and extends about 14 miles to a point off the WSW extent of Spitfire Banks (27°01'S., 153°16'E.). Spitfire Channel, with a depth of 14.7m, leads from North West Channel to the NE terminus of Main Channel.

Main Channel offers deep water for most of its length, but has a controlling depth of 9.7m in its SW leg.

Deep-draft vessels normally use East Channel, entered abreast of **Cowan Cowan Point** (27°08'S., 153°22'E.). East Channel, leading between Middle Banks and Ridge Shoal, has a dredged depth of 14.7m. North East Channel, which is entered about 6 miles NW of North Point Light (27°02'S., 153°27'E.), has a depth of 5.5m and is used by local traffic only.

Underkeel clearances (UKC) are required (2013) in the approach channels, as follows:

Moreton Bay Channel Depth Information		
Channel Name	**Depth (m)**	UKC
North West	15.0	2.3 (280m width)
North West Bypass	9.2	1.6
Spitfire	15.0	1.5m (600m width)
Spitfire remarks—possible shoaling and least depth of 14.6m exists in position (27°02.4'S.,153°15.7'E.).		
East Knoll Bypass	6.0	1.4m
East	15.0	1.5m (300m width from W side)
Main (M8-M9)	10.0	1.8m
Entrance E5-EBCN)	14.7	1.5m

Depth information for Brisbane River along with Associated UKDC (2013) is as follows:

Brisbane River Depth Information		
Location Description	**Depth (m)**	**UKC**
Outer Bar Cutting	14.0	1.46m
Inner Bar Cutting	14.0	1.46m
Fisherman Islands Swing Basin	14.0	1.3m
River	9.1	0.6m/0.9(draft/tide)
Cement Australia Swing Basin	9.1	0.6m/0.9(draft/tide)
Pinkenba Swing Basin	9.1	0.6m/0.9(draft/tide)
Hamilton Swing Basin	9.1	0.6m/0.9(draft/tide)

A spoil ground, with a radius of 0.7 mile, is centered a little over 2 miles ENE of the water tower charted in position 27°04.3'S, 153°12.2'E.

A spoil ground, with a radius of 0.7 mile, is situated 8.5 miles, bearing 167° from the tower charted in position 26°48.0'S, 153°08.4'E. A spoil ground, with a radius of 0.7 mile, is centered about 5.5 miles, bearing 172° from the same tower. A spoil ground, with a radius of 1 mile, is centered about 4.8 miles, bearing 121° from the same tower.

Aspect.—The N approach to Moreton Bay can be easily identified by Cape Moreton and Caloundra Head, both of which are prominent. Mount Tempest is a conspicuous landmark on Moreton Island.

The Glass House Mountains are three adjacent peaks rising abruptly from the coastal plain.

5.31 Mount Beerwah (26°54'S., 152°53'E.), 553m high, lies about 15 miles WSW of Caloundra Head and is visible for about 50 miles. Coonowrin, 390m high and cylindrical in shape, lies about 1.2 miles E of Mount Beerwah. Tibrogargan, 350m high, lies about 2.5 miles SE of Coonowrin.

Cowan Cowan Point (27°08'S., 153°22'E.), on the W side of Moreton Island, shows a light and is easily identified. Tangalooma Point, S of Cowan Cowan Point, is prominent and readily made out by Ship Patch, a sandy patch resembling a vessel under sail.

Mud Island and the outer channel entrance lighted beacons, about 2 miles WNW, are prominent marks for the Brisbane River entrance channel. Several towns lie on the W side of the central part of the bay. A conspicuous water tower stands at Margate, about 7 miles NW of the outer beacons of the entrance channel. Cleveland Point Light, about 10 miles S of Mud Island, is easily recognized by a pier extending N from the point. Marine farms have been established just W of Mud Island.

Brisbane (27°28'S., 153°04'E.)

World Port Index No. 53490

5.32 The port of Brisbane is situated at the entrance to the Brisbane River, near the head of Moreton Bay. The port offers facilities for the handling of container, bulk petroleum, and bulk solid commodities, as well as general cargo. The Port of Brisbane is managed and developed by Port of Brisbane Proprietary Limited (PBPL) and maintains the following web site:

Port of Brisbane Proprietary Limited

http://www.portbris.com.au

Tides—Currents

The tidal rise in the Brisbane River is 2.1m. The tidal current attains at springs a rate of about 2 knots in the upper reaches of the river, and of about 3 knots below Hamilton Reach Cutting. Strong tidal effects have been reported by vessels alongside berths.

At South Brisbane Drydock, opposite Gardens Point, the flood current runs for 5 hours and the ebb for 7 hours 30 minutes. Slack water occurs from 12 to 30 minutes after HW and LW. Tidal influence is felt as far upstream as Ipswich. Freshets in the river may make navigation dangerous.

Depths—Limitations

Brisbane Entrance Channel is entered from Brisbane Roads, about 9 miles NE of Luggage Point. The channel is dredged to a depth of 14m as far as the S edge of the turning basin S of Luggage Point, then 9.1m to the ANL Wharf (27°27'S., 153°03'E.), and 8m from the ANL Wharf to the Mercantile Wharf, about 0.3 mile SE. It has been reported that all berths upstream of the Mercantile Wharf have been closed to commercial traffic.

An overhead power cable, with a vertical clearance of 48m, spans the channel just S of the ANL Wharf.

Submarine cables and pipelines, as well as ferry traffic, cross the channel at various places along the river and are best seen on the chart.

The table titled **Brisbane and Upriver Facilities** lists the number and type of cargo operations by berth. There is more than 7,860m of total quayage available.

Brisbane and Upriver Facilities

Cargo Berths	Number
Container	12
Oil-Crude & Refined	5
General Purpose (Fishermas Islands)	1
Grain/Woodchip Cotton Seed	1
Grain/dry bulk/General cargo (Pinkenba)	1
General Cargo/Motor Vehicles	3
Clinker (Bulwer Island)	1
Coal/Clinker	1
Chemical Fertilizers	2
Queensland Bulk Terminal	1
Wet Bulk	2
Cairncross dock fit-out berths	2
Cruise Ship	1
Bulk Products Private Berth	1

The table titled **Brisbane—Berthing Facilities at Fisherman Island Terminal & Up River Facilities** lists the berths along with their associated specifications for the Port of Brisbane and upriver facilities in order of a vessel's arrival from sea:

Pilotage

Pilotage for Brisbane and Moreton Bay is compulsory for foreign vessels over 35m in length. Vessels should request a pilot via their agent at least 24 hours in advance, confirming 8 hours before arrival. Vessels should radio Brisbane Harbor on VHF channel 12 to confirm ETA at pilot boarding ground at

least 2 hours prior to arrival. Pilotage is also available for the Inner Route or other Queensland coastal ports from the Brisbane Pilotage Service by prior arrangement.

The pilot boarding ground is situated about 3 miles SE of Point Cartwright, near Caloundra Head, but a vessel will be met outside the boarding ground if the situation requires it.

Visual signals may be exchanged with the signal station on Caloundra Head, or the station may be contacted via VHF.

Brisbane Marine Pilots

http://www.brisbanepilots.com.au

Brisbane—Berthing Facilities at Fisherman Island Terminal & Up River Facilities

Berth	Distance from River Mouth (miles)	Berth Length	Depth alongside	Remarks
Fisherman Islands No. 12	0.0	900m	14.0m	Containers.
Fisherman Islands No. 11	0.0	350m	13.3m	Containers.
Fisherman Islands No.10	0.0	900m	13.2m	Containers.
Fisherman Islands No. 9	0.2	—	14.0m	Containers.
Fisherman Islands No. 8	0.3	—	14.0m	Containers.
Fisherman Islands No. 7	0.5	210m	14.1m	Containers.
Fisherman Islands No. 6	0.5	—	14.0m	General cargo, ro-ro, and containers.
Fisherman Islands No. 5	0.7	250m	13.1m	General cargo, ro-ro, and containers.
Fisherman Islands No. 4	0.8	300m	13.1m	General cargo, ro-ro, and containers.
Fisherman Islands No. 3	1.0	300m	13.6m	General cargo, ro-ro, and containers.
Fisherman Islands No. 2	1.3	200m	14.0m	General cargo, ro-ro, and containers.
Fisherman Islands No. 1	1.5	197m	14.0m	General cargo, ro-ro, and containers.
Fisherman Islands Grain	1.5	285m	12.9m	Grain, woodchips, cottonseed exports, and motor vehicles.
Caltex Fisherman Islands	1.6	91.4m	14.4m	Crude oil discharging and loading.
BP Luggage Point	1.7	329m	14.3m	Crude oil discharge. Maximum vessel length of 280m.
Fisherman Islands Coal	1.8	240m	14.0m	Coal exports.
Fisherman Islands General Purpose Berth	1.9	213m	10.5m	Dry-bulk and break-bulk facilities.
Caltex Products	3.1	74.3m	10.2m	Petroleum products.
Cement Australia	3.7	133m	9.7m	Gypsum, bulk clinker, slag imports and plasterboard.
BP Products	4.4	235m	10.9m	Petroleum products load/unload LPG.
Shell	4.6	74m	11.0m	Petroleum products.
Pacific Terminals	4.8	50m	10.7m	Bulk flammable and combustible liquids.
Incitec North	4.9	123m	9.2m	Bulk liquid and bulk dry fertilizer.
Pinkenba 1 & 2	5.1	314m	10.1m	Grain, silica sand and other dry bulk handling, general cargo, soya bean meal, and fertilizer.
Incitec South	5.2	152m	10.2m	Bulk liquid and bulk dry cargo.
Queensland Bulk Terminal	7.0	158m	9.8m	Bulk cargo (formerly Sugar Terminal).
Cairncross Breasting Wharf	7.9	—	5.0m	Dry dock.

Brisbane—Berthing Facilities at Fisherman Island Terminal & Up River Facilities				
Berth	**Distance from River Mouth (miles)**	**Berth Length**	**Depth alongside**	**Remarks**
Cairncross Fitting Out Wharf	7.9	307m	7.4m	Ship Repair Berths 1 and 2—Maximum size of vessel is 85,000 dwt.
Maritime No. 1 (Dolphin Berth)	8.0	32m	8.8m	Bulk oil and chemicals, and other wet-bulk.
Hamilton No. 4	8.1	240m	10.2m	Bulk liquid, dry bulk, and general cargo.
Brisbane Naval Wharf	8.4	49m	4.3m	Royal Australian Navy Wharf, Bulimba
Hamilton No. 1	8.4	130m	8.7m	Bulk liquid, dry bulk, and general cargo.
Brisbane Cruise Ship Terminal	8.5	386m	8.7m	Passenger vessels.
Note.—All berths require and underkeel clearance of 0.3m				

Regulations

The quarantine anchorage is situated just E of the Brisbane River channel entrance.

Vessels with explosives must not proceed SW of a line joining Woody Point, Outer Bar Entrance lighted beacons, St. Helena Island, and the N point of North Stradbroke Island.

Commercial explosives must not be brought into the Brisbane River if the quantity on board exceeds 9kg.

Vessel Traffic Services is responsible for shipping movements in the pilotage area and operates 24 hours.

Inbound vessels should report to Brisbane Port Control on VHF channel 12, as follows:

1. When the pilot is onboard, give the vessel's draft, the ETAs at Fairway Light and Entrance Light, and the channels used.
2. If at anchor, give anchor aweigh time.
3. When passing Fairway Light.
4. Not less than 30 minutes before entering Bar Cutting.
5. When passing Entrance Light, notify river traffic of ETA at berth (name), and if berthing head-up, head-down, or swinging (name basin).
6. After vessel alongside, give time of first line and time all fast.
7. Vessels anchoring in Brisbane Roads are required to give anchored position as a bearing and distance from Entrance Light.

Outbound vessels should report to Brisbane Port Control, as follows:

1. One hour before departure for a radio check and ETD.
2. Five minutes prior to weighing anchor or departing berth, with details of intended movement and pilot's name.
3. When letting go or heaving anchor, give the time of last line or anchor aweigh. Also give the ETA to Entrance Light or next berth.
4. When passing Entrance Light, give ETA to pilot boarding ground and/or Fairway Light, the channels to be used, and next port.

Vessels over 35m long should not enter the port of Brisbane without permission from the harbormaster

No tanker containing a cargo with a flash point below 66°C may move in the river at night, except by express permission of the harbormaster's office. A tanker may not pass any other vessel in the dredged cuttings upriver of Luggage Point. Vessels, except loaded crude oil tankers over 213m in length, may only pass similar vessels in the 230m wide part of Inner Bar Cutting. Loaded crude oil tankers will be given a clear river at all times. Only vessels under 153m long may be passed seaward of Inner Bar Cutting, but those under 107m in length may pass in any part of the river cuttings.

There is a speed limit of 10 knots in the Brisbane River between the entrance and Luggage Point and 8 knots thereafter. A minimum speed consistent with safe navigation should be used when passing wharves, moored vessels, dredges or barges, and in particular when passing the harbor oil fuel lighter, whether moored or under tow.

As the slightest surging of a container vessel during cargo operations could cause considerable damage, vessels should approach at a minimum speed possible when the container boom is in the lowered position, and, if possible stop engines when passing.

Signals

The Pilotage Control Signal and Radar Station, Caloundra Head and Harbor Control Radar Station, Whyte Island, keep a continuous watch and can be contacted on VHF channel 16.

Weather signals are displayed from the customhouse flagstaff on the W side of Town Reach. These signals are displayed on weekdays from 1030 to 1630, and on Saturdays from 1030 to 1200.

Channel signals.—A deep-draft vessel, equipped with a radiotelephone and intending to use the dredged Northwest Channel, Spitfire Channel, and East Channel should advise its intention by radio.

Vessels, not equipped with radiotelephone, should fly the International Code Flags HI and in addition the Morse Signal HI by flashing light directed towards approaching vessels (day or

night).

At night, a vessel of more than 40m in length, shall exhibit two green lights, disposed vertically, when navigating in the Brisbane River.

Anchorage

Anchorage may be obtained in any part of Moreton Bay among the shoals, the bottom being sand, fine silt, and mud. Caution is necessary as a heavy sea, caused by N to NE winds, combined with the strong tidal currents experienced in parts of the bay, can cause vessels much difficulty.

In Brisbane Road, anchorage, in 8.4 to 9.1m, mud, may be anywhere up to about 4.5 miles WNW of Mud Island or N of a line from the N end of that island to Woody Point. The exception is the prohibited anchorage area located NNW of Mud Island, which can best be seen on the chart. The quarantine anchorage, situated 1 mile E of West Entrance Lighted Beacon No. 1, has a least depth of 5.7m.

Yule Road (27°05'S., 153°20'E.) affords temporary anchorage in good weather with Cowan Cowan Light bearing 161°, distance 3.7 miles. Small vessels may obtain anchorage in Tangaloona Roads, in depths of 11 to 16m. Some protection from W gales is afforded by Sholl Bank, and in SE gales is the best anchorage on the W coast of Moreton Island, where little current is felt.

Vessels may anchor, in 9.1 to 11m, with **Cleveland Point** (27°31'S., 153°17'E.) bearing 242°, distance 1 mile, and the S end of Peel Island bearing 110°. Anchorage, in not less than 5.5m, good holding ground, may be found about 0.7 mile NE of Cleveland Point.

Port of Brisbane Corporation

Brisbane—Fisherman Island

Directions

The channels through Moreton Bay, although well-marked, require extensive local knowledge. Strong cross-channel sets are experienced in many portions of the bay and must be guarded against.

Caloundra to Sandy Cape

5.33 **Raper Shoal** (26°46'S., 153°10'E.), over which the sea breaks, is a 3.6m shoal lying about 1 mile offshore and 3 miles N of Caloundra Head. Point Cartwright, from which a light is shown, lies about 7.5 miles N of Caloundra Head. A conspicuous water tower stands close E of Point Cartwright Light.

Mooloolaba Harbor (26°41'S., 153°08'E.), at the entrance to the Mooloolaba River, is entered between two breakwaters and lies 0.3 mile W of Point Cartwright. There is a depth of 2.7m over the bar outside the entrance. Range lights mark the center of the channel.

Depths—Limitations.—A channel, dredged to 3m, leads to a mooring basin dredged to a least depth of 2.1m, on the N side of the harbor close inside the entrance. Shoaling has been reported (1996) in this entrance and continues to remain a problem into 2012. Port management reported that it resolved safety concerns due to a large sand shoal through the completion of recent dredging operations. The channel is marked by lighted beacons. The W limit of the channel is marked by a beacon.

A prohibited anchorage extends 0.6 mile E from the coast 3 miles S of Point Cartwright.

Regulations.—Vessels with an LOA greater than 35m, beam greater than 15m or an under-keel clearance of less that 0.5m are prohibited from the waters of Mooloolaba Harbor.

The **Maroochy River** (26°39'S., 153°05'E.), which enters the sea 3 miles NNW of Point Cartwright, can only be used by small boats in good weather and local knowledge. The bar usually has a depth of 0.8m, but is subject to change.

Gneering Shoal, with a depth of 6.7m, lies 2.5 miles NNE of Point Cartwright. The sea breaks over the shoal in bad weather. A reef, with a depth of 10m, lies 3 miles NE of Point Cartwright. A rocky shoal, with a depth of 12.8m, lies 1 mile ESE of Leach Shoal. A lighted buoy is moored about 0.2 mile ENE of Leach Shoal. Broken water is reported to have been seen SE of the rocky shoal and it is advisable to give this part of the coast a wide berth. The sea breaks over the above shoals in bad weather.

Arkwright Shoal (26°33'S., 53°07'E.), with a depth of 7.6m, rock, lies on the outer end of a spit, which extends 1.2 miles E from Arkwright Point. Hancock Shoal, with a depth of 9.1m, lies 2.5 miles NNE of Arkwright Point.

Noosa Head, bold and rocky, is the N end of a ridge of sand hills, partially covered with scrub, which runs parallel with the coast and lies 9.5 miles N of Arkwright Point.

Laguna Bay, on the W side of Noosa Head, affords anchorage, close in, sheltered from the S and SE gales, in depths of 11 to 13m, 1.5 miles WNW of Noosa Head. This anchorage is not recommended should the wind shift to the E.

5.34 The **Noosa River** (26°25'S., 153°04'E.), which discharges into the SW part of Laguna Bay, about 2 miles W of Noosa Head, has depths of 0.6 to 1.2m over a shifting entrance bar. The channel is marked by buoys and beacons and, when practicable, lights are shown which lead to the entrance. The river connects with a series of shallow lagoons paralleling the coast close inland for about 11 miles to the N.

Double Island Point (25°56'S., 153°12'E.) lies 28 miles N of Noosa Head. The point shows a light and has been reported to give good radar returns up to 17 miles. There is a signal station at the lighthouse. A red pendant displayed at the lighthouse indicates a storm warning message has been received

and will be signaled on request.

Wolf Rock, awash, lies 1.2 miles NNE of Double Island Point, with a 4m rocky shoal between it and Double Island Point.

Wide Bay lies between Double Island Point and **Inskip Point** (25°49'S., 153°04'E.), 10.5 miles to the NW. The shore of the bay is formed by a sandy beach, backed by sand hills. The bay affords anchorage, as long as the wind is S of ESE, in a depth of 11m, 2.5 miles W of Double Island Point.

Fraser Island (Great Sandy Island) (25°11'S., 153°10'E.), which lies with Hook Point, its S extremity, 1.2 miles ENE of Inskip Point, is formed by a range of barren sand hills and cliffs with stunted trees. The E coast is an unbroken sandy beach, which extends 50 miles to Indian Head. Boomerang Hill rises 19 miles SSW of Indian Head and is one of the few hills easily identified. A conspicuous radio tower stands 6 miles NE of Boomerang Hill.

Indian Head (25°00'S., 153°22'E.), the E extremity of Fraser Island, is a steep bluff promontory and when seen from N or S appears as an island. Waddy Point, similar to Indian Head, lies 3 miles N of the head. A conspicuous radio tower stands 2 miles W of Waddy Point.

Between Waddy Point and Sandy Cape, 17 miles NNW, the coast continues as a sandy beach, off which anchorage may be obtained in offshore winds.

5.35 Sandy Cape (24°42'S., 153°16'E.), the N extremity of Fraser Island, is a prominent headland and an excellent landmark when proceeding by the Inner Route to Torres Strait. The cape has been reported to give good radar returns up to 14 miles. Sandy Cape Light is situated 3.5 miles SW of the Cape. There is a signal station at the light, equipped with a radiotelephone. A racon transmits from the light. A red pendant displayed at the light indicates a storm warning message has been received and will be signaled on request.

The site of a historic wreck, protected from unauthorized interference, lies 6 miles S of Sandy Cape.

Breaksea Spit, which dries in places and is formed of dead coral and sand, over which the sea breaks heavily, extends 19 miles NNW from Sandy Cape. Vessels should exercise caution when approaching Breaksea Spit, as both the ebb and flood currents set strongly across it. In daylight, during good weather, the broken water on the edge of the spit can generally be seen at a distance of 5 to 6 miles.

Sandy Cape Shoal (24°35'S., 153°20'E.), with a depth of 2.7m, and over which the sea breaks in bad weather, lies 8 miles NE of Sandy Cape. Patches, with depths of 13.1m and 19.2m, lie 1.5 miles S and 4.5 miles SSE, respectively, of Sandy Cape Shoal. Except in cases of necessity, vessels should pass E of Sandy Cape Shoal, and at night, should keep in depths of more than 65m.

Long Shoal, with a depth of 4m, and over which the sea breaks in bad weather, lies 13 miles NNW of Sandy Cape. Depths of less than 11m extend 1.2 miles N and 5 miles SW, respectively, of Long Shoal.

Porpoise Shoal (24°38'S., 153°09'E.), with a depth of 5.5m, lies 7.5 miles NW of Sandy Cape. Four patches, with depths of 11 to 16.5m, lie between 4 and 8 miles WNW of Porpoise Shoal.

Great Sandy Strait

5.36 Great Sandy Strait (25°30'S., 152°59'E.) separates Fraser Island from the mainland and is approximately 40 miles long. From Wide Bay Harbor, which lies within the S entrance of the strait, the channel leads N to the entrance of the Mary River, and then N into Hervy Bay. Only those with local knowledge can navigate the strait.

Pilotage.—If a pilot is required for Great Sandy Strait, notice should be given at the harbor office at the port of departure at least 24 hours before sailing. The ETA and the ship's draft should be sent with the request for pilotage.

The quarantine anchorage for any part of the Port of Maryborough lies 1 mile N of the fairway entrance buoy.

5.37 South entrance to Great Sandy Strait.—The bar across the entrance to Wide Bay Harbor, which leads into the S part of the strait, can be seen by the discoloration of the water or the sea breaking over it. The bar can only be crossed during good weather, at or near HW, and by light-draft vessels with local knowledge.

There is a least charted depth of 4m over the bar in the channel entrance. The entrance between Hook Point and Inskip Point has depths of 9.1 to 29m between steep-to shores, and inside the entrance there are depths of 7.5 to 21.9m. A light is shown from a position about 0.7 mile N of Hook Point.

Depths—Limitations.—The channels through Great Sandy Strait are marked by range beacons, buoys, and beacons, most of which are lighted. The depths in the channels are subject to frequent changes and the navigational aids are moved to meet them. The least depth in the strait, through the banks between South White Cliffs and Sheridan Flats 3 miles WSW, is normally from 0.6 to 1.4m. For the latest information regarding the depths, contact the Port Officer, Brisbane, or the harbormaster, Maryborough; the Australian Notice to Mariners should be obtained.

Anchorage.—Anchorage may be taken, in 7.3 to 21.9m, in the deep channel in Wide Bay Harbor. Good anchorage will be found in 10 to 18.3m, about 0.2 mile off the SW side of Fraser Island and about 1.5 miles NW of the W end of Inskip Point. The latest available information should be sought from Tin Can Bay Coast Guard.

Hervey Bay

5.38 Hervey Bay (24°55'S., 152°52'E.) is entered between Sandy Cape and South Head, the S entrance point to the Burnett River, 47 miles W. During NW winds the bay offers little shelter and as hazy visibility generally accompanies these winds, those without local knowledge should proceed with caution. If proceeding to Great Sandy Strait, keep in depths of more than 13m until an accurate position is obtained. During N, NE, and SE winds, good shelter is obtainable in Platypus Bay on the E side of Hervey Bay.

Ferguson Spit, with depths of less than 11m, extends 3.5 miles NNW from **Rooney Point** (24°49'S., 153°07'E.). The coastline in this area is low and sandy, backed by sand hills.

Platypus Bay (24°57'S., 153°09'E.) lies between Rooney Point and Moon Point (Sandy Point), 25 miles SSW. The shore is formed by a sandy beach, backed by wooded high land, with

several fresh water lagoons in its N part.

The bay affords good anchorage, in depths of 13 to 24m, sheltered from winds between SE and N, but there is a short sea with inshore winds. Small vessels can anchor in Lagoon Anchorage, 3 miles N of Triangle Cliff, in depths of 7 to 11m, 0.5 to 1.5 miles offshore.

The W shore of Hervey Bay between South Head, the Burnett River, and Vernon Point, 37 miles SE, is formed by sandy beaches interspersed with rocky points. A conspicuous tower stands 0.7 miles N of **Elliot Heads** (24°56'S., 152°30'E.). Burrum Point lies 15.5 miles SE of Elliot Heads, with the entrance of the Burrum River 2 miles SSW of it, and appears as a thickly-wooded point from the vicinity of Great Sandy Strait Fairway Buoy.

The **Burrum River** (25°11'S., 152°35'E.), whose entrance is easily recognized as it shows a well-defined opening in the coast, is navigable by small vessels of 1.8m draft to Howard, a mining town, 14 miles upriver. The bar and channel are marked by beacons. Within the bar there is safe anchorage, in a depth of 5m.

Vernon Point lies 11 miles SE of Burrum Point. The town of Pialba is situated 3 miles SSE of Vernon Point. A radio mast, marked by lights, stands midway between the point and the town.

5.39 Port of Maryborough (25°53'S., 152°43'E.) (World Port Index No. 53470) includes the oil port of **Urangan** (25°18'S., 152°53'E.) and is accessible from sea via Hervey Bay and Great Sand Strait.

The port is no longer used commercially except for fishing.

Depths—Limitations.—Urangan Boat Harbor, marked by lighted beacons, lies on the SE side of Dayman Point, but in 1990, depths in the entrance were reported to be uncertain and the harbor should not be used without local knowledge.

Pilotage.—Pilotage is compulsory for vessels over 35m long. Vessels send ETA and pilotage request 24 hours in advance to Bundaberg. The pilot boards 2 miles NW of Fairway Light in Hervey Bay.

Bundaberg (24°52'S., 152°21'E.)

World Port Index No. 53460

5.40 The Burnett River discharges into the sea on the N side of South Head, which shows a light. The wharves of the Port of Bundaberg are situated on the E bank of the river, 2 miles above the entrance, and at Fairymead, on the W bank, 3 miles farther upriver. The town of Bundaberg is situated 4 miles above Fairymead. Barubbra Island encumbers the mouth of the river; the main entrance lies between the SE end of the island and South Head. Training walls extend from the N bank of the river to within about 0.2 mile of South Head.

Tides—Currents.—The tidal rise at Bundaberg is 2.4m at MHWS, and 1.9m at MHWN. The tidal currents have a rate of 2.5 to nearly 4 knots in the entrance, and are even stronger in the entrance channel.

It is reported that a strong N set is frequently experienced close seaward of South Head Light.

Depths—Limitations.—Sand flats, with depths of less than 3m, extend up to 2 miles NE from Barubbra Island and a shoal, with a depth of 7.9m, lies about 4.5 miles from the SE extremity of the same island.

The three entrance reaches have depths (2005), as follows:

1. Sea Reach—9.5m.
2. Middle Reach—9.5m.
3. Inner Reach—9.5m.

The Bulk Liquids Terminal at the John T. Fisher Wharf is 240m long, with an alongside depth of 9.8m. The terminal offers facilities for handling bulk petroleum, ammonia, and molasses. The turning basin off the terminal has a depth of 7.7m alongside.

The Bulk Sugar Terminal at the Sir Thomas Hiley Wharf is 191m long, with a dolphin connected by a catwalk at each end and a depth of 11m alongside.

Above the sugar berth, the river has a controlling depth of 1.6m.

Aspect.—The light on South Head, the pilot station on the same point, and the white tower to the S, as well as the sugar sheds are all excellent marks for making the port.

Pilotage.—Pilotage is compulsory, and vessels are met about 4.5 miles E of South Head. The pilot vessel is equipped with a radiotelephone. Vessels should order pilots well in advance, radioing their ETA at least 24 hours in advance.

Regulations.—The port limits are described by the arc of a circle 4 miles in radius, centered on South Head.

The quarantine line for the port is drawn N from South Head for 1 mile, then W to the shore.

Entering vessels are restricted to a length of 183m and must maintain an underkeel clearance of 0.9m at all times. Vessels normally berth only in daylight hours on the outgoing tide, with departures made on the incoming tide.

There is a 10 knot speed limit in the river from its entrance to Bundaberg Creek, at the E end of the town, and of 4 knots thereafter.

Signals.—The pilot station and harbormaster office may be contacted via VHF.

Anchorage.—Vessels may take anchorage, in 7.3m, about 1.5 to 2 miles ENE of South Head Light. There is a spoil ground centered 2 miles ESE of South Head. An additional anchorage area is located in a depth of 12m about 5 miles E of South Head.

Directions.—Vessels bound for the Burnett River from the N should keep at least 7 miles offshore until South Head Light bears about 245°. Vessels bound from the S, after passing E of **Sloping Hummock** (24°50'S., 152°25'E.), should keep more than 2 miles offshore, until the approach can be made on the entrance range.

Off-lying Islands and Reefs

5.41 Extensive off-lying detached reefs, islets, and shoal patches lie between Sandy Cape and a position about 138 miles NW. They parallel the coast between about 21 miles and 52 miles offshore, except at a position about 25 miles ESE of Cape Capricorn, where they lie about 15 miles offshore. These dangers are comprised of Lady Elliot Island, the Herald Patches, the Bunker Group, and the Capricorn Group. Several detached dangers lie up to about 78 miles NE of Sandy Cape.

Lady Elliot Islet (24°07'S., 152°43'E.), is a coral scrub-covered islet fringed by coral reefs. It is reported to give radar re-

turns up to 15 miles. A light, equipped with a racon, and signal station are situated here.

A marine park is established in the vicinity of Lady Elliot Island. This is an area to be avoided.

Anchorage, sheltered from SE winds may be taken in the lee of the island, about 0.2 mile off the reef, in depths of 18 to 37m.

Herald Patches, a group of detached 10 to 18m coral and sand patches, lie about 6 miles S of Lady Elliot Islet. They extend about 7 miles from E to W and are about 2.5 miles wide with the shallowest water reported over the E end.

Bunker Group (23°50'S., 152°21'E.) comprises several coral islets and reefs which lie between 20 and 33 miles NW of Lady Elliot Islet. Lady Musgrave Islet, the southernmost of the group, from which a light is shown, has been reported to give good radar returns up to 11 miles. A depth of 16.9m was reported to lie about 2.5 miles NE of the reef on which the islet lies.

Caution.—An Area to be Avoided, best seen on the chart, surrounds the Bunker Group. This area is to be avoided by all unauthorized vessels greater than 500 gross tons, except in emergencies.

5.42 Fairfax Islet, several islets in the center of a reef which is about 2 miles long, lies about 3 miles NNW of Lady Elliot Islet. Hoskyn Islet, two islets almost connected at LW, lies on a reef about 1.5 miles long, about 5 miles NW of Fairfax Islet.

Boult Reef (23°45'S., 152°17'E.), which dries, has a sand cay on its SW end, which nearly covers at HW. Heavy breakers occur on the NE end of the reef.

Patches, with depths of 14.6m and 17.4m, lie 1.7 miles apart, 16 miles W of Hoskyn Islets.

Capricorn Group consists of a number of coral islets and steep-to coral reefs, lying between 5 and 41 miles NW of the Bunker Group. Its NE side is formed by a line of islets and reefs extending about 36 miles NNW from Llewellyn Reef to North Reef, the S and N extremities, respectively, of the group. From the middle of the NE side, the central part of the group extends about 28 miles WSW to Rock Cod Shoal, about 15 miles ENE of the coast at Facing Island. The sea breaks heavily over most of the reefs, parts of which dry or are awash. Large areas of discolored water, caused by masses of plankton, have been reported in the waters surrounding the Capricorn Group.

Llewellyn Reef (23°42'S., 152°11'E.), about 3.5 miles long and 2 miles wide, is the southernmost of the Capricorn Group. It lies about 5 miles NW of Boult Reef. A 9.1m coral patch, and a 25.5m sand and coral patch lie 3 miles NW and 4 miles WNW, respectively, of Llewellyn Reef.

North Reef (23°11'S., 151°54'E.), on which a light is shown, is about 1.2 miles long and lies at the N end of the Capricorn Group. North Reef has been reported to give good radar returns up to 14 miles. Broomfield Reef, with a sandy cay on its W side, lies about 5 miles SSE of North Reef. The channel between the two reefs has not been closely examined and should not be used.

Guthrie Shoal (23°03'S., 151°51'E.), with a depth of 9.4m, lies on the SE end of a bank with depths of less than 36.6m, which lies 8 miles NNW of North Reef. Innamincka Shoal, with a depth of 9.4m, lies about 2.5 miles N of Guthrie Shoal. Haberfield Shoal, with a depth of 9.8m, lies from 4 to 6 miles WNW of Guthrie Shoal.

Johnson Patch, with a depth of 11.9m, and steep-to, lies about 9.5 miles WSW of the middle of Haberfield Shoal. Douglas Shoal, with a depth of 8.2m, lies about 3 miles ESE of Johnson Patch.

Goodwin Shoal (22°55'S., 151°44'E.), with a depth of 8.2m and over which the sea breaks in bad weather, lies 8.5 miles NW of Innamincka Shoal. Shoals, with depths of 16.2m and 18.3m, lie 6 miles W and 10 miles WSW, respectively, of Goodwin Shoal.

5.43 **Edgell Bank** (22°53'S., 151°47'E.), with a depth of 15.5m, lies 3 miles NE of Goodwin Shoal. Moresby Bank, with depths of less than 36.6m, and a least depth of 16.1m over its E end, lies 3 miles NE of Edgell Bank. Both the E end of Moresby Bank and Edgell Bank have been reported to break in heavy weather.

Barcoo Bank, with a depth of 17.7m, lies 1.5 miles WNW of the W end of Moresby Bank.

Karamea Bank, with a depth of 18.3m, and which breaks in heavy weather, lies 14.5 miles NW of the W end of Moresby Bank. During calm weather the bottoms of all the above shoals can clearly be seen. Their positions are indicated by slight tide rips.

Northwest Islet lies on the W end of a reef and is about 6 miles long. It is located about 13 miles W of Broomfield Reef. An abandoned cannery may be seen here.

The central islets and reefs of the Capricorn Group can best be seen on the appropriate chart.

Burnett River Entrance to Bustard Head

5.44 The **Kolan River** (24°40'S., 152°12'E.) empties into the sea 12.5 miles WNW of the entrance to the Burnett River. The channel across the bar at the entrance is subject to frequent changes, and local knowledge is essential. Camp Island, low and sandy, lies off the NW entrance point. A lookout tower stands N of a village fronting the entrance.

Baffle Creek (24°31'S., 152°04'E.) discharges into the sea about 10 miles NW of the Kolan River entrance,; the mouth of Mullet Creek lies about halfway between. A shifting unmarked bar, with a least depth of 0.6m, obstructs the entrance to the creek. Vessels with a draft of 2.1m can navigate the creek for a distance of 6 miles above the entrance.

A dangerous wreck, with a depth of 10m over it, lies 10 miles NE of the entrance to Baffle Creek.

Anchorage.—Anchorage during offshore winds may be taken, in a depth of 10.9m, about 2.5 miles ENE of the entrance with Double Sloping Hummock, bearing about 210°.

Round Hill Head (24°10'S., 151°53'E.) lies about 14.5 miles NNW of Toowong Hill, a conspicuous hill about 9.7 miles NNW of Baffle Creek entrance. A monument is situated on the W side of this headland, about 0.7 mile S of its N end. Round Hill Head has been reported to give good radar returns up to 17 miles. A light is shown on Round Hill Head.

Bustard Bay indents the coast about 3.2 miles SW between Round Hill Head and Bustard Head, about 10 miles NW. The low coast on the W side of the bay is backed about 3.5 miles inland by the Munro Range, up to 323m high. The S end of the

bay has depths of less than 2m S of the 5.5m curve, which trends W from the N end of Round Hill Head.

A narrow and shallow inlet, on the E side of which is a small settlement, lies on the W side of Round Hill Head. Several beacons mark the entrance of a creek at the S end of Bustard Bay, but there are only depths of 0.6 to 1m over the bar. Although Bustard Bay affords shelter only during offshore winds, small craft may find protection from SE winds in depths of 4.5 to 5.5m about 1.5 miles W of the N end of Round Hill Head.

Bustard Head (24°01'S., 151°46'E.) shows a light on its SE point; another light is shown on Clews Point, on the NW point of the head. Storm signals are also displayed from the station.

Tides—Currents.—The tidal currents off Bustard Head set NW during the rising tide and SE during the falling tide and have a rate of about 2 knots.

Pancake Creek (24°01'S., 151°44'E.), the entrance to which is narrow, has a least depth of 3.7m in the fairway. On the E side, rock ledges, which dry 1.8m, extend 0.2 mile offshore. The W side is formed by Shelter Spit, which dries 1.5m, and extends 1 mile N from Pancake Creek. The edge of this spit is easily seen.

Anchorage.—Anchorage may be obtained in the creek by small vessels, with local knowledge, in a depth of 4m, good shelter. Tidal currents in the creek attain a rate of 1.5 to 2 knots.

A reef of above and below-water rocks extends 1.7 miles NNE from Bustard Head. Inner and Middle Rocks, each 0.3m high, lie on the seaward end of the reef. Outer Rocks lie 1 mile NNE of Middle Rocks. The reef and Outer Rocks are covered by the red sector of Bustard Head Light. Outer Rocks are also covered by the red sector of Clews Point Light.

5.45 Richards Point (23°59'S., 151°38'E.), a low point fronted by a rocky ledge, lies near the NW end of the Rodds Peninsula. Ethel Rocks, which uncover, lie up to a little over 0.2 mile N of this point.

Rodds Bay lies between Richards Point and Seal Rocks, about 7.5 miles W. There are depths of less than 5.5m over most of Rodds Bay, but a channel with depths of about 6.4 to 9.1m leads into Rodds Harbor, a confined anchorage at the SE end of Rodds Bay.

Seal Rocks (23°57'S., 151°29'E.), a ridge of sand and rocks, parts of which dry, extend about 4 miles NE from Tiber Point. A rock, about 1.5m high, lies on this ridge about 0.5 mile from its NE end. Depths of less than 5.5m extend up to about 1 mile NNE from this rock. Seal Rock lies at the NW end of Rodds Bay and separates it from Port Curtis.

Jenny Lind Bank, a 2.7 to 5.2m bank, extends about 1 mile NE from a position about 1.5 miles NE of Seal Rocks. Several drying rocks lie near the middle of this bank and rocks with depths of less than 1.8m lie between the drying parts of Jenny Lind and Seal Rocks.

Gladstone (Port Curtis) (23°55'S., 151°23'E.)

World Port Index No. 53450

5.46 Gladstone occupies the NW end of the bight indenting the coast between Richards Point and Gatcombe Head, and extends about 22 miles NW between Facing Island and Curtis Island and the mainland. The port, one of the safest and most commodious anchorages on the Queensland coast, is entered through South Channel between the S end of East Banks and Jenny Lind Bank. The town of Gladstone, where there are several wharves, lies on the SW side of Port Curtis, about 7 miles WNW of Gatcombe Head. There are also wharves at South Trees Point, Barney Point, and Clinton, all on the S side of the channel.

Gladstone Port Authority

http://www.gpcl.com.au

Tides—Currents.—The tide at the Port of Gladstone has a mean spring rise of 3.8m and a mean neap rise of 3m.

The tidal currents at the SE end of East Bank, in the channel entrance, set WSW during the rising tide and NE during the falling tide, at a rate of 2 to 3 knots. In the entrance channel between East Bank and the banks to the S, the tidal currents set NW during the rising tide, and SE during the falling tide at a rate of 2 to 3 knots. The current between South Trees Point and Auckland Point set WNW during the rising tide and SE during the falling tide, at a velocity of 2 to 3 knots. The prevailing winds may considerably influence the set and rate of these currents.

Depths—Limitations.—It has been reported (2003) that the approach channel for the Port of Gladstone has a limiting dredged depth of 16.3m as far as South Trees Point Wharves, a depth of 12.8m from South Trees Point to **Auckland Point** (23°50'S., 151°15'E.), and a depth of 16m from Auckland Point to Clinton Wharf. The three numbered berths at Clinton Wharf have alongside depths of 18.8m. Above Clinton Wharf, the channel has a depth of 8.9m. The Clinton swing basin has a reported depth of 10.6m. The Targinie Swing Basin has a reported depth of 8.9m.

The South Trees Island Wharf, situated about 4.5 miles NW of **Gatcombe Head** (23°53'S., 151°23'E.), handles bulk aluminum products. East Wharf, with a depth of 12.8m, is a loading berth. West Wharf, with a depth of 12.8m, is a discharge facility which handles bulk ore and petroleum products. Both berths are limited to a length of 243m and a beam of 35.4m.

The Smelter Wharf, situated at **Boyne Island** (23°55'S., 151°20'E.), has a length of 250m, an alongside depth of 15m, and can handle bulk carriers up to 60,000 dwt.

The Barney Point Wharf is situated N of the South Trees Island Wharf and has facilities for handling bulk coal. The wharf has an alongside depth of 15m and will accept vessels up to 245m in length.

The Auckland Point Wharf is situated at the town of Gladstone itself, and provides a variety of facilities. Berth No. 1, with an alongside depth of 11.3m, will accommodate vessels loading bulk coal with lengths of up to 228m.

Berth No. 2 is a bulk grain loading facility with an alongside depth of 11.3m. Vessels up to 189m in length, and a beam of 30m, are accommodated.

Berth No. 3, with alongside depths of 11.3m, is a general purpose berth that will handle general cargo, bulk petroleum products, bulk liquid, dangerous cargo, and heavy lifts.

Berth No. 4 has an alongside depth of 11.4m.

The Clinton Coal Facility Wharf has four berths, with a total length of 1,490m and depths alongside of 18.8m.

Courtesy of Major Metals Queensland

Gladstone—RG Tanna Coal Loading Wharf

Fishermans Landing Wharves (Targinie Berths) have two berths. Berth No. 4 is 228m long, with an alongside depth of 11.2m; vessels berth bow headed SE at Berth No. 4. Berth No. 5 has a length of 220m and a depth of 11.2m alongside.

Aspect.—Most of the coast of the Port of Gladstone is low, but there are several prominent hills that are useful landmarks. In addition to Many Peak Range and the Edinburg Mountains S of the port, a short range lies on the W side of the N end of the port.

Mount Stanley (Peak Hill) lies near the end of Many Peak Range, about 12.5 miles SSW of Tiber Point. Mount Larcom, 628m high, is another prominent peak about 9.5 miles WNW of Gladstone.

Hummock Hill is a prominent landmark on the S side of the entrance, and Round Hill lies close S of Gladstone on the SW side of the port. View Hill and Ship Hill lie on the S end of Curtis Island; these hills provide useful landmarks when arriving at the port.

Gatcombe Head (23°53'S., 151°23'E.), the N entrance point of the Port of Gladstone, is a bold prominent bluff at the S end of Facing Island.

Pilotage.—Pilotage is compulsory and available 24 hours for all foreign vessels of 35m in length or greater and Australian vessels of 50m in length or greater. Certain Australian vessels may be exempt if they have the proper documentation.

Vessels should forward their ETA and maximum draft 24 hours in advance of expected arrival and subsequent amendments should be sent immediately.

Vessels are considered "arrived" for pilotage and vessel traffic purposes when crossing a line with a 6 mile radius centered on the Fairway Lighted Buoy (23°53'S., 151°31'E.), and notifying Gladstone Harbor Control on VHF channel 13.

The pilot boards at the following positions:

1. Alpha (23°51.0'S., 151°31.5'E.).
2. Bravo (23°51.9'S., 151°32.7'E.).
3. Charlie (23°53.0'S., 151°33.0'E.).
4. Delta (23°55.0'S., 151°31.0'E.).

The pilot boards LNG vessels in vicinity of position (23°50.9'S., 151°34.7'E.) which lies approximately 5.5 miles NE of S1 and S2 light beacons.

The pilot working channels are VHF channels 10, 13, and 16; the call sign is "Gladstone Pilots." Gladstone Harbor Control will advise which boarding station will be used.

A helicopter pilot transfer service for vessels able to provide landing facilities is available for the Port of Gladstone. The helicopters use VHF channel 13 for communications.

Vessels not able to accept a helicopter, due to physical restrictions or safety considerations, will be serviced by launch.

Vessels should advise in their ETA message whether the vessel is capable of accepting a helicopter, or if not, the impediment precluding the use of this service.

Regulations.—The Port Limit Line for Gladstone is best seen on the chart. The quarantine line for the port is drawn across the channel just S of the South Trees Island wharf. Pratique is usually granted at the wharf, but if the vessel is proceeding to an anchorage, it will be boarded there. Deep-draft vessels must not pass each other in South Channel; an inflammable liquids tanker must not pass deep-draft vessels, or another tanker, in South Channel.

Vessels wishing to enter the port must advise harbor control by VHF.

Vessel Traffic Service.—A Vessel Traffic Service, which is compulsory for all commercial vessels, is located at the port. All vessels arriving or departing Gladstone should monitor VHF channel 13 when within the VTS and Pilotage Area to monitor traffic conditions and must maintain a listening watch on VHF channel 16.

Inbound vessels of 10m in length or greater should call Gladstone Harbor Control on VHF channel 13, as follows:

1. At least 2 hours before arrival and again on crossing a line with a 6 mile radius centered on the Fairway Lighted Buoy(23°53'S., 151°31'E.).
2. When passing the starboard lighted beacon at Laird Point.
3. When passing North Point for the N entrance.
4. When passing E2 Lighted Buoy for the E channel.
5. When passing Fairway Lighted Buoy for the S channel, main entrance.

Outbound vessels should contact the VTS Center on VHF channel 13 at least 15 minutes before departure, on departure, and when outside the port limits.

Outbound deep-draft vessels and tankers may, provided there is sufficient depth of water for safe navigation, pass inbound deep-draft vessels or tankers between South Trees Lighted Beacon and the inner end of South Channel.

Signals.—The Port Radio Station at Gladstone keeps a constant watch; a listening watch is maintained in the harbormaster's office during office hours. Mobile stations are maintained in the tugs, launches, pilot boat, and the main wharves.

Anchorage.—Anchorage may be taken, in a depth of 11m, between Barney and Auckland Points. Several anchorage berths are available clear of the range lines, and are best seen on the chart.

Gatcombe Head to Cape Capricorn

5.47 Between Gatcombe Head and Cape Capricorn, about 26 miles NNW, the coast trends in that direction along the E side of Facing Island and Capricorn Island. All dangers except the Rundle Islands are contained within a distance of 2.7 miles offshore.

East Point Ledge (23°52'S., 151°24'E.), with depths of less than 2.7m, extends up to about 1.2 miles NE and NW from East Point. Sable Chief Rocks, a small group of detached rocks which dry, lies about 1 mile offshore about 3 miles N of East Point.

North Entrance lies between North Point and the SE end of Curtis Island, about 0.7 mile to the W. This entrance into Port Curtis is suitable only for small craft with local knowledge.

Caution.—Several dangerous wrecks, best seen on the chart, exist approximately 5 miles NE of North Point.

From North Entrance to Cape Capricorn, about 17 miles to the NNW, the coast is a series of rocky points and sandy beaches backed, less than 1 mile inland, by a ridge of hills.

The **Rundle Islands** (23°32'S., 151°17'E.) lie about 2.5 miles offshore and 4 miles SE of Cape Capricorn. The E islet shows a light; the W islet is low, sandy, and rocky. The islets are steep-to and lie on a bank, with depths of less than 10m.

Cape Capricorn (23°29'S., 151°14'E.), a bold headland, lies on the NE end of Curtis Island and appears white and barren. A wreck lies in about 24m, about 1.5 miles NNE of the cape. A light is shown on the summit of the cape. A white house on which there is a lantern, is situated on the N side of the cape.

Keppel Bay

5.48 Keppel Bay (23°22'S., 151°00'E.) indents the coast about 12 miles SW between Cape Capricorn and Great Keppel Island. The S end of the bay is formed by the N end of Curtis Island and the W side is formed by the low mainland, which is backed by hills up to about 488m high. The N end of the bay is formed by the Keppel Islands and the shoals between them and the mainland.

Tides—Currents.—In the outer part of the bay, the flood current sets S, and the ebb N. From abreast Cape Capricorn, on the S, and Hummocky Island, on the N, however, the direction is reversed, probably due to an eddy, with the flood setting N into the bay and the ebb S out of it. Close E of Cape Capricorn, the N current runs for approximately 7 hours, from about 3 hours before LW at Mackay, to about 1 hour before HW at that port. The current then turns, and the S current runs for approximately 4 hours, 42 minutes, the current turning again as stated above. The flood current W of Cape Capricorn sets W past Cottier Bank.

The strength of the tidal current in the outer part of the bay has seldom been found to exceed 1.5 knots.

Caution should be exercised by mariners who may be deceived by discolored water. Muddy water is carried out by the deep channels during the latter part of the falling tide, while the water is clear over the shallower parts where the current does not set at that time.

5.49 South end of Keppel Bay.—The coast between Cape Capricorn and **Cape Keppel** (23°27'S., 151°03'E.) is formed by a sandy beach, backed by low, swampy and mangrove-covered ground rising inland to the Ramsay Range. Between the two above capes, a flat, with depths of less than 10m, extends up to 4 miles offshore.

Boat Rock, which dries 1.5m, lies 2.5 miles E, and Cottier Bank, with a least depth of 1.2m, lies close inside the edge of the flat, 2.2 miles NE of Cape Keppel. Cape Capricorn Light, in line bearing 121°, leads NE of the bank.

Ship Rock (23°25'S., 151°11'E.) and Fairway Rock lie 5.2 miles NW and the same distance WNW, respectively, of Cape Capricorn. Both rocks are good marks when entering Keppel Bay from the S. There is deep water between them and between the rocks and Hummocky Island.

Hummocky Island (23°24'S., 151°09'E.) lies about 6.5 miles NW of Cape Capricorn. This small steep-to island consists of three conspicuous hills. A rock, awash, lies about 0.5 mile off the SW side of the island. Depths of less than 10m extend 0.6 mile W from the island. A spit, with depths of less than 10m, extends 1 mile NW from the middle of the N side of the island. A detached 9.4m patch lies 0.7 mile NW of the W extremity of the island.

Sea Hill Point is the NW extremity of Curtis Island, and the E entrance point to The Narrows at the N end. Sea Hill rises 1 mile ENE of the point. There is a village close SE of Sea Hill Point. A light is shown on the point.

Anchorage.—Anchorage, with good shelter from all but N and NW winds, may be obtained, in a depth of 11.9m, 0.7 mile WNW of Sea Hill Point. As the tidal currents set fairly strongly through The Narrows, it is recommended that a longer scope of anchor cable be used than is indicated by the water depth alone.

Timandra Bank (23°26'S., 151°00'E.), which dries in places, extends 3.5 miles W from the outermost of Keppel Rocks. North West Bank, with depths of less than 5m, extends 1.5 miles offshore between Station and Sea Hill Points.

Off-lying Islands and Shoals

5.50 Jabiru Shoals (23°21'S., 151°05'E.), four patches with depths of 7.9 to 10m, lie between 3 and 6 miles WNW of Hummocky Island. Lisa Jane Shoals, three patches with depths of 7.6 to 11.9m, lie 7.5 miles NW of the above island.

Peak Island (Second Lump) (23°21'S., 150°56'E.) is shaped like a sugarloaf. Arch Rock lies on the outer end of a reef, which extends 1 mile SSE from the island. A bank, with depths of less than 5m, extends 1 mile W of the island and a rock lies close off its N extremity. Split Rock lies 0.5 mile NW of Peak Island.

Divided Island, 35m high, cliffy, and divided into two parts at HW, lies 2.5 miles NNW of Peak Island. A rock, which dries, lies on the outer end of a reef which extends 0.5 mile NNW from the island. Wedge Island lies 2.5 miles WNW of Divided Island.

Pelican Island (23°15'S., 150°52'E.) lies 2.5 miles NNW of Wedge Island. Pelican Rock is joined to the island by a drying reef. A bank, with a least depth of 2.7m, extends 1.2 miles WNW from Pelican Island, and a 4m patch lies 0.3 mile S of the same island.

Egg Rock (23°12'S., 151°06'E.), the E of the islands and rocks which form the N side of Keppel Bay, is steep-to on its S side. Two above-water rocks lie close off its E side. Barren Island (First Lump) lies 2.3 miles NW of Egg Rock. The Child, a cliffy rock, 49m high, lies close off the NE side of the island.

Great Keppel Island (Wapparaburra) (23°10'S., 150°58'E.) lies with its E extremity about 6 miles WNW of Egg Rock. The island, the largest of the Keppel Isles, is inhabited and covered with grass and a few trees. A bight is shown from the E side of the island. A number of islets, rocks, and banks, lies off each

side of the island and can best be seen on the chart. A light hut stands on the E point of Great Keppel Island.

The Fitzroy River

5.51 The **Fitzroy River** (23°30'S., 150°55'E.) flows into the SW end of Keppel Bay between Sea Hill Point and Cattle Point. The mouth of the river is about 6 miles wide and is encumbered by islets, shoals, and rocks. The shore is low within the river entrance, where numerous creeks empty from its S bank. Between Sea Hill Point and Cardigan Point a shallow inlet, separating the N part of Curtis Island from the mainland, extends almost 9 miles SSE to The Narrows at the N extremity of Port Curtis.

The river is entered through three channels. The main channel is through Sea Reach and then through South Channel. Middle Channel is closed to navigation. North Passage can only be used by small vessels with local knowledge.

Sea Reach and South Channel are marked by lighted beacons and buoys. The lighted range markers can best be seen on the chart.

5.52 **Port Alma** (23°36'S., 150°52'E.) (World Port Index No. 53440) is a natural deep water harbor and is part of the Port of Rockhampton. It lies 8 miles SW of Sea Hill Point on the S end of the Fitzroy River. The Rockhampton port limit extends from the E tip of Cattle Point to the N tip of Arch Rock and then to the NW extremity of Cape Keppel. The city of Rockhampton lies 35 miles up the Fitzroy River and is navigable only by small recreational vessels. Rockhampton is used only by recreational vessels.

Gladstone Ports Corporation

http://www.gpcl.com.au

The principal cargoes handled at Port Alma Shipping Terminal are Class 1 explosives, ammonium nitrate, bulk tallow and military equipment. All berths are owned and operated by Gladstone Ports Corporation, which is owned by the Queensland Government.

Port Alma has two general cargo and one dolphin berth used for handling bulk liquids.

Tides—Currents.—The mean spring tide rand is 4.0m and the mean neap tide range is 1.9m.

Inside the mouth of the river, the tidal currents tend to parallel the channels. The tides are known to set fairly strongly in and out of The Narrows past Sea Hill Point. In the approach to Port Alma and in the river channel off Broadmont, they may attain a rate of 2 to 3 knots. At Port Alma, the tidal streams, both flood and ebb, set parallel to Port Alma Wharf.

Depths—Limitations.—In 1993, there was a least depth of 7.3m in the approach channel to Port Alma. In the channel to Rockhampton, which is about 30 miles upstream from Port Alma, there are depths of about 4.6m at LW; however, seasonal variations may carry the level below this datum. Vessels that exceed 160m in length should pass the fairway buoy 2.5 hours before HW.

Berth No. 1 is 169m long, has a concrete deck and is suitable for all general cargo, including frozen meats and other products. A mooring dolphin is situated 43m N of this berth, which can accommodate mooring lines from vessels required to moor over the N end of the berth.

Berth No. 2 has a concrete deck 18.5m wide and 122m long. A mooring dolphin is situated 49m S of this berth which can accommodate mooring lines from vessels required to moor over the south end of the berth. Berth No.2 is part of the same wharf as Berth No. 1, thereby providing a total of 291m of mooring space plus the aforementioned dolphins at either end. Berth No. 2 is suitable for general cargo and containers.

Berth No. 3 consists of four berthing dolphins in line with Berth No. 1 and Berth No. 2, with mooring dolphins at each end to provide an overall length of 238m. This berth is currently used for loading tallow.

All three berths are approximately 13 miles from Fairway Buoy and have depths of 9.2m alongside. The maximum vessel length that can be accommodated at Port Alma is 200m.

Channel Depths

Channel	Designed Depth	Width
Balaclava Leads (Sea Reach)	7.6m	90-135m
Kazatch Leads	7.0m	90-135m
Eupatoria Leads	7.9m	90-135m
Shell Point Leads	7.0m	90-135m
Swing Basin	5.8m	240m

Pilotage.—Unless the master holds a current Pilotage Exemption Certificate, pilotage is compulsory for:

1. Vessels 50m or more in length.
2. Vessels towing another vessel where the combined length of both vessels is 50m or more.
3. Vessels that are directed to use a pilot by the harbormaster.

Pilotage is available 24 hours. The Rockhampton Pilotage area is bounded by the following positions:

a. 23°28.8'S, 150°52.3'E.
b. 23°28.8'S, 150°56.6'E.
c. 23°26.9'S, 150°03.2'E.

Pilots will also board vessels NE of Timandra Lighted Buoy in position 23°24.4'S, 150°00.9'E.

Vessels requiring pilot services shall submit Arrival, Removal, and Departure Notices no later than the indicated number of hours prior to the desired movement as listed below:

Notice Required	
Arrival	48 hours
Removal	24 hours
Departure	24 hours

Additionally, the vessel shall transmit the current and maximum draft to the Regional Harbormaster (Gladstone) at least 48 hours in advance and subsequent amendments should be sent immediately.

As the time taken for the pilot launch to reach the boarding ground in Timandra Bay is approximately 3 hours, the time of

arrival should be confirmed or adjusted as necessary.

In bad weather, if the pilot is unable to board, proceed inbound on the range lights situated on the N end of **Balaclava Island** (23°32'S., 150°56'E.), keeping them slightly open to the W until past the lighted buoy marking the W end of Timandra Bank, where the pilot will board. If the pilot is not at the buoy, proceed to the anchorage off Sea Hill Point.

The vessel will be advised of the pilot boarding arrangement by Gladstone Harbor Control. The vessel should be underway, proceeding at 6 knots and providing a good lee, when embarking the pilot.

The pilots can be contacted, as follows

1. Duty Pilot
   a. Telephone: 617-4972-4693
   b. Facsimile: 617-4972-9516
2. Manager of Pilot Services—by telephone (617-4972-8201)
3. Pilot Launch—VHF channel 16

Regulations.—The Regional Harbormaster controls the movement of vessels within the port area while the allocation of berths and moorings are controlled by Gladstone Ports Corporation.

Vessels should plan on arriving 15 minutes after a departing outbound vessel. Departures are typically conducted on the flood tide. Vessels sailing at maximum draft will depart 30 minutes before HW. Other departures will be conducted from 30 minutes after LW to 30 minutes before HW. Maximum permissible draft is 6.3m plus tide.

The following restrictions are in effect for vessels entering Port Alma:

1. The maximum length of arriving vessels is 180m depending upon capability.
2. There are no restrictions on vessels less than 165m in length.
3. Vessels between 165m and 173m in length will be subject to their own individual merits as determined by the harbormaster.
4. Vessels great than 180m will need approval from RHM Gladstone.

The following restrictions are in effect for vessels within Port Alma:

1. Arrival draft is restricted to 5.3m plus height of tide to provide UKC (under-keel clearance) of 0.5m in the swing basin.
2. Maximum departure draft limited to 6.3m plus height of tide one hour prior before HW.
3. Ships should be loaded or ballasted in order to have an even keel or be trimmed by the stern with the forward draft not less than 2% of its length with the propeller fully submerged.
4. Vessels 173m in length will be limited to berthing during daylight hours only.
5. Vessels 180m in length can only berth on the last hour of the flood tide with the wind not exceeding 10 knots from the E and a draft not exceeding 7.6m.
6. Vessels carrying ammonium nitrate and/or explosives cargo must be capable of sailing at the next LW and therefore the maximum draft is limited to 6.9m plus or minus the height of tide at the next LW. Such vessels are berthed with bow facing out, except at the harbormaster's discretion.

Vessel Traffic Service.—Harbor Control is delivered from the VTS center at Gladstone. Vessels are not to move within the pilotage area unless satisfactory two-way communications are maintained with Gladstone Harbor Control Center, which maintains a continuous listening watch on VHF channels 13 and 16.

Contact Information.—Port Alma can be contacted, as follows:

1. Gladstone Harbor Control (VTS):
   a. Call sign: Gladstone Harbor Control
   b. VHF: VHF channels 13 and 16
   c. Telephone: 617-4973-1208
   d. Facsimile: 617-4973-1212
2. Port Alma Wharves:
   a. Call sign: Port Alma Wharves
   b. VHF: VHF channel 6
3. Port Manager:
   a. Telephone: 617-4934-6931
   b. Facsimile: 617-4934-6928
4. Regional Harbormaster:
   a. Telephone: 617-4973-1200
   b. Facsimile: 617-4973-5520
5. Port Authority:
   a. Telephone: 617-4934-6931
   b. Facsimile: 617-4934-6928
   c. E-mail: info@gpcl.com.au

Anchorage.—Vessels requiring anchorage upon arrival should anchor in the vicinity of the pilot boarding area NE of Timandra Lighted Buoy in position 23°24.4'S, 151°00.9'E, subject to the approval of the Regional Harbormaster. Holding ground is reported as good but it is recommended that additional anchor cable be veered to accommodate wind and tidal current effects.

A vessel must not anchor in any of the dredged channels, on any of the range lines, nor in any position where the vessel's lights might be mistaken for channel range lights.

Double Head to Port Clinton

5.53 Double Head (23°10'S., 150°48'E.) is a prominent headland at the N end of Keppel Bay. Although the head is steep-to on its E side, an extensive shoal, with depths of less than 3.6m, lies between a position about 1.5 miles E of the head of Great Keppel Island.

North Keppel Island lies 7.5 miles NE of Double Head. The island is inhabited and similar in formation to Great Keppel Island. Sloping Island lies near the outer end of a spit of foul ground which extends 1.5 miles S from the S side of North Keppel Island, with Pumpkin Island between.

Yeppoon Inlet (23°08'S., 150°45'E.) lies about 3 miles NW of Double Head on the N side of the mouth of Yeppoon Creek and is a harbor for small craft. A breakwater, on the head of which stands a lighted beacon, extends from the E entrance point. The entrance should not be attempted without recent local knowledge. Tidal currents in the inlet are strong.

An overhead power cable, with a vertical clearance of 11m spans the entrance to the inlet.

Cape Manifold (22°41'S., 150°50'E.) is composed of rocky heads with sandy beaches between, behind which rise the Manifold Hills. An islet, sparsely covered with vegetation, lies 0.2

mile E of the cape, with an above-water rock between. Tide rips occur N of the islet.

Flat Island and Peaked Island, both steep-to and bare, lie 9 miles ESE and 7 miles ENE, respectively, of Cape Manifold. The latter is perforated and light can be seen through it from the SE. Cliff Point lies 1.5 miles NW of Cape Manifold.

Anchorage.—Anchorage may be taken during offshore winds, in 11 to 14.6m, in a position about 1.3 miles N of the N side of Cape Manifold, and also in a position about 2.2 miles N of Cliff Point.

Quoin Island (22°34'S., 150°48'E.) lies about 7.5 miles NNW of Cape Manifold. Anchorage may be obtained during offshore winds, in depths of 15 to 18m, 0.5 mile S of the island.

Cape Clinton (22°32'S., 150°48'E.) is the E point of a bold headline on the S side of the entrance to Port Clinton. Mount Flinders, a 160m peak, lies about 1.5 miles W of the cape. The steep-to NE side of Cape Clinton headland trends about 1.5 miles NW from the cape to the N extremity of the headland. It then trends about 0.3 mile W to Inner Head, the NW point of the headland. Round Islet lies about 0.2 mile N of the N extremity of the headland with a drying reef between. Perforated Point lies about 2.2 miles NNW of Round Islet. The entrance of Port Clinton lies between the point and the islet.

5.54 Port Clinton (22°32'S., 150°46'E.) consists of an inlet which indents the coast about 4.5 miles SW between Round Islet and Perforated Point. This inlet, much of which dries or is encumbered with shoals, offers sheltered though somewhat confined anchorage, but is difficult to enter because of the bar. Coasters frequently seek shelter here during bad weather.

Tides—Currents.—The flood current sets W off the N end of Round Islet at the rate of 1.5 to 2 knots, and then sets SSW between Inner Head and Black Rock at a rate of 2.5 to 3 knots. In the vicinity of Bullock Point the flood divides, one branch sets S into South Arm at a rate of about 2 knots, and the other branch sets W into the channel S of West Point at a rate of 1.5 to 2 knots. In the vicinity of Black Rock, the flood current sets toward the sands off West Point. Between Entrance Island and Perforated Point, the flood current sets to the N.

The ebb current sets in the opposite direction to the flood current described above and attains about the same rate.

Depths—Limitations.—A bar, with depths of about 1.8 to 5.2m, lies across the entrance to Port Clinton. There are depths of 7.3 to 14.6m on the approach to the bar. Inside the bar, there are depths of about 9.1 to 28m in the fairway to the anchorage. During a fresh breeze, the sea breaks over the shallower parts of the bar; when the sea is calm, there are current rips over them.

A 10 to 29m deep channel trends SW along the W side of the entrance bar from a position about 0.5 mile NNE of Inner Head to close off the W side of the head. Care must be taken to avoid the shoal water from 0.2 to 0.3 mile SW of the islet off Bullock Point. At Fish Rock, the channel narrows and trends SSE into South Arm, a narrow inlet which extends about 5 miles to the S. In South Arm, the channel has depths of about 5.5 to 7.3m for a considerable distance.

A channel, with depths of about 7 to 10.9m, trends about 1.5 miles toward the W part of Port Clinton from a position about 1.5 miles SE of West Point.

Aspect.—The entrance of Port Clinton is easily distinguished from seaward as it is about midway between the high hills at Cape Manifold and Mount Westall, about 16 miles NW of Cape Clinton. The headlands on either side of the entrance and the islets and rocks described above are prominent identifying features.

A remarkable sand cliff is located about 3 miles S of West Point on the E side of the low point from which West Flats extends. The remains of a wharf, with a depth of 5.5m alongside, is situated close S of Holtness Point.

Pilotage.—Pilots are not available at Port Clinton and vessel intending to enter should obtain a pilot at Keppel Bay. Vessels should not attempt to enter without local knowledge.

Anchorage.—An indentation outside the bar and immediately NW of Round Islet affords temporary anchorage, in 12.8m, for vessel waiting to cross the bar. The only secure anchorage in Port Clinton is in about 10.9 to 16.5m, close SW of Fish Rock. Here a vessel will be sheltered from all winds and from the heavy swell which occasionally sets over the bar. Anchorage may also be taken, in 10.9 to 16.5m, about 0.2 mile W of Fish Rock.

Care must be taken when anchoring in order to avoid Fish Rock and Creek Rock and the shore bank close SW of the anchorages.

Port Clinton to Cape Townshend

5.55 Between Port Clinton and Reef Point, about 15 miles NNW, the high rugged coast trends in that direction and is indented by a number of small bays and inlets. Hills rise abruptly from the coast and a mountain range parallels the shore about 5 miles inland.

Caution.—Mariners are advised of the existence of the Shoalwater Bay Military Training Area. The waters within this area are closed to the public during the conduct of defense exercises; closures will be advised by Notice to Mariners. However, all creeks within the are a permanently closed to public access. Shelter from storms or tempests may still be sought at Freshwater Bay, Port Clinton and Pearl Bay.

Pearl Bay (22°25'S., 150°42'E.) lies about 5 miles NNW of Port Clinton. The bay is entered between the S entrance point and a point 5 miles NW. Prominent patches of sand are located 0.5 and 1.5 miles W of the S entrance point to the bay. A group of islets, with shallow water between them and the mainland SW, extends 1 mile NW from the S entrance point to Pearl Bay. Depths of less than 5.5m extend 1 mile E from the middle of the bay.

The Hervey Islands consists of two groups of rocks and islands. The S group lies 1.7 miles N of the S entrance point to Pearl Bay. The Clara Group, the N group, lying 3 miles NE of the N entrance point to Pearl Bay, consists of three islets and a number of rocks.

The S group is comprised of **Dome Island** (22°25'S., 150°45'E.), Split Island, and a number of rocks.

Tides—Currents.—The flood current sets NW at a rate of 1.5 to 2 knots past the Hervey Islands; the ebb current sets SE.

Anchorage.—Anchorage may be obtained, in depths of 6 to 13m, 1.5 miles WSW of Dome Island.

5.56 Island Head (22°20'S., 150°40'E.), an island, lies 3

miles W of the Clara Group. Island Head Creek extends 7 miles S from its entrance and is obstructed by rocky shoals. Small craft, with local knowledge, may enter the creek by keeping close to the S shore.

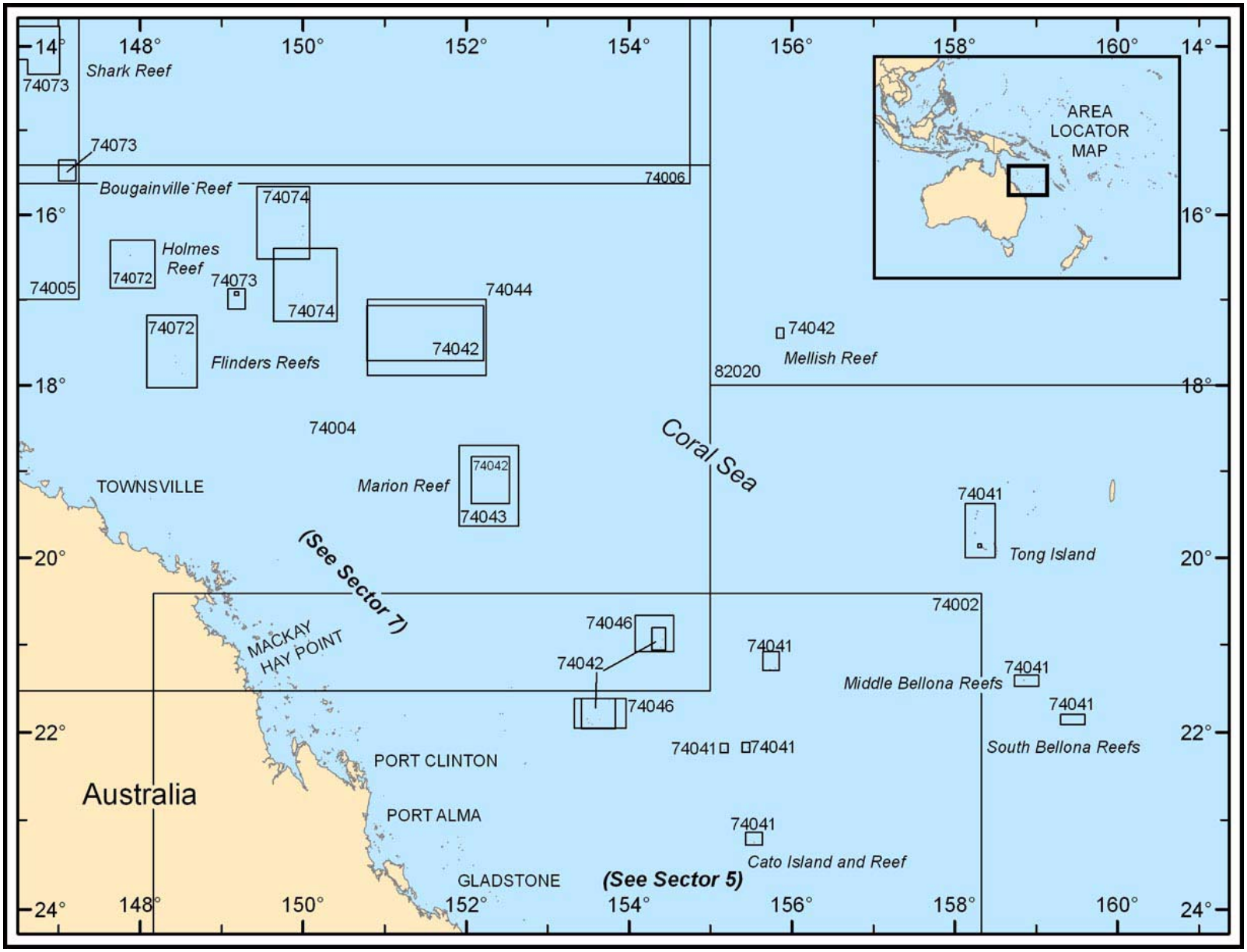
Reef Point lies on the S side of the E entrance of Strong Tide Passage. This reef-fringed point rises abruptly to the peak of Mount Westall, about 2.7 miles to the S.

Secure anchorage, out of the tidal currents and sheltered from SE gales, may be obtained, in depths of 7 to 16m, 1 mile NW of **Pinetrees Point** (22°20'S., 150°38'E.).

Strong Tide Passage (22°20'S., 150°32'E.) may be entered between Reef Point and the SE end of Townshend Island, about 1 mile to the N. The passage trends about 5 miles SW into Shoalwater Bay. There are depths of not less than 5.5m in the channel, but the W end is obstructed by a bar with a least depth of 3.6m.

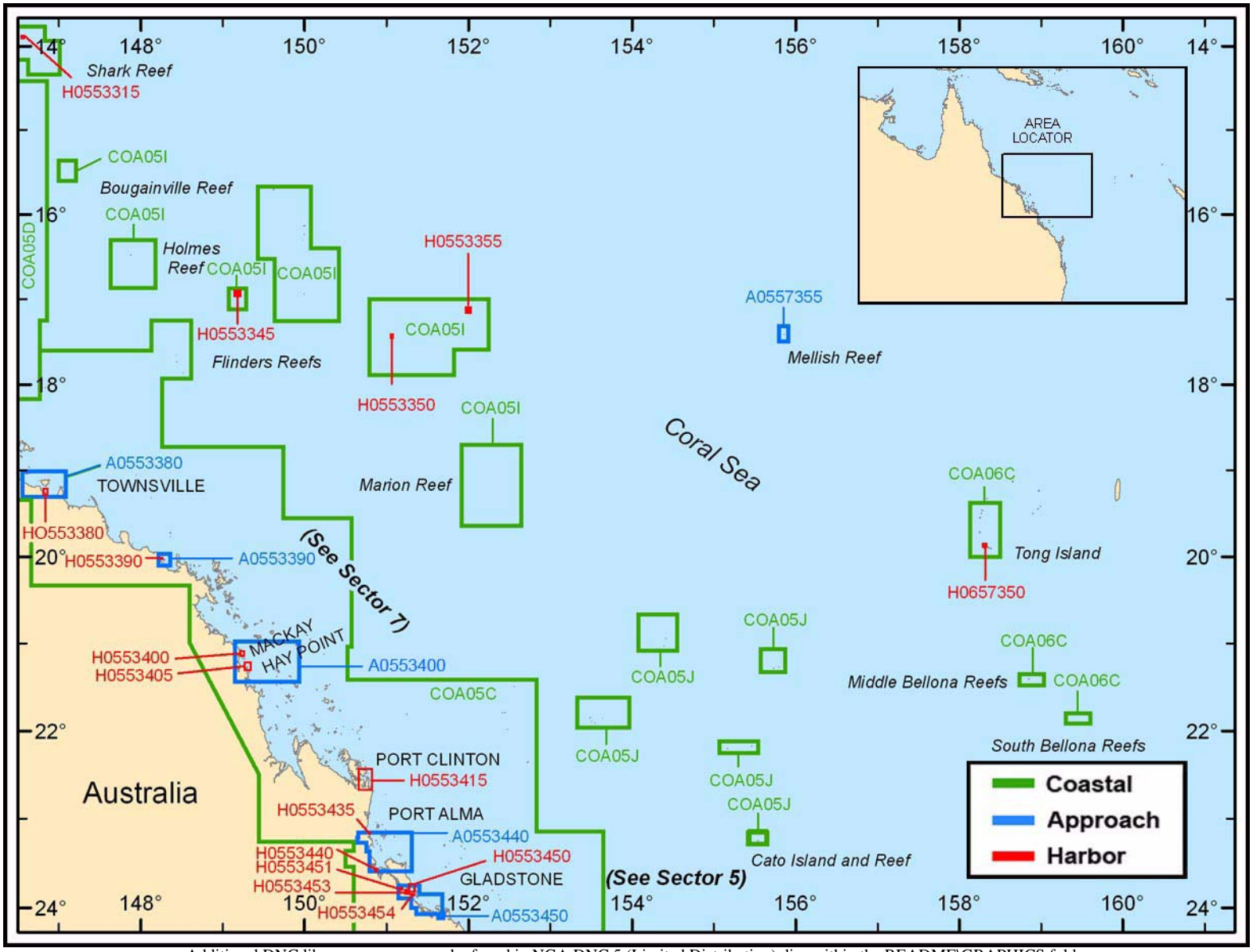
The tidal currents attain a rate of 5 to 6 knots in the passage, and the ebb current causes strong overfalls which break at the E entrance. This dangerous passage is not recommended for any vessel.

Townshend Island, on the NW side of Strong Tide Passage, is high, level, and sparsely wooded. Cape Townshend forms the N extremity of the island. The cape marks the SE entrance to Broad Sound Channel. Raynham Island lies 2.5 miles NW of the SE extremity of Townshend Island. Cape Islet, a rock, lies W of Cape Townshend, and is connected to it by a rocky ledge at LW. A drying rock was reported (1990) to lie 0.9 mile W of Cape Townshend.



Additional chart coverage may be found in NGA/DLIS Catalog of Maps, Charts, and Related Products (Unlimited Distribution).

SECTOR **6** — CHART INFORMATION



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SECTOR 6 — DNC LIBRARY INFORMATION

SECTOR 6

AUSTRALIA—CORAL SEA—ISLANDS AND DANGERS

Plan.—This sector describes the islands and dangers in the Coral Sea. The arrangement is from S to N and from W to E.

General Remarks

6.1 The Coral Sea lies between the E coast of Australia, on the W, and New Caledonia and the New Hebrides, on the E. The S limit is the parallel of 30°S; the N boundary is approximately the S extremity of the Solomon Islands and the S coast of the E part of New Guinea. Numerous islands, reefs, and sunken dangers, many of which have not been closely examined, are found in the Coral Sea. In general, the many islands in this area are not inhabited, but some of the islands and reefs are visited by local fishermen. There are some anchorages off the leeward sides of some of the reefs.

The charts of the Coral Sea should be referred to by vessels using the Outer Route from the parallel of Sandy Cape, N to Torres Strait. Vessels proceeding N should cross the above parallel at about the meridian of 157°E.

All vessels are cautioned to exercise extreme care in navigating in the vicinity of the reefs and other dangers in the Coral Sea. The usual set of the current is to the W, but it may be deflected or accelerated in the immediate vicinity of the reefs and dangers. Some areas of the Coral Sea have only been partially examined.

Winds—Weather.—The Southeast Trades are the prevailing winds between the parallels of 20°S and 25°S west of the meridian of 155°E, however, winds from the N and NW are common from September to December, and winds from the SW are common from May to August. Gales occur monthly from January to August W of the meridian of 155°E; and on an average of 3 or 4 days per month E of the meridian of 160°E. This frequency is somewhat less from September to December.

Between the parallels of 15°S and 20°S, the Southeast Trades are steady, and are fresh to strong. West of the meridian of 150°E, the Northwest Monsoon may occur in January. Gales are infrequent during the greater part of the year, but from June to August a SE gale occurs on an average of about 1 day a month, W of the meridian of 150°E, and on an average of 2 or 3 days per month farther E. Nearly all of these gales occur while a well-developed anticyclone is crossing the N part of Australia.

The Southeast Trades are very persistent N of the parallel of 15°S during the months of March to November and are often fresh and strong. In December, they have a tendency to weaken and are sometimes replaced by light NNW or W wind. In January and February, N and NW winds are about as frequent as the Southeast Trades. As a general rule and apart from brief squalls, gales do not occur on an average of more than one day a year N of the parallel of 15°S. Those which do occur are generally associated with tropical storms.

Tides—Currents.—Little is known of the currents in the Coral Sea except that they are variable and have a tendency to set in a NW or W direction towards Torres Strait. In the vicinity of certain reefs in the Coral Sea, currents are sometimes deflected and their rate is often increased. These currents are referred to later under detailed descriptions of the reefs.

Along the Outer Route, little or no current is generally experienced until within 50 or 60 miles of the Great Barrier Reef in the direction of Torres Strait. In this area, a NW set becomes evident and increases in strength as the edge of the reefs is approached. The current tends to set N within 10 miles of the outer edge of the reefs, and its rate depends to a great extent on the strength and direction of the wind.

Pilot Charts for the South Pacific Ocean should be consulted for the average current conditions of the Coral Sea area.

South Part of Coral Sea—South of Marion Reef

6.2 **Cato Island** (23°15'S., 155°32'E.) is a small oval-shaped island and lies about 152 miles NE of Sandy Cape. The island is 5.8m high and formed of coral grit. An automatic weather station, with two radio masts and a silver-painted hut, stand on the NE end of the island. The island is almost entirely surrounded by reefs. There are three narrow boat passages through the reefs on the N side of the island. The best entrance is the center entrance, located 0.2 mile N of the E end of Cato Island, and has a conspicuous rock at half tide on its E side; leading marks, in line bearing 154.5°, lead into the entrance channel which is well defined. In 1989, this entrance was reported to lie almost 0.2 mile W of its charted position. The island lies on the W end of an oval-shaped reef enclosing a lagoon. The lagoon contains numerous coral heads. The sea breaks over the reef in all types of weather. The reef lies on Cato Bank and is steep-to on all sides. It has been reported the NW side of Cato Bank extends farther W than charted.

Hutchison Rock (23°15'S., 155°36'E.), with a depth of 5.5m, lies 2.5 miles E of Cato Reef. Danger Patch, coral rocks, with depths of less than 18.3m, lie near the outer end of the E ledge of Cato Bank. A tidal race is found between the E end of Cato Reef and Danger Patch. Tidal currents attain a rate of 1 to 3.5 knots during SE winds.

Anchorage.—The only suitable anchorage lies off the N side of Cato Reef, in a depth of 29m, coral grit, with the E end of Cato Island bearing 189°, distant 0.6 mile.

6.3 **Wreck Reefs** (22°11'S., 155°20'E.) lies with their W extremity about 66 miles NNW of Cato Island and consists of a narrow chain of reefs and several cays which cover an area of about 18 miles, W to E. The sea always breaks over the cays. Bird Islet, the E cay, is the only one known to produce vegetation. The wrecks contained within this area lie within a historic wreck site and are protected from unauthorized interference.

The passage between **Bird Islet** (22°10'S., 155°28'E.) and a reef 2.5 miles WSW has depths of 18 to 33m. This reef was reported to lie 0.5 mile SW of the charted position; a small reef, 1 mile in diameter, lies 0.5 mile W. A reef is reported to extend 0.8 mile NW of Bird Islet.

Anchorage.—Anchorage may be obtained off the N side of the reefs, in depths of 18 to 37m, but the bottom is very uneven. Without local knowledge the area should be avoided. Anchorage may also be obtained, in depths of 26 to 31m, about 1 mile WNW of Bird Islet.

6.4 Porpoise Cay, about 27m high, lies 6.2 miles W of Bird Islet in the center of a shallow lagoon surrounded by a reef. The reef partially uncovers at LW.

West Islet (22°12'S., 155°10'E.), 1.8m high and bare, lies near the middle of the SE of three detached reefs at the W end of Wreck Reefs. A below-water reef lies 0.5 mile SE of the reef surrounding West Islet, with depths of 7.3 to 11m between them.

Landing can be made on the NW end of West Islet. It should be approached from the NW, following the shortest route across the reef taking care to avoid the coral heads.

Tides—Currents.—In the vicinity of Wreck Reefs, the tidal current sets SW during the rising tide and NE during the falling tide at a rate of about 1 knot. The tides rise about 1.8m in the area of Wreck Reefs.

Caution.—A bank, with depths of 25.5m, was reported to lie 68 miles E of Bird Islet,; a depth of 16.5m was reported to lie 76 miles ENE of the same islet. Reported depths of less than 200m indicate the presence of a ridge extending NNE from the 25.5m patch toward Selfridge Bank. A depth of 18.3m was reported 59 miles ENE of Bird Islet.

Kenn Reefs

6.5 **Kenn Reefs** (21°16'S., 155°48'E.) consists of four separate reefs, and lies with Southwestern Extreme, the W end of the SW reef, 56 miles NNE of Bird Islet. The W side of the reefs forms a bay with depths of 9.1 to 68m, coral, sand, and rock, outside which the depths increase suddenly to more than 183m. All the reefs dry at half-tide, and the sea breaks over all of them except for the SW reef.

The Southwestern Extreme (21°17'S., 155°43'E.) has a conspicuous boulder, 1.8m high, on its NE side, which from a distance appears as part of a wreck. Landing can be made on the SW side of the reef. An exposed wreck lies on the S side of the reef. The reef is steep-to except on its N side, where it is fringed by below-water rocks. The SW reef is separated from the largest reef by an opening, 1.7 miles wide, which is unsafe for other than small vessels, owing to foul ground with depths of 7.3 to 9.1m in the middle of the fairway.

Eastern Projection (21°15'S., 155°50'E.) lies at the elbow of the SE and largest reef, and on it lies High Reef Stone, a large boulder. There are two sand cays on the SW part of the reef.

Anchorage.—Anchorage may be obtained, in a depth of 24m, 1.2 miles WNW of Observatory Cay, but care must be taken to avoid the below-water rocks in the vicinity.

The N reef encloses a shallow lagoon, which is entered on its W side near the S end. High Reef Stone and some other boulders lie close inside Northwestern Extreme, the N end of Kenn Reef. There is a channel, 2.5 miles wide between the N reef and the reef S of it, with depths of 18 to 60m.

Anchorage may be obtained, in depths of 37 to 44m, coral and sand, 0.5 mile SSW of Northwestern Extreme.

Saumarez Reefs

6.6 **Saumarex Reefs** (21°48'S., 153°42'E.) consists of three main reefs and numerous smaller reefs.

Northeast Cay (21°38'S., 153°46'E.), a small sand cay lying near the N extremity of Saumarez Reefs, is located about 86 miles NNW of West Islet of the Wreck Reefs. This 2.4m high cay, which is enclosed by a coral reef, with an opening on the SW side, is the northernmost of the Saumarez Reefs. A light, from which a racon transmits, is shown from the N edge of the cay. A clear channel, about 1.2 miles wide, lies between Northeast Cay and the next reef to the S.

Southeast Elbow (21°55'S., 153°35'E.), located about 20 miles SSW of Northeast Cay, forms the SE extremity of Saumarez Reefs. A conspicuous stranded wreck lies about 5.2 miles NE of Southeast Elbow. The wreck was reported to be a good radar target up to 19 miles. Three reefs lie between 0.5 to 4.2 miles WNW of Southeast Elbow. These small reefs are separated from each other by unsurveyed channels with widths of 0.5 to 1.2 miles.

Southwest Cay (21°50'S., 153°30'E.), enclosed by a reef, 6 miles NW of Southeast Elbow, is the westernmost above-water part of the Saumarez Reefs, and is 2.4m high. There is a channel, 2.2 mile wide, with depths of 27 to 46m, between the cay and the reef SSE.

Anchorage.—Recommended anchorages are 1.7 miles NW of Southeast Elbow, in a depth of 40m, and 2 miles E, 0.7 mile N, and 0.7 mile W, respectively, of Southwest Cay, in depths of 37 to 49m. Anchorage can also be taken about 0.7 mile N of Northeast Cay, in depths of 31 to 59m.

Fredrick Reefs

6.7 **Observatory Cay** (21°02'S., 154°23'E.), located about 50 miles NE of the NE extremity of Saumarez Reefs and 75 miles W of the NW extremity of Kenn Reefs, lies near the S end of **Frederick Reefs** (20°58'S., 154°24'E.). The reefs enclose a U-shaped body of water, known as Anchorage Sound, which is protected on all sides except the N.

Observatory Cay is 1.8m high; landing is possible on its N side through a boat channel which leads from NE through the reef. As the cay lies near the S edge of the reef, the surf sometimes breaks over it in heavy gales. In 1983, it was reported that Observatory Cay lay about 0.5 mile W of the charted position.

In 1990, it was reported that Observatory Cay is the only one of five cays on the S reef which does not cover.

A solitary remarkable leaning rock, 1.2m high, lies on the W extremity of the S reef, 1.5 miles WNW of Observatory Cay.

From Observatory Cay the S reef extends NE and N for 3.5 miles. Off the SE side of this reef the bottom was reported to have been seen at a distance of 1 mile from the reef, but no soundings were obtained. The inner edge of the reef, which is always covered, has some below-water patches lying 0.5 mile off it.

Danger Ridge (21°00'S., 154°21'E.), which is narrow, lies between the rock on the W end of the S reef and Ridge Rock, on which the sea always breaks. There are general depths of 9.1 to 12.8m over the ridge, but below-water dangers lie on the S end of the ridge, and near its middle. This passage should not be attempted.

North Reef Extreme, the N reef, is located with its S extremity about 1.7 miles N of the NE extremity of the S reef. It is about 1.5 miles long and about 0.5 mile wide. A small cay, from which Frederick Reef Light is shown and a racon transmits, is situated on this reef about 0.5 mile N of its S extremity. Landing can be effected on the W side of the reef.

There is clear passage between the N and S reefs, with general depths of 11 to 16.5m. Tide rips occur across the passage.

Anchorage.—Anchorage can be taken in Anchorage Sound, in depths of 18.3 to 31m, coral and sand. This anchorage is sheltered to the E and S, and partially protected to the W by Danger Ridge.

Marion Reef

6.8 Marion Reef (19°05'S., 152°17'E.), located about 150 miles NW of Frederick Reefs, is somewhat circular in shape. The N, E, and S margins are marked by narrow coral reefs, on the outer edges of which the sea always breaks. The W side has three small isolated reefs. Long Reef forms the SE side and Wansfell Reef the SW side of the group comprising Marion Reef.

Carola Cay (19°06'S., 152°23'E.), 3.7m high, is located 2.5 miles S of the end of Long Reef, the SE reef of the group. From this cay the reefs curve to the N and W for about 15 miles and to the S, SW, and W for about 18 miles. Two partly examined openings lie in the NE part and one near the SW end of Marion Reef. A white tower, conspicuous on radar, stands on Carola Cay.

A shoal, with a depth of 3.7m, lies about 2.5 miles NW of the N end of Carola Cay.

Paget Cay (19°15'S., 152°21'E.), 1.5m high, lies on the S side of Long Reef in a position 7.5 miles SSW of Carola Cay. A reef, which is reported to be extending S, lies about 1 mile SW of Paget Cay. A wreck was reported to be 2 miles to the S of its charted position on the reef.

Brodie Cay, 3m high, lies on the SE end of Wansfell Reefs, which form the SW side of Marion Reef. The sea breaks over the N reef. The opening between Wansfell Reefs is foul and overfalls occur on the S side. Brodie Cay was reported to lie 1.5 to 2 miles SW of its charted position. There are depths of 20 to 30m in the entrance between Brodie Cay and the W end of Long Reef. Anchorage can be found, in 8m, 0.2 mile E of Brodie Cay.

Two reefs, over which the sea breaks, lie on the W side of the bank, 10 miles N and 14 miles NNW, respectively, of Brodie Cay.

A S set of about 2 knots on the E of the reef may be experienced. Tides rise about 1.5m in the vicinity of Marion Reef.

Mellish Reef

6.9 Mellish Reef (17°22'S., 155°51'E.) encloses a lagoon, with Herald's Beacon Islet (17°25'S., 155°52'E.) 2 miles NNE of its S end. The islet is a grass-covered sandy cay, 1.5m high. Another sand cay, 0.6m high, was reported to lie 2.7 miles NNW of Herald's Beacon Islet.

Mellish Reef, which is narrow and on which there are a few above-water rocks, dries 0.9m. The remains of stranded wrecks lie 2.5 and 3 miles NNW and 1.5 miles SSW of Herald's Beacon Islet. The sea breaks heavily over the E side of the reef, and slightly on other parts.

The lagoon within the reef has irregular depths of 1.8 to 14.6m, with below-water patches, the greater depths being N of Heralds Beacon Islet. The entrance to the lagoon is through a small boat passage, 0.3 mile SSW of the islet.

Anchorage.—Anchorage may be obtained in an emergency by vessels of moderate length, in a depth of 47m, 0.8 mile WSW of Herald's Beacon Islet, but the depths decrease rapidly towards the reef. The anchorage should be approached with the center of the islet bearing 065°, but caution is necessary as the rocks and shoal patches are not easy to see. Discolored water has been seen in the close proximity of the charted position of the anchorage.

Bellona Reefs

6.10 South Bellona Reefs, located with **West Point** (21°52'S., 159°25'E.), the W extremity, about 230 miles ENE of Cato Island, is formed by two reefs, which dry about 1m, and a detached cay. The cay lies on a drying reef which has a boat entrance on its W side; in 1988, this cay was reported to be non-existent. There are some below-water rocks off the SE and NW sides of the reef.

Nigger Head Rock, 0.6m high and prominent, lies on the NE end of the E reef, and is an unusually large, black coral rock. There is a depth of 24m in the fairway between the sand cay and the rock.

The E reef encloses a lagoon with many drying heads in its SW part, but there appears to be no entrance to the lagoon. The W reef, which also encloses a lagoon, is separated from the E reef by a channel, 0.5 mile wide, with a depth of 12.8m in the fairway. Several below-water rocks lie up to 0.5 mile off the N side of the reef, and some off West Point, the W end of the reef. A beacon stands on the reef.

A 24m ridge of foul ground, marked by overfalls, lies 3.5 miles NW of West Point; a depth of 11m lies 7 miles farther NW. A depth of 26m was reported to lie 6.5 miles N of Nigger Head Rock.

Anchorage.—There are regular depths of 37 to 51m, coral sand, off the N side of the reefs, which affords anchorage sheltered from S and SE winds.

Middle Bellona Reefs (21°25'S., 158°25'E.) consists of three reefs, the E of which lies 37 miles WNW of South Bellona Reefs, with navigable openings between. The E reef, which dries 0.9m, encloses a lagoon. The sea always breaks over the reef.

Observatory Cay (21°24'S., 158°51'E.), a bright coral sand cay, 2.1m high, lies near the NW end of the middle reef, which dries 0.9m and encloses a lagoon. There is a boat entrance on the N side of the reef.

Western Breaker, 5 miles W of Observatory Cay, is a group of steep-to below-water rocks, over which the sea breaks, but only at long intervals. Western Breaker is dangerous as it lies so far from the main reefs and in the direction of passing vessels.

Anchorage.—Anchorage may be obtained, in a depth of 20m, coral, sand and rocks, 0.5 mile N of Observatory Cay.

Northwest Bellona Reef (20°52'S., 158°28'E.) is about 5 miles long, 1 mile wide, and dries about 1m. The reef is steep-

to on its W side. There are a number of black coral rocks on the reef. A patch, over which the sea breaks, lies 2.5 miles NW of the reef.

Olry Reef (21°26'S., 159°34'E.) lies on the SE side of the Bellona Reef Plateau.

Noel Bank (20°32'S., 158°34'E.) lies at the NW end of the Bellona Reef Plateau.

Booby Reef (21°01'S., 158°34'E.) lies 6 miles S of Northwest Bellona Reef. The reef, which dries 1m and on which the sea always breaks, extends about 7 miles NNW and is about 1 mile wide. The reef has some below-water patches off its SE end, and a below-water rock, 1 mile N of its NW end. There are some black coral rocks on the S side of the reef. The tidal current off the reef sets SW and NE, at a rate of 1.5 to 2 knots.

Anchorage.—Anchorage may be obtained, in a depth of 8m, 0.2 mile off the NW end of the reef. Care must be taken to avoid the below-water rock, 1 mile N of the reef.

Minerva Shoal (20°55'S., 159°22'E.), with a least charted depth of 14.6m, lies 46 miles E of Bellona Shoal. Shallower depths were observed SW of Minerva Shoal. A small drying reef lies about 20 miles WNW of Minerva Shoal. A reef, 1 mile in diameter, which never covers, lies about 10 miles NW of Minerva Shoal. A below-water rock lies 33 miles ENE, and a 9.1m rocky patch lies 40 miles NE, respectively, of Northwest Bellona Reef. Between the last two shoals mentioned above, and the charted 200m curve 32 miles W, there is dangerous ground, which has not been surveyed.

Chesterfield Reefs

6.11 Chesterfield Reefs, with Loop Islet (19°58'S., 158°28'E.) near their S end, consists of three narrow reefs which extend 9 miles N and 27 miles NW, respectively, from South Elbow, their S extremity.

South Elbow (19°59'S., 158°29'E.), on which there is a meteorological station, is well marked by Loop Islet, a flat, tufted islet, 3.4m high, just inside the reef. The inner edge of the reef extending N from South Elbow is bordered by numerous shoal patches, some of which are steep-to.

The **Anchorage Islets** (19°54'S., 158°28'E.) are a group of islets on the inner edge of the reef, 5 miles N of Loop Islet. An isolated underwater dangerous rock lies 1.2 miles NNW of Loop Islet. The third islet from the N, the highest, is 11.6m high. The islets and dry sand cays on the reef add to its elevation, and form a natural breakwater from E. There are numerous wrecks on the islets.

Anchorage.—There is good anchorage in convenient depths inside Chesterfield Reefs in the SE part, sheltered from N through E and S through W. The chief precaution in anchoring is to select a sandy area on which to anchor with swinging room, between the below-water coral patches.

The greater part of this area inside the reefs has regular depths of 37 to 53m, but on the E side numerous steep-to patches have been seen. A below-water reef, dark in color and difficult to discern, and dangerous even to boats, lies 5 miles W of the highest of the Anchorage Islets. A number of other patches have been reported inside the reef and can best be seen on the chart. The positions of the patches are approximate.

The best anchorage is 0.5 mile W of the highest of the Anchorage Islets.

6.12 **Passage Islet** (Bennett Islet) (19°55'S., 158°22'E.), 12.5m high, lies 7 miles NW of South Elbow, 0.2 mile SE of the narrow passage from which it takes its name. The passage is 0.2 mile wide, with a depth of 14.6m in the center of the fairway. Several sand cays lie on the reef SE of the islet. A strong 3 knot tidal current sets through it in a S or N direction.

From the above passage, the SW side of the reef extends 4.5 miles NW, and close within the NW end is Long Island. Three small low islets lie on the reef between the passage and Long Island. Shoals, with depths of 2.1 to 2.7m, lie 0.1 mile off the reef on the NE side of Long Island.

Long Island (19°52'S., 158°19'E.), 6.1m high, is the largest of Chesterfield Reefs. A monument stands near the middle of the NE side of the island; a small bush-covered cone stands on its NW end. A boat passage is available through the reef; in good weather boats may pick their way past the dangers lying NE of the monument.

Anchorage.—Anchorage may be obtained, in a depth of 27m, 0.6 mile NE of the monument, or in 24m, 0.7 mile NNE of the monument on Long Island.

Long Island Passage (19°51'S., 158°17'E.), between Long Island and the S end of the W reef, is 2.5 miles wide. The S side of this passage has depths of 11 to 40m; the N side appears to be deeper.

From Long Island Passage, the W side of Chesterfield Reefs extends 14 miles NNW to Northwest Point and is steep-to on its seaward side. The reef encloses a lagoon at its S end, between that point and a sand cay 2 miles N of it. Farther N there are some small sand cays and boulders, mostly awash.

The Avon Isles

6.13 The **Avon Isles** (19°30'S., 158°15'E.), two in number, lie between Northwest Point (19°37'S., 158°13'E.) and the S end of Bampton Reefs, 9 miles N. The islets are 5.2m high and densely covered with stunted trees and grass.

The opening between Northwest Point and the S of the Avon Isles is 4 miles wide, with depths of 7 to 31m. The abrupt rise of this shelf or below-water barrier causes a remarkable tide rip.

The opening between the Avon Isles is 1.2 miles wide, with depths of 16 to 24m; the opening between the N islet and the S end of Bampton Reefs is also 1.2 miles wide, with a depth of 7.3m. The tidal currents in mid-channel between the Avon Isles set SW and NE, and can attain a rate of 2 to 3 knots.

Bampton Reefs

6.14 **Bampton Reefs** (19°18'S., 158°40'E.) form a bank which extends N from Chesterfield Reefs, the E limits of which have only been partially examined. West Bampton Reef, a narrow barrier, extends 35 miles NNE from the Avon Isles to North Elbow. An underwater rock lies about 3 miles W of North Elbow.

The barrier is low, with groups of boulders, and some rocks, 1.8m high, which when first seen on the horizon have the appearance of sailboats. The rocks are conspicuous at a distance of 6 to 8 miles, although if there is no swell breaking on the barrier, they may not be seen until dangerously close. Small sand cays can also be seen on the S part of the barrier, which

also serves to indicate the leeward part of the reefs.

Bampton Island (19°07'S., 158°36'E.), located about 14 miles ESE of North Elbow, is of small extent and about 5.2m high. A fringing reef extends 0.2 mile from its E side and up to 150m from the remaining sides. A sand cay, located 2 miles W of Bampton Island, lies on the E edge of a small reef which has an opening on its W side.

Depths of 31 to 73m are found in the channel between the island and the cay, but to the N they increase rapidly. The area S of Bampton Island, for a distance of about 2 miles, has an average depth of 48m, but has only been partially surveyed.

North Bampton Reef (19°03'S., 158°43'E.) lies with its W extremity 3 miles SW of Bampton Island and extends about 20 miles ENE to NE Cay. It extends E about 8 miles and curves slightly to the N near its center. On the E extremity of this reef is a small sand cay. A passage, 2 miles wide and having general depths of 12.8 to 25.5m, lies E of the cay, between it and the S extremity of another reef.

The last mentioned narrow reef extends about 7.5 miles N and consists of broken patches. It terminates in an elbow at the N extremity of Bampton Reefs; from the elbow the same reef trends 8.5 miles in a S direction. A horseshoe-shaped reef lies 2 miles E of the SE end of the reef.

Northeast Bampton Reef (19°06'S., 159°03'E.) lies with its NW end 1 mile SE of the above horseshoe-shaped reef. The reef extends 2.7 miles SE, and then turns sharply for the same distance SW, forming an elbow. Three small cays lie on the N part of the reef; another small cay lies on the elbow.

Reynard Island (19°14'S., 158°58'E.) is 6.1m high, bush-covered, and fringed by a reef except on its W side. Southeast Bampton Reef lies with its N end 3.5 miles SSE of Reynard Island and extends 10 miles S. There are drying sand cays on the reef.

Skeleton Cay (19°27'S., 158°57'E.) is a coral patch with a sand cay in its center.

Anchorage.—Anchorage may be obtained, in depths of 11 to 18m, 1 mile SW of Bampton Island.

Fair anchorage has been obtained, in a depth of 25m, coral, within the reef, 2.2 miles W of the sand cay on the elbow of Northeast Bampton Reef. Foul ground extends 1.5 miles W from the elbow.

Anchorage may be obtained off the NW or W side of Reynard Island, in depths of 16 to 26m, taking care to avoid a 2.7m rocky patch 1 mile W of the island. This patch is often seen from aloft.

Nereus Reef

6.15 **Nereus Reef** (20°07'S., 160°28'E.) is reported to have a depth of 3.7m. Its position is doubtful. A shoal, with a depth of 16m, lies 14 miles WNW of Nereus Reef. A depth of 46m was reported to lie midway between them.

Two shoals were reported to lie 89 miles ENE and 82 miles NE, respectively, of Nereus Reef.

North Part of Coral Sea—North of Marion Reef

Lihou Reef and Cays

6.16 **Lihou Reef and Cays** (17°22'S., 151°45'E.) are located with their SW extremity about 90 miles NW of the N extremity of Marion Reef. The reefs and cays extend about 56 miles NE from their SW extremity. Surveys have been made of the SE side and the NE end of the group. A bank, with depths of less than 200m, approximately 12 miles wide, was reported to extend the whole length of the reef on its NW side.

It has been reported that between the SW end of Lihou Reef, and a sand cay, 20 miles NNE, there appeared to be no visual signs of reefs or discolored water. A cay on a reef (17°36'30"S., 151°25'00"E.) was reported to give a response on radar at 11 miles. The NW side of the reef, between the sand cay and Observatory Cay, appeared to be as charted.

From the SW extremity, the barrier consists of a chain of reefs which extend in an ENE direction for about 40 miles to the reef forming the W side of Herald Passage. About eight cays lie on the barrier; there are several openings between the reefs which have not been examined. One of the cays lies about 6 miles WSW of the W side of Herald Passage and is about 2.4m high. A stranded wreck lies on a reef about 4 miles NE of Herald Passage.

Herald Passage (17°24'S., 151°58'E.) is 1.5 miles wide, with a ridge with depths of 7.3 to 9.1m. Inside the ridge there are depths of 37 to 55m. From the entrance to Herald Passage, the reef extends 18 miles NE, and then 9 miles W to Turtle Islet, forming a horseshoe bend. Within the bend the area has not been closely sounded, but there are depths of 27.5 to 55m, and patches with depths of 4.6m.

Observatory Cay (17°08'S., 152°06'E.) is 1.8m high and covered with vegetation. Landing can be made on the W side of the cay. From the cay a chain of reefs, with deep water close inside them, extends 15 miles W and then 5 miles SW, and continue in that direction along the NW side of Lihou Reef. There are several prominent sand cays between Observatory Cay, and Turtle Islet, 4 miles W, none of them more than 1.8m high. A white hut and a tower, 14m high, are conspicuous on Turtle Islet.

Anchorage.—Anchorage was reported within the SW end of Lihou Reef, where there are depths of 14.6 to 51m, and also in the entrance to Herald Passage, in a depth of 8m. Anchorage may be obtained, in a depth of 27.5m, 0.7 mile S of Observatory Cay, with shelter from the swell.

The Diamond Islets

6.17 The **Diamond Islets** (17°25'S., 151°00'E.), four in number, lie about 20 miles NW of the SW extremity of Lihou Reef and Cays. They have broad sandy beaches and are covered with low trees and bushes. Central Diamond Islet lies in position 17°27'S, 150°56'E; the other three islets lie 8 miles E, 9 miles W, and 15 miles SSW, respectively, of it. Shoal depths of 9.1 and 10.9m were reported to lie 18 miles WSW and 13 miles W of West Diamond Islet.

East Diamond Islet is 8m high, with a reef extending 1.5 miles N and 1 mile elsewhere around its perimeter. Central Diamond Islet is 7.6m high, and surrounded by a reef similar to the above reef. West Diamond Islet is 6.1m high, with a reef extending 0.7 mile all around. South Diamond Islet is 21.5m high and surrounded by a reef 0.7 mile all around. A shoal was reported to lie about 4 miles W of Central Diamond Islet.

Tregrosse Reefs (17°47'S., 150°37'E.), two small drying

reefs, lie 7 and 14 miles SW of South Diamond Islet, close inside the SE edge of a bank. Two below-water rocky patches lie 4 miles WNW and 7 miles W, respectively, of the SW part of Tregrosse Reefs. The area comprising the Diamond Islets and Tregrosse Reefs has only been partially examined.

Abington Reef (18°05'S., 149°37'E.) is nearly awash. The reef is steep-to all around at a distance of 1 mile. Malay Reef, 18 miles WNW of Abington Reef, is difficult to see, not clearly defined, and not steep-to. There is no discoloration of the water and no line of breakers, which is typical of the reefs in the area. The reef should be given a wide berth at all times.

The Coringa Islets

6.18 The **Coringa Islets** (16°58'S., 150°00'E.) consists of two small reef-fringed islets. **Southwest Islet** (16°57'S., 149°55'E.) lies at the SW extremity of the Coringa Islets in a position about 93 miles NW of the SW extremity of Lihou Reefs. Discolored water and foul ground extend up to 0.5 mile N from the N side of the islet. A depth of 8.2m lies in an approximate position about 1 mile SW of the islet.

Chilcott Islet is located about 4.5 miles ENE of Southwest Islet. It is fringed by reefs and foul ground to a distance of 0.7 mile. Both of the islets lie on drying reefs and are covered with bushes. Depths of as little as 7.3m lie up to 2.5 miles NE and 1.5 miles NNE of Chilcott Islet. A depth of 11.9m lies about 0.8 mile NW of Chilcott Islet; a depth of 6.2m lies 6 miles NE of the islet.

Southwest Islet was reported to lie 1 mile WSW of the charted position. The islet is infested with rats.

Anchorage.—Temporary anchorage may be obtained W of Chilcott Islet and NNW of Southwest Islet, 0.2 mile off the foul ground extending from the islets, but it must be noted that the depths increase very rapidly outside the anchorages.

6.19 **Magdelaine Cays** (16°36'S., 150°20'E.) consist of an islet and a sand cay. Magdelaine Islet, small and fringed by a reef, lies about 26 miles NE of Chilcott Islet. The islet is 9.1m high and covered with vegetation. The sand cay, located about 6 miles NNW of the islet, is reef fringed, and steep-to on all sides. Landing can be effected on the W side of the cay where there is a break in the reef, however, care must be taken to avoid the numerous coral heads in the approach.

In 1989, Magdelaine Cays were reported to lie 2 miles E of their charted position.

An 11m shoal, which has not yet been completely defined, lies 4 miles W of Chilcott Islet. It was reported that the charted soundings around the islet were incorrect. An unexamined depth of 11m lies 1 mile NW of the islet.

An unexamined depth of 16.7m lies 26 miles SE of Magdelaine Cays; depths of 20m and 25.6m lie 3 miles NE and 4 miles S, respectively, of the 16.7m depth.

A depth of 10m was reported to lie 13 miles NE of Chilcott Islet. A depth of 12m was reported to lie 12 miles WSW of South West Islet.

Herald Cays (16°56'S., 149°13'E.) are two in number. The NE cay lies 4 miles NE of the SW cay. The NE cay is 7m high and the SW cay is 4.6m high; both are covered with vegetation and lie on drying reefs.

Landings can be made on the NW side of both cays, through breaks in the reefs, but care must be taken to avoid the numerous coral heads in the approaches.

A shoal, with a depth of 14.6m, lies between the two cays, but it has not been examined; it is inadvisable to pass through the passage.

The Willis Islets

6.20 The **Willis Islets** (16°14'S., 150°00'E.) consists of three islets lying on the E and N edges of a bank with general depths of 24 to 49m.

South Islet (16°18'S., 149°59'E.) lies 38 miles N of Chilcott Island. South Islet, 6m high and covered with grass, lies at the N end of a reef, which dries 0.9m, and extends 1 mile S. Buildings, surrounded by palms, and three radio masts stand near the center of the island. A white radar dome atop a 20m lattice tower and a large ground level radar dome are conspicuous. Foul ground extends 0.7 mile W from the reef.

Mid Islet, 5.8m high, 4 miles NNE of South Islet, lies on the W edge of a reef, which dries 0.9m. Foul ground, with deep water between patches, extends 0.7 mile S, 1 mile SW, and 0.7 mile N, respectively, of Mid Islet.

South Passage (16°16'S., 149°59'E.), with depths of 12.8 to 37m, lies between South Islet and Mid Islet. This passage may be safely used with a good lookout aloft, passing midway between the islets. Tidal currents in the passage cause a dangerous overfall.

North Cay (16°09'S., 150°01'E.), a narrow sand cay, with a small cay W of it which dries, lies 5 miles N of Mid Islet. These sand cays lie on the NW part of a reef, which dries 0.9m, and over which the sea always breaks. North Cay Reef is fronted by foul ground extending up to 1.5 miles from the inner side of the S end of the reef.

The opening between Mid Islet and North Cay Reef is divided into two channels by a dangerous patch, on which there are several shallow shoals, some of which are awash and break.

North Passage (16°13'S., 150°01'E.), between the dangerous patch and Mid Islet, is 1.2 miles wide, with depths of 14.6m. Within the entrance, the depths increase and are irregular.

The channel between the dangerous patch and the foul ground, which extends S from North Cay Reef, is 0.6 mile wide. Apart from the single line of soundings on the chart across the entrance, it has not been surveyed.

Anchorage.—Anchorage may be obtained, in a depth of 49m, sand, 1 mile W of South Islet, and also in a depth of 46m, coral, 0.7 mile WNW of Mid Islet. Before anchoring leeward of the Willis Islets, a sufficient space of clear ground, which will best be seen from aloft, should be found. This should allow for swinging room and for getting underway, without fouling the coral rocks, which rise abruptly to near the surface.

Caution.—The Willis Islets have been reported (1991) to lie 2 miles W of their charted position.

Diane Bank and Moore Reefs

6.21 **Diane Bank** (15°46'S., 149°43'E.), with a depth of 16.5m, lies near the N end of a bank with general depths of 22 to 51m, which extends 33 miles S. Depths of 14.6 to 18.3m lie close inside the S end of the bank. A sand cay, 3m high, lies

close inside the NW end of the bank. Depths of less than 18.3m are reported to extend at least 3.5 miles NE from the sand cay.

Unexamined depths of 4m and 15m lie 1 mile SW and 2 miles ENE of the sand cay.

Moore Reefs (16°00'S., 149°09'E.), three coral reefs awash, lie 32 miles WSW of Diane Bank. There are two sand cays on the N reef; one is 2.4m high while the other dries 0.9m. Both reefs are steep-to.

A reef lies 24 miles WSW of Diane Bank; a 3m shoal was reported to lie 3 miles WNW of this reef. Numerous sharks have been sighted in this vicinity.

A depth of 22m lies 15 miles SSW of South Islet.

Flinders Reefs

6.22 Flinders Reefs (17°35'S., 148°24'E.) consists of two main groups and several adjacent reefs and shoal patches. The S reef (17°55'S., 148°30'E.) of the S group lies with its S extremity about 220 miles WNW of the N extremity of Marion Reef. These reefs have only been partially surveyed.

It has been reported that the positions of Dart Reef, North Reef, and Herrald's Surprise lie 1 to 2 miles further N than charted.

South Flinders, the smaller S complex, is 8.5 miles long and 4 miles wide, lying SE-NW. The SE end of this S group is a semi-circular reef, 4 miles wide, opening to the NW, which dries in places with deeper water between. Rocks, both submerged and drying, extend 0.5 mile from the inner edge of this reef.

Channel Reef, which dries, is the N part of South Flinders group. In the center of the reef is a drying sand cay.

Entrance Reef (17°49'S., 148°25'E.), which dries, and lies 2 miles S of Channel Reef and 1 mile SSE of the W reef, is the SW limit of the group. A patch of shoal water lies midway between Channel Reef and the W reef; it is reported that deep water lying either side of this patch is the preferred entrance into the lagoon contained within the group of reefs.

North Flinders Reef is a large group of reefs and shoal water, 21 miles N-S and 17 miles E-W, which enclose a lagoon. At the SE corner of the group is **East Ribbon Reef**(17°40'S., 148°35'E.), which is narrow, curving, and 11 miles long. A sand cay was reported (1978) to lie on the N part of this reef.

Toe Reef (17°42'S., 148°31'E.) lies 0.8 mile W of the SW point of East Ribbon Reef, with foul ground between. Main Cay Reef lies 2 miles W of Toe Reef. Cod Reef, awash, lies 2.5 miles W of Main Cay Reef.

Victoria Cay (17°44'S., 148°27'E.) is a 2m high sand cay that lies on Main Cay Reef. An automated weather station, consisting of instruments, aerials, and a 15m high radio mast, stands on the NW side of the cay.

South West Reef(17°43'S., 148°21'E.) lies awash and clearly visible, is the SW extremity of the N group of Flinders Reef and it is separated from Cod Reef by a 1 mile wide passage that is fouled by a number of coral heads. A boulder, 1m high, lies on the W edge of this reef. Breakers on this reef were seen at 3 miles (1990).

Mid Reef (17°35'S., 148°20'E.), awash, lies 7 miles N of South West Reef. Unexamined shoals lie 2.7, 4, 5.3, and 6.5 miles N of the boulder on South West Reef.

6.23 North West Reef (17°31'S., 148°18'E.), awash, is the W edge of the N group of Flinders Reef. An unexamined shoal lies 1.2 miles SE of North West Reef on the edge of the bank. There are apparently several obstructions lying between this shoal and Mid Reef, 2.5 miles SSE.

Anchorage may be obtained 1 mile SW of the N end of East Ribbon Reef, in depths of 42 to 48m; a good lookout is essential. A reef, which dries 0.5m, and a coral head, 0.1m, lie 1 mile SSE and 0.9 mile S, respectively, from this anchorage.

Another anchorage lies 5 miles SSW of the above anchorage. A single line of soundings leads to this anchorage, and a good lookout from aloft must be kept as this course leads close E of a drying patch midway between the two anchorages. Another drying patch lies 1.2 miles ENE of the S anchorage, and two more patches lie 3 miles WSW of it. A shoal, with a depth of 6.1m, was reported in position 17°24'S, 148°54'E.

North Reef (17°27'S., 148°20'E.), which dries 0.9m, lies close inside the NW edge of the main bank.

Anchorage.—Anchorage may be obtained 0.5 mile W of North Reef, in a depth of 46m.

6.24 The N danger of the group of Flinders Reefs is a bank (17°24'S., 148°25'E.), with depths of less than 15m. The passage between North Reef and this bank is clear. From seaward, depths rise steeply from 400m to less than 60m and deepen very slightly.

The edge of the main bank between the N danger and the N point of East Ribbon Reef, 10.5 miles SSE, has not been delineated but appears to be clear. Depths of less than 30m are indicated 5.5 miles NNW from the N point of East Ribbon Reef.

Dart Reef (17°24'S., 48°11'E.), a circular reef, about 2 miles in diameter, lies about 7.5 miles WNW of North Reef. The reef, which is steep-to, encloses a lagoon in which there are many rocky heads. There is an opening to the lagoon on the NW side of the reef. The reef is entirely covered at HW and in calm weather is not always visible.

McDermott Bank, with a least known depth of 22m, lies about 20 miles WNW of Dart Reef.

Herald's Surprise (17°20'S., 148°26'E.) lies 8 miles NE of North Reef and is circular in shape, with a diameter of about 2 miles. The reef, over which the sea breaks, dries in places, and is steep-to. Some above-water rocks lie near the NW edge of the reef.

In 1981, a shoal area 3 miles long and 1 mile wide, lying in a NE-SW direction, was reported to exist in position 17°24'18"S, 148°53'48"E, about 25 miles E of Herald's Surprise. The least known depth over the shoal is 4.9m.

Flora Reef and Holmes Reef

6.25 Flora Reef (16°45'S., 147°45'E.), lying about 50 miles NW of Herald's Surprise, was reported to have breakers on its S side where the reef is about 4.5 miles long. The SE extremity of the reef may dry at LW. Discolored water extends from the SW end of the reef.

Holmes Reef (16°28'S., 147°58'E.) lies with the S extremity of the W group of reefs, 13 miles NNE of Flora Reef, and consists of two groups, separated by a 3.5 mile wide passage which appears to be free of dangers. It is very deep N and S of the reefs. The E group of reefs is awash and encloses a shallow

lagoon, which is entered on its W side.

The W group of Holmes Reefs consists of three reefs, which dry in places. Only the S and N ends of the E reef, and the N side of the N reef, have been surveyed. A conspicuous tower stands on the sand cay near the center of the W group. An underwater rock lies 7.7 miles NE of the conspicuous tower on the W group.

Landings can be made on the W side of the two charted cays, taking care to avoid the coral heads in the near approach.

There is apparently a deep, but narrow passage between the S and E reefs, but that between the E and N reefs is foul. Two patches of discolored water were reported to lie 1 mile within the W end of the N reef.

When approaching the W group of Holmes Reefs from SW, care must be taken not to mistake the S sand cay for the 1.8m high cay 2.5 miles NE of it.

A depth of 41m lies 40 miles W of the W group.

Bougainville Reef

6.26 Bougainville Reef (15°30'S., 147°07'E.) is located about 69 miles NNW of the N extremity of Holmes Reefs. It is about 2.5 miles in length and 1.5 miles wide. The reef dries at half tide and, when covered, is difficult to see in calm weather. Two stranded wrecks lie on this reef. It was reported that both wrecks give good radar returns up to 14 miles. A light stands on Bougainville Reef.

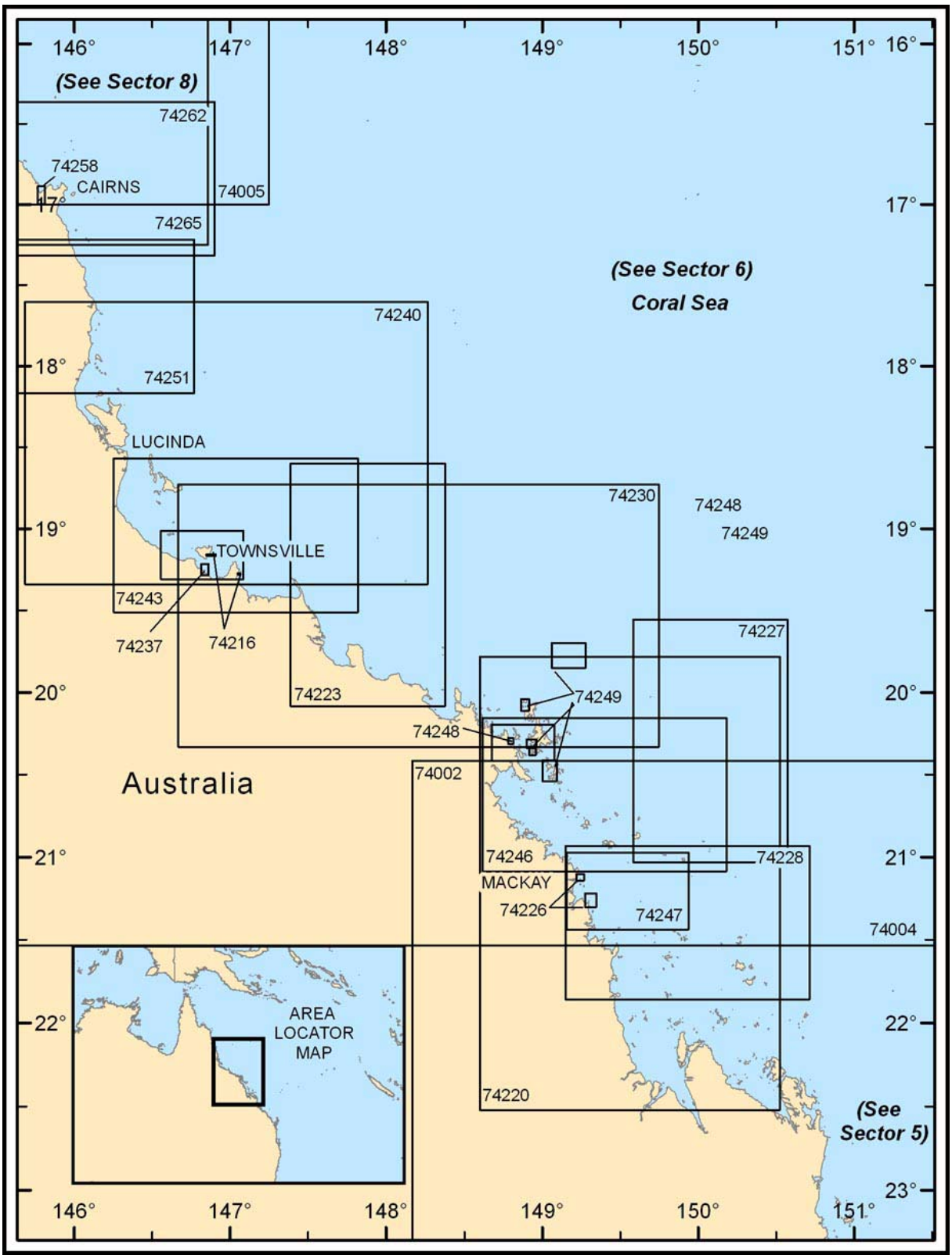
Osprey Reef

6.27 Osprey Reef (13°55'S., 146°36'E.) lies 97 miles NNW of Bougainville Reef. The reef extends in a general NNW direction for a distance of about 16 miles and encloses a lagoon from 1.5 to 4.5 miles wide. North Horn, the N extremity of the reef, is steep-to with great depths 0.5 mile N of it. **Rapid Horn** (14°01'S., 146°42'E.) forms the S extremity of the reef. The reef in most places is awash; during strong SE winds, the sea breaks heavily on the SE side and moderately on the NE side, but does not break on the W side.

The entrance to the lagoon is 0.5 mile wide, with depths of 9.1 to 18.3m. There are several detached reefs within 1 mile S of the entrance. The entrance to the reef is reported (1989) to be clearly defined from seaward. Depths immediately within the entrance are generally 19 to 35m, although there are least depths of 10m. The S side of the entrance is shoal and encumbered with coral. From just within the N side of the entrance, a line of detached coral heads extends ESE for a distance of 0.7 mile; the deepest water is reportedly 50m S of this line.

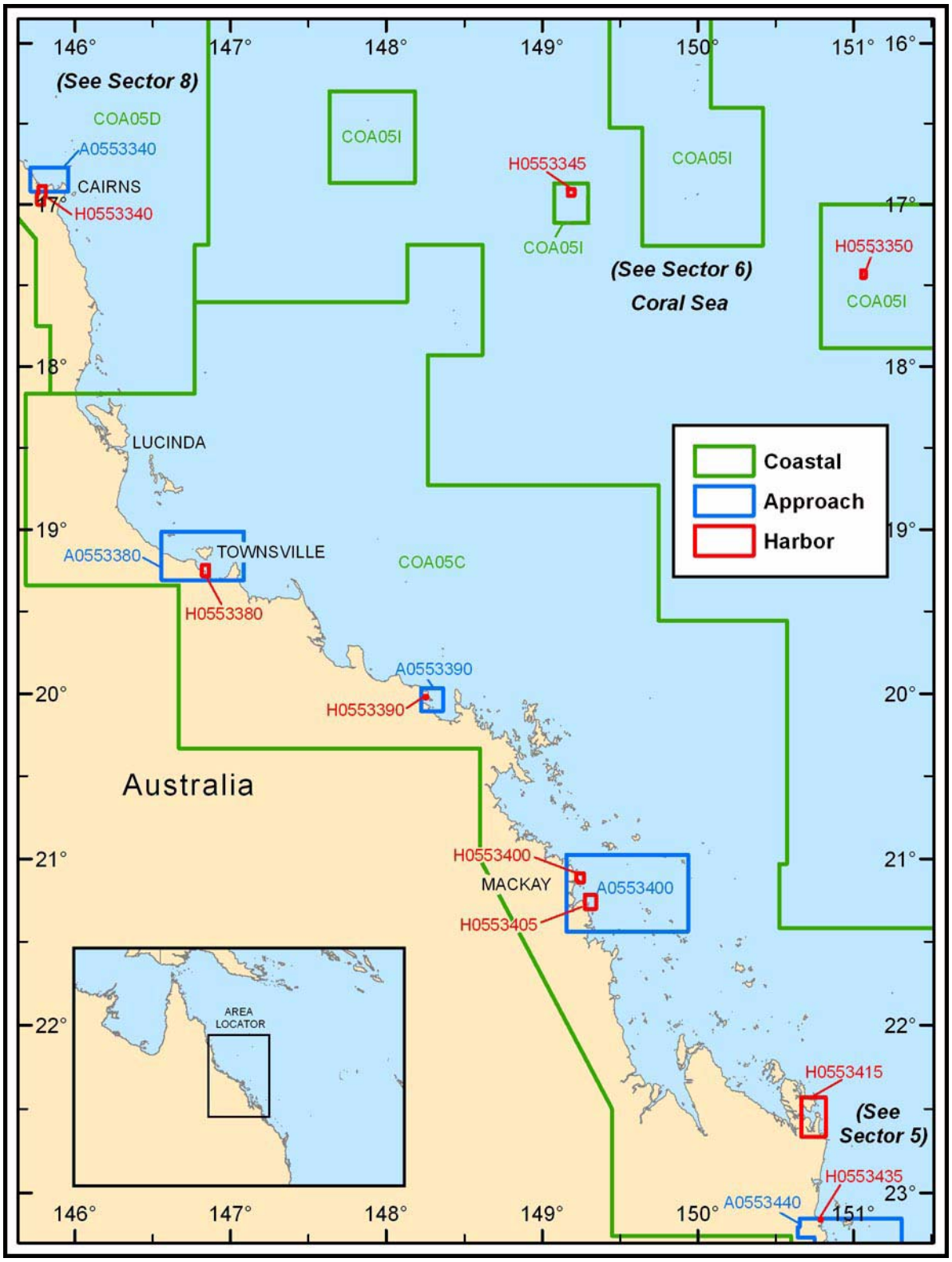
There is anchorage in the middle of the entrance, in a depth of 11m, but the depths increase very rapidly outside.

Shark Reef (14°17'S., 146°56'E.), with a least depth of 7.8m, coral, and steep-to, lies 9 miles SE of Rapid Horn. A bank, with a depth of 14.5m, lies 13 miles SE of Shark Reef, while a 10m shoal lies 4 miles SSE of Shark Reef.



Additional chart coverage may be found in NGA/DLIS Catalog of Maps, Charts, and Related Products (Unlimited Distribution).

SECTOR **7** — CHART INFORMATION



Additional DNC library coverage may be found in NGA DNC 5 (Limited Distribution) disc within the README\GRAPHICS folder.

SECTOR 7 — DNC LIBRARY INFORMATION

SECTOR 7

AUSTRALIA—CAPE TOWNSEND TO CAPE GRAFTON

Plan.—This sector describes the E coast of Australia from Cape Townshend NW to Cape Grafton and the inner and outer parts of Great Barrier Reef from Swain Reefs NW to Grafton Passage. The first part of the sector will describe the Great Barrier Reef, the latter part will describe the coastline from S to N, and off-lying islands, islets, and dangers.

General Remarks

7.1 The Great Barrier Reef consists of a group of coral reefs extending in a general NW direction from Swain Reefs to **Anchor Cay** (9°22'S., 144°07'E.), a distance of about 1,000 miles. In general, the reefs follow the trend of the coast as far N as **Cape Direction** (12°51'S., 143°32'E.), where the barrier diverges from the coast in a N direction to Anchor Cay.

The outer edge of the reefs varies in distance from the coast. When viewed from the E, the outer edge appears as a series of oval-shaped or circular patches clustered together. Few of the reefs seem to exceed 2 miles in diameter and a second line of breakers is generally seen inside. Little is known about the outer edge of the reefs between Swain Reefs and the parallel of 20°S. The inner edge of Great Barrier Reef consists of large scattered reefs with deep channels between them. There are many passages, seldom more than 3 miles wide, leading through the reefs to the coast, but only a small portion of them have been examined.

Winds—Weather.—The Southeast Trade Winds prevail throughout the year off this part of the coast. Southwest winds occur 4 to 5 days a month from May to July; NW or N winds occur about 6 to 7 days a month from September to December. The wind is usually moderate, but attains force 7 or more about 20 or 30 days a year. Brief squalls, sometimes of gale force, are fairly frequent with the Southeast Trades.

Land and sea breezes, strengthened by the trade winds, are often strong in the afternoon and may cause a considerable sea. At such times, the wind often shifts to the NE.

Tropical cyclones, called Queensland Hurricanes, occur about 4 or 5 times a year. They are most frequent from December to April, but have occurred in every month except August.

Fog is almost unknown 20 miles or more off the coast and visibility is good, except during heavy rain. At times, there may be some haze with the trade winds. Along the coast, fog or mist sometimes develops at night, but usually disperses soon after sunrise. Such fogs occur 2 or 3 times a month from May to September and sometimes in other months.

Storm warnings and weather information are broadcast by radio.

Tides—Currents.—The current appears to set N within 10 miles of the outer edge of Great Barrier Reef, the rate depending to a great extent on the strength of the wind. During the months of the Southeast Trades (April to November), a continuous N set will be experienced, except in certain areas where the tidal currents are predominant.

From May to November, close to the outer edge of the reefs between Flinders Passage and One and a Half Mile Opening, the current has always been found to set S, parallel with the line of reefs. It appears to be little affected by the prevailing SE winds. The rate of the current is diminished by the W flood current and increased by the E ebb current; the greatest strength being about 1.5 knots. In the former case, the water sets through the reef openings in a SW direction towards the coast.

Within the above-mentioned limits, 20 to 30 miles from the outer edge of Great Barrier Reef, the current is very uncertain and somewhat weaker. During the months of the Southeast Trades, a surface drift varying in strength up to about 1 knot will be found to set in a NW direction. Very often, when the wind subsides, a reactionary flow in the opposite direction will be experienced.

The tidal currents set through the openings in the Great Barrier Reef in a W or SW direction on the rising tide and in an E or NE direction during the falling tide. In the wider openings these tidal currents are only slight, but in the narrower openings their rates may be as high as 2 knots at springs, increasing to 3 knots if the moon has a high declination at springs.

A nominal rise and fall of the tide will, when the sea is smooth, entirely alter the appearance of the reefs. At LW, their margins show clearly and large masses of rock occasionally appear. The interior, or lagoon part of the reef, is then of a light green color, contrasting sharply with the darker blue of the channels between them. As the tide rises, these characteristics become less and less distinct.

Cays, composed of dead, bleached, coral fragments, form on some of the reefs, but their position and extent are known to shift considerably and at times they erode completely, only to reappear some years later.

Vessels should use the main examined openings, even though some of the other openings may appear to be clear of dangers. As a general rule, the waters lying between the latter and the Inner Route have not been examined.

Caution.—Vessels navigating in the vicinity of the outer edge of the Great Barrier Reef or through any of its passages are cautioned to keep a good lookout and to take frequent soundings. All passages from seaward through the Great Barrier Reef between 11°40'S and 19°07'S have been swept and are open to surface navigation. Due to sunken mines, it is not safe for anchoring, dredging, trawling, cable laying, or resting on the bottom by submarines. Most of the area has been examined, but little is known of the outer edge of the reefs between Swain Reefs and the parallel of 20°S.

Military exercises are conducted off this section of the Australian coastline. For further details, see Pub. 120, Sailing Directions (Planning Guide) Pacific Ocean and Southeast Asia.

Restricted areas.—The Commonwealth of Australia has established a system of regulated zones within the waters comprising the Great Barrier Reef.

These areas, established as the Great Barrier Reef Marine Park, are designed to control the movement of all vessels with-

in specific size categories and geographic locations.

Further information can be found in Pub. 120, Sailing Directions (Planning Guide) Pacific Ocean and Southeast Asia.

The limits of these areas, accompanied by amplifying information, are seen on the appropriate chart. Complete information regarding the Great Barrier Reef Marine Park Zoning Plan, which includes Zoning Maps, Designated Shipping Areas, and Particularly Sensitive Sea Areas, can be found on the Authority's web site.

Great Barrier Reef Marine Park Authority

http://www.gbrmpa.gov.au

Navigation in the Great Barrier Reef

7.2 Compulsory pilotage.—The Great Barrier Reef Marine Park Act 1975 requires all vessels of 70m or greater in length, including all oil tankers, chemical tankers, and liquefied gas carriers of any length are to carry a pilot for the inner passage through the Great Barrier Reef (GBR). A pilot must be licensed under Commonwealth, State, or Territory law, when taking passage, as follows:

1. Through the inner route of the Great Barrier Reef between the parallels of Cape York (10°41'S) and Cairns Roads (16°40'S).
2. Through Hydrographer's Passage (19°47'S., 150°24'E.).
3. Through Whitsunday Passage (20°20'S., 148°54'E.) and in the vicinity of the Whitsunday Group and the Lindeman Group.

In addition to the legislation that applies to the Great Barrier Reef Marine Park, the International Maritime Organization (IMO) recommends that ships transiting Torres Strait and Great North East Channel make use of the available pilotage due to the navigational complexity and environmental sensitivity of the region.

The Australian Maritime Safety Authority (AMSA) also recommends that Masters who are not familiar with the sections of the Inner Routes of the Great Barrier Reef, Palm Passage, and Grafton Passage, employ the services of licensed pilots.

Penalties.—It is an offense for a ship of the size and type specified to navigate without a pilot in the compulsory area; the master and owner each will be liable to a fine. Similarly, liabilities are also imposed on vessels that had entered an Australian port previously in the GBR area without a pilot, with a 3-year statute of limitations.

Queensland Coast and Torres Strait Pilot Services—Draft limitations and service.—Licensed pilots will pilot vessels through Gannet Passage, Varzin Passage, Prince of Wales Channel, and Torres Strait with a maximum draft up to 12.2m. The draft limitation of 12.2m applies only to vessels transiting the Great Barrier Reef Inner Route from Torres Strait (Booby Island) to Cape Flattery or through the Great North East Channel to Dalrymple Island.

Vessels entering or leaving the Inner Route by way of Grafton Passage, Palm Passage, and Hydrographer's Passage are restricted by draft limitations at the Australian port of call or departure from it. The minimum underkeel clearances are, as follows:

1. Gannet and Varzin Passages—1.0m.
2. Prince of Wales Channel—1.0m for vessels with a draft less than 11.9m, or a clearance of 10 per cent of draft for vessels that exceed 11.9m.

Pilotage and boarding arrangements.—Pilot services in the Torres Strait (including the Great North East Channel) and the Great Barrier Reef are provided by three private companies, as follows:

1. Australian Reef Pilots ("Reef Pilots").
2. Torres Pilots.
3. Hydropilots PIL ("Hydro Pilots Helicopter")—Hydrographers Passage only.

For northbound vessels transiting Hydrographers Passage (Hay Point and Dalrymple), "Reef Pilots" will remain on board to pilot the vessel through Jomard Passage and disembark in Papua New Guinea waters at the Torlesse Pilot Boarding Ground N of the N entrance to Jomard Passage. Southbound vessels will board "Reef Pilots" at the Torlesse Pilot Boarding Ground in Papua New Guinea, who will remain on board to Hay Point to pilot the vessel through Jomard Passage. Australian Reef Pilots are requesting 10 days notice to allow for the relevant arrangements and formalities to be completed. The other two piloting providers have advised no changes to their services.

Boarding by helicopter is used as an alternative to launch services at some pilot boarding places (PBP) and for Hydrographers Passage. Boarding by helicopter, when used, is by land-on operation only. Masters should consult Marine Orders Part 57 and the Australian Code of Safe Practice for Ship Helicopter Transfers or the International Chamber of Shipping Guide to Helicopter/Ship Operations and confirm that the vessel is suitable for a land-on operation when ordering a pilot at a boarding place where this practice is an option.

A line will be required to lift aboard the pilot's luggage and equipment (usually two items).

Requesting pilotage by inbound vessels.—Contact pilots, preferably 5 days before arrival, informing the boarding place with ETA (UTC+10 hours), vessel's deepest draft, and the destination. All messages are acknowledged by the pilots, who will also advise on ETA update requirements.

Torres Strait Pilotage

Port and Pilot Boarding Place		Position	VHF channel	Pilot boards by
Brisbane	Point Cartwright	26°43'S, 153°11'E	16	Launch.
Gladstone	North Point	23°44'S, 151°22'E	12 and 16	Launch or helicopter.
Whitsunday	Penrith Island	21°00'S, 149°57'E	9 and 16	Helicopter.

Torres Strait Pilotage				
Port and Pilot Boarding Place		Position	VHF channel	Pilot boards by
Whitsunday	Bailey Island	21°00S, 149°36'E	9 and 16	Helicopter.
Palm Passage	Pith Reef	18°13'S, 147°07'E	9 and 16	Helicopter.
Cairns	Yorkeys Knob	16°47.5'S, 146°53.5'E	20	Launch or helicopter.
Grafton Passage	Euston Reef	16°39'S, 146°14'E	20	Launch or helicopter.
Torres Strait	Goods Island	10°34'S, 142°04'E	20	Launch or helicopter.
Torres Strait	Booby Island	10°36'S, 141°50'E	20	Launch or helicopter.
Great North East Channel	Dalrymple Island	9°34'S, 143°24'E	20	Launch.

Pilot Contact—Australian Reef Pilots	
Brisbane Head Office	
Facsimile:	61-7-3026-2666
Telephone:	61-7-3026-2660 (office hours)
E-mail:	operations@reefpilots.com.au
Web site:	http://www.reefpilots.com.au
Mobile:	6-413-878792 (24 hours)
Mackay Pilot Station	
Facsimile:	61-7-4953-0736
Telephone:	61-7-4957-4877
E-mail:	hydropil@tpgi.com.au
Cairns Pilot Station	
Facsimile:	61-7-4055-7828
Telephone:	61-7-4055-8311
Thursday Island Pilot Station	
Facsimile:	61-7-4069-1570
Telephone:	61-7-4069-1570
E-mail:	arptis@bigpond.com.au
Note.—The VHF call sign for all of the above is REEF-PILOTS.	

Pilot Contact—Torres Pilots	
Brisbane Operations Offices	
Facsimile:	61-7-3217-9722
Telephone:	61-7-3217-9544 (24 hours)
E-mail:	operations@torrespilots.com.au
Web site:	http://www.torrespilots.com.au
Pilot Base—Thursday Island	
Facsimile:	61-7-4069-2252
Telephone:	61-7-4069-2251 (24 hours)
E-mail:	torresti@bigpond.com.au
Pilot Base—Great North East Channel	
Facsimile:	Contact through Thursday Island
Telephone:	Pilot Base
Pilot Base—Hamilton Island	
Facsimile:	61-7-4946-8280
Telephone:	61-7-4946-8249
E-mail:	torres@whitsunday.net.au

Pilot Contact—Torres Pilots
Note.—The VHF call sign for all of the above is TORRESPILOTS.

Helicopters are restricted to land-on operations under visually clear and moderate weather conditions. Winch-down transfers are not undertaken in Australia.

Requesting pilotage by outbound vessels.—Arrangements are made directly with the Pilots Office or by the ship's agent.

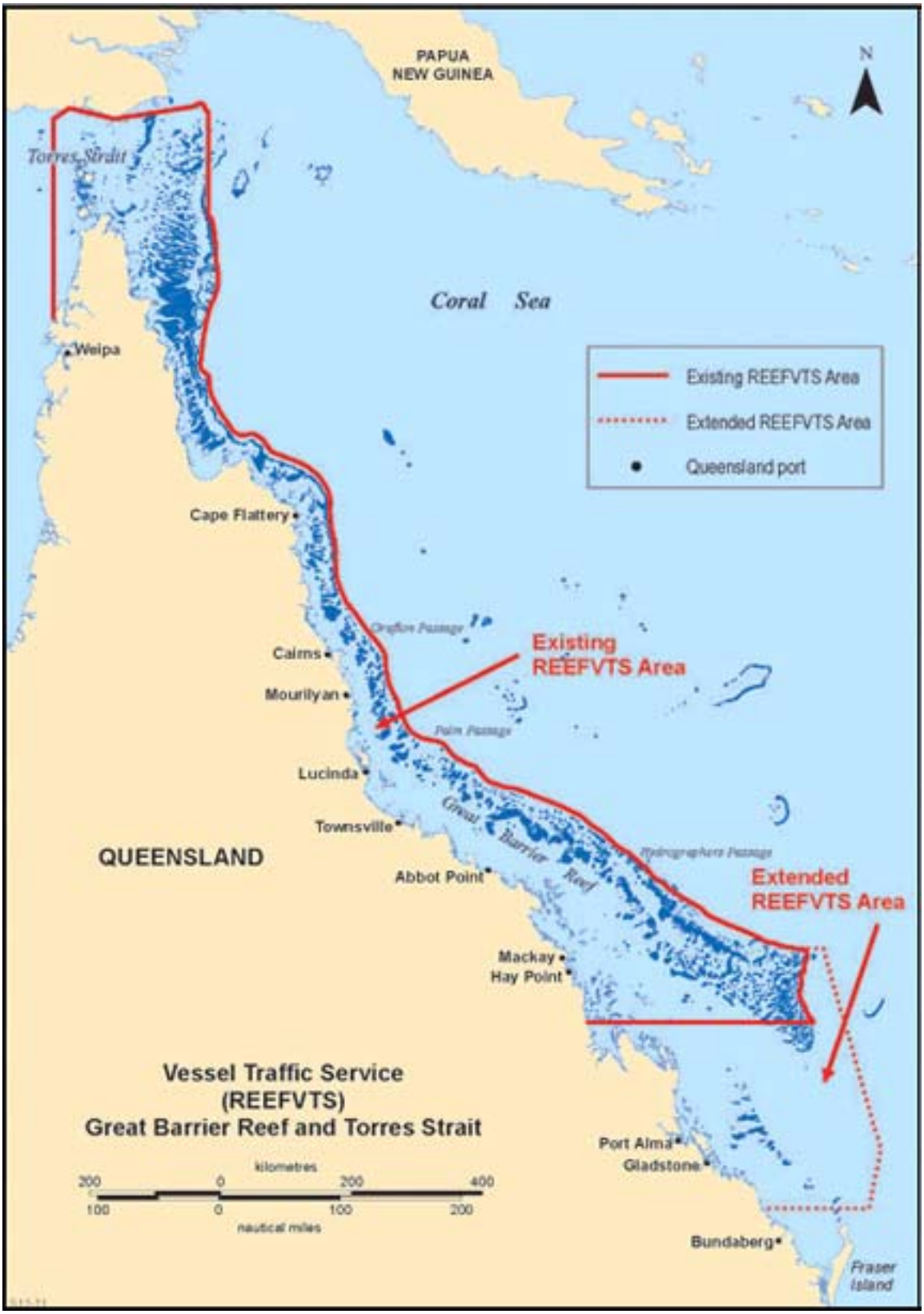
Pilotage for Torres Strait, including the Great Northeast Channel.—Pilot boarding arrangement may be made for any port in Queensland, New South Wales, Northern Territory, or Papua New Guinea at any of the following pilot boarding places listed in the table titled "Torres Strait Pilotage."

Deep Water Route.—A Deep Water Route has been established for deep draft vessels between the Barrow Islands (14°22.5'S., 144°41.6'E) and Lizard Island (14°40.2'S., 145°24.7'E).

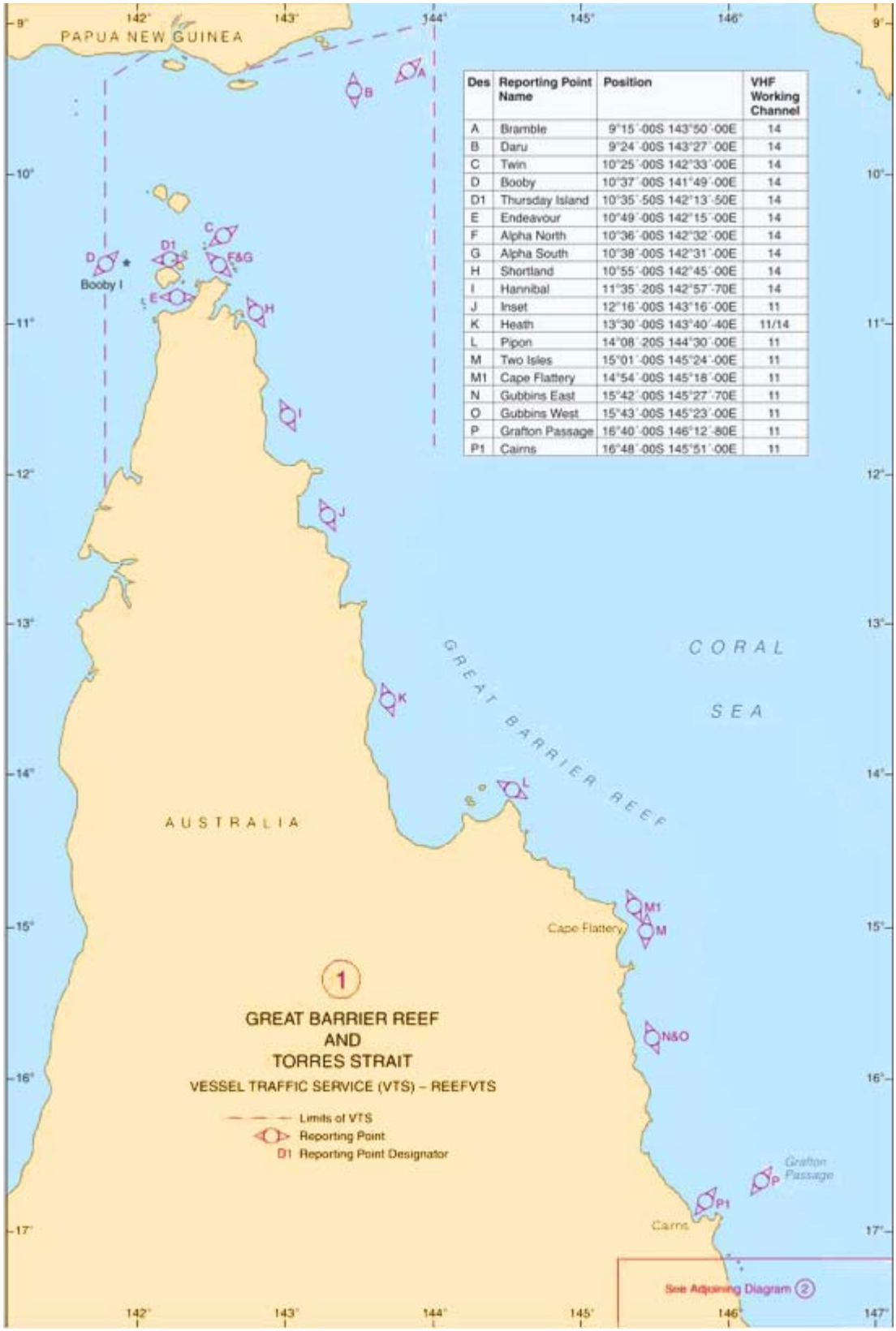
Two-Way Route.—A Two-Way Route has been established between the Palm Isles (18º25'S., 145º31'E) and the Low Isles (16º23'S., 145º33'E), continuing to Booby Island (10º36'S., 141º55'E). The use is not mandatory, but it does indicate the best and safest route.

Area to be Avoided.—The area of the Capricorn Group and the Buker Groups in the S area of the Great Barrier Reef is designated an Area to be Avoided. Ships exceeding 500 gt should avoid the area bounded by a line connecting the following positions:

a. 23°10'S, 151°56'E.
b. 23°53'S, 152°28'E.
c. 23°55'S, 152°28'E.
d. 23°57'S, 152°26'E.
e. 23°57'S, 152°24'E.
f. 23°32'S, 152°55'E.
g. 23°36'S, 151°39'E.
h. 23°33'S, 151°35'E.
i. 23°30'S, 151°35'E.
j. 23°25'S, 151°53'E.
k. 23°20'S, 151°50'E.
l. 23°20'S, 151°40'E.
m. 23°15'S, 151°40'E.
n. 23°10'S, 151°52'E.

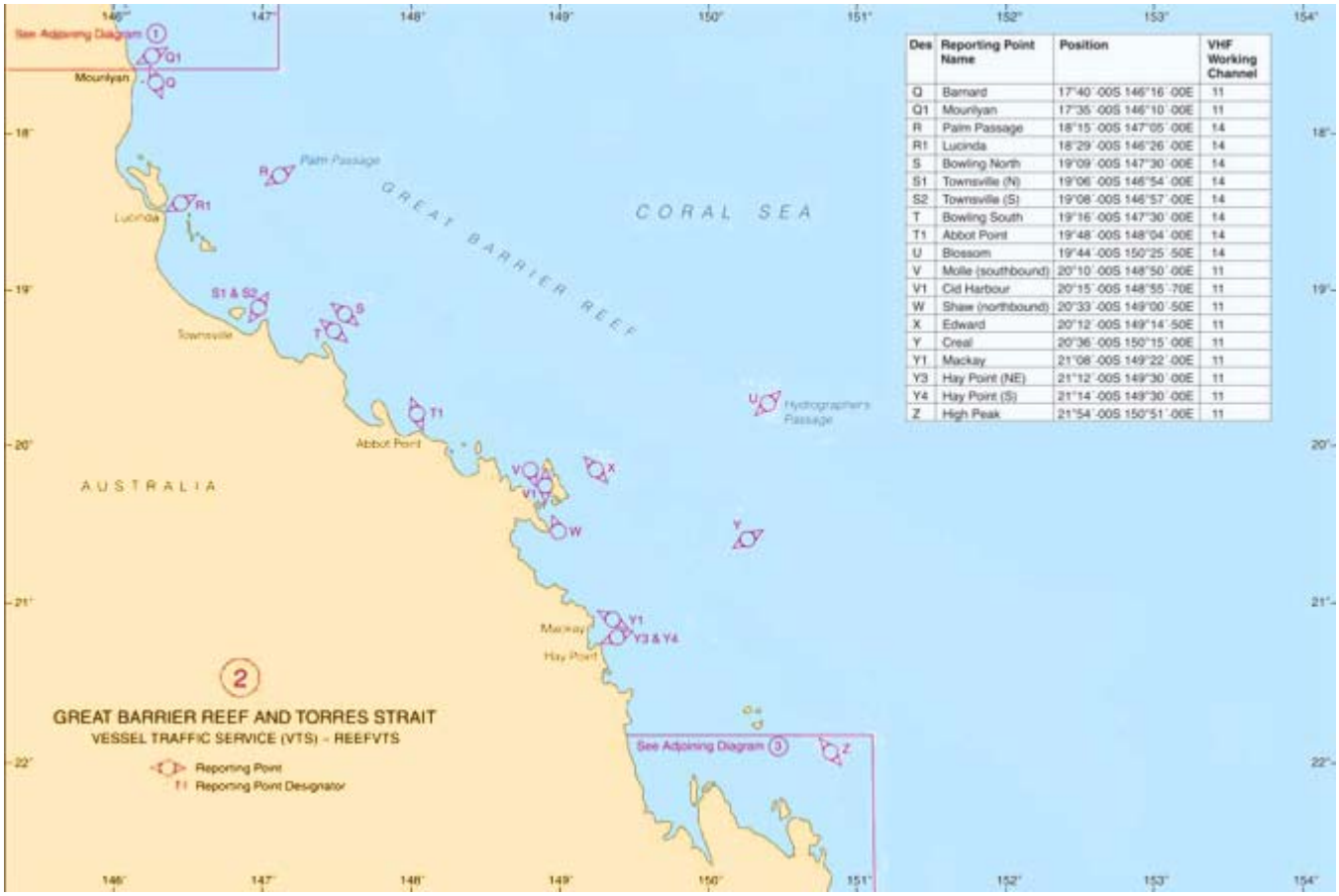


REEFVTS Coverage Overview



Des	Reporting Point Name	Position	VHF Working Channel
A	Bramble	9°15'·00S 143°50'·00E	14
B	Daru	9°24'·00S 143°27'·00E	14
C	Twin	10°25'·00S 142°33'·00E	14
D	Booby	10°37'·00S 141°49'·00E	14
D1	Thursday Island	10°35'·50S 142°13'·50E	14
E	Endeavour	10°49'·00S 142°15'·00E	14
F	Alpha North	10°36'·00S 142°32'·00E	14
G	Alpha South	10°38'·00S 142°31'·00E	14
H	Shortland	10°55'·00S 142°45'·00E	14
I	Hannibal	11°35'·20S 142°57'·70E	14
J	Inset	12°16'·00S 143°16'·00E	11
K	Heath	13°30'·00S 143°40'·40E	11/14
L	Pipon	14°08'·20S 144°30'·00E	11
M	Two Isles	15°01'·00S 145°24'·00E	11
M1	Cape Flattery	14°54'·00S 145°18'·00E	11
N	Gubbins East	15°42'·00S 145°27'·70E	11
O	Gubbins West	15°43'·00S 145°23'·00E	11
P	Grafton Passage	16°40'·00S 146°12'·80E	11
P1	Cairns	16°48'·00S 145°51'·00E	11

REEFVTS Reporting Points Chartlet 1



Des	Reporting Point Name	Position	VHF Working Channel
Q	Barnard	17°40'.00S 146°16'.00E	11
Q1	Mourilyan	17°35'.00S 146°10'.00E	11
R	Palm Passage	18°15'.00S 147°05'.00E	14
R1	Lucinda	18°29'.00S 146°26'.00E	14
S	Bowling North	19°09'.00S 147°30'.00E	14
S1	Townsville (N)	19°06'.00S 146°54'.00E	14
S2	Townsville (S)	19°08'.00S 146°57'.00E	14
T	Bowling South	19°16'.00S 147°30'.00E	14
T1	Abbot Point	19°48'.00S 148°04'.00E	14
U	Blossom	19°44'.00S 150°25'.50E	14
V	Molle (southbound)	20°10'.00S 148°50'.00E	11
V1	Cid Harbour	20°15'.00S 148°55'.70E	11
W	Shaw (northbound)	20°33'.00S 149°00'.50E	11
X	Edward	20°12'.00S 149°14'.50E	11
Y	Creal	20°36'.00S 150°15'.00E	11
Y1	Mackay	21°08'.00S 149°22'.00E	11
Y3	Hay Point (NE)	21°12'.00S 149°30'.00E	11
Y4	Hay Point (S)	21°14'.00S 149°30'.00E	11
Z	High Peak	21°54'.00S 150°51'.00E	11

REEFVTS Reporting Points Chartlet 2

Mandatory Ship Reporting System

7.3 REEFVTS has been adopted for the Great Barrier Reef and Torres Strait Vessel Traffic Service. This service has been established as a means of enhancing navigational safety and environmental protection in these areas.

Great Barrier Reef and Torres Strait Vessel Traffic Service (REEFVTS)

http://www.amsa.gov.au/Shipping_Safety/REEFVTS/

REEFVTS consists of two major component, as follows:

1. A mandatory Ship Reporting System known as the Great Barrier Reef and Torres Strait Ship Reporting System (**REEFREP**), adopted by the IMO and operated in accordance with the International Convention on the Safety of Life at Sea (SOLAS).
2. **REEFVTS**—A traffic monitoring system for participating vessels that provides the following:
   a. Gives timely, relevant, and accurate information to vessels.
   b. Keeps a listening watch on REEFVTS VHF working channels.
   c. Receives the information provided by vessels in accordance with the ship reporting requirements.
   d. Responds to requests for information from vessels regarding ship traffic and marine safety information.

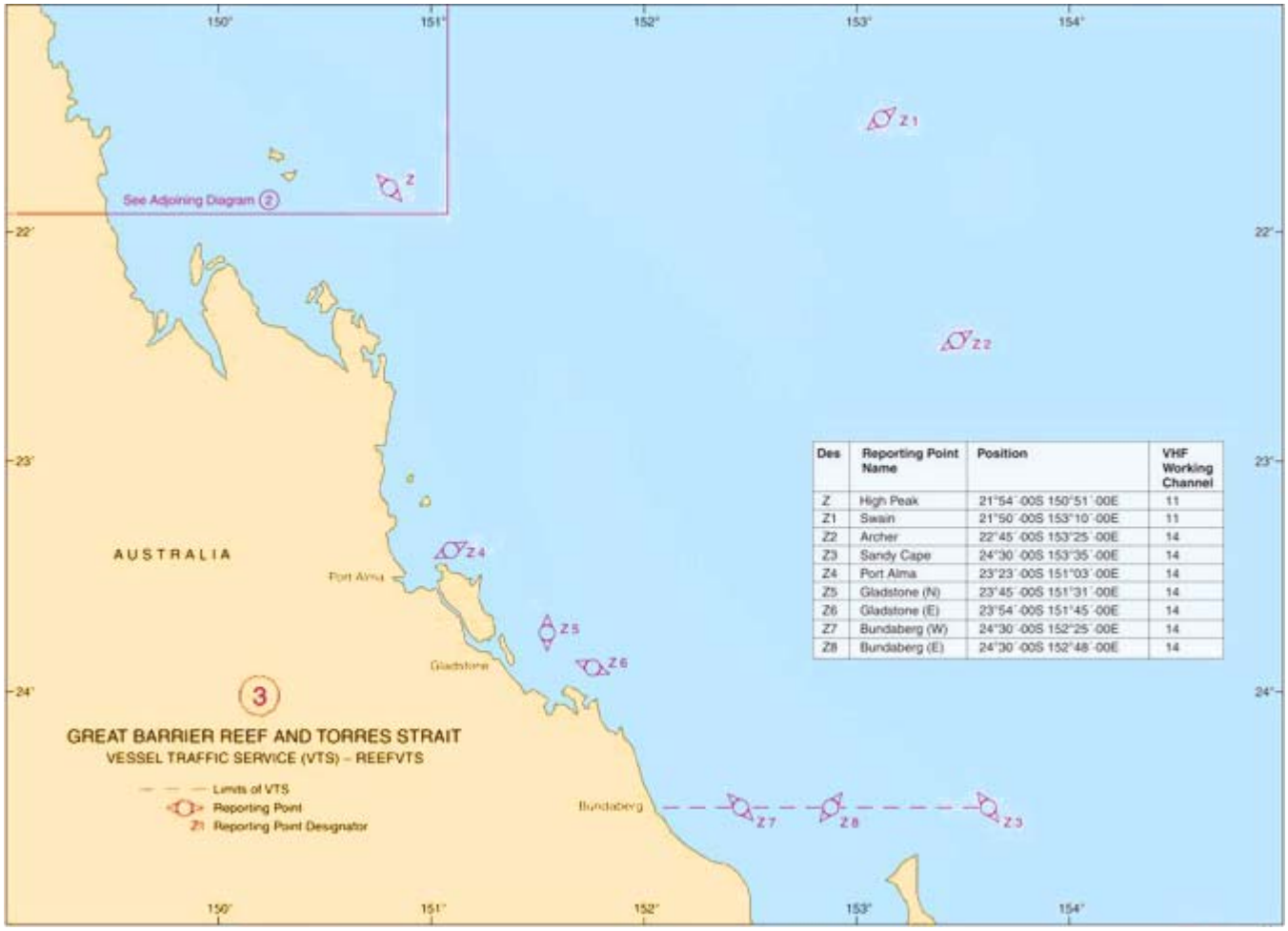
The system is manned and operated 24 hours by Maritime Safety Queensland personnel operating from the REEFVTS Center, (call identity: REEFVTS and call sign: VZQ641) situated in Townsville.

Contact Information.—REEFVTS can be contacted, as follows:

a. VHF: VHF channels 11 and 14
b. Telephone (general): 617-4726-3428
c. Facsimile: 617-4721-0633
d. E-mail: reefvts@vtm.qld.gov.au

Purpose.—REEFVTS was established in 2004 and relies on information received from vessels as well as other sources for the purpose of:

a. Make navigation in Torres Strait and the inner route of the Great Barrier Reef safer by providing coordinated information on possible traffic conflicts and other navigational information.
2. To minimize the risk of maritime accidents thereby avoiding the pollution and damage that can result from such accidents in the fragile marine environment that exists in the Great Barrier Reef and Torres Strait.



Des	Reporting Point Name	Position	VHF Working Channel
Z	High Peak	21°54'.00S 150°51'.00E	11
Z1	Swain	21°50'.00S 153°10'.00E	11
Z2	Archer	22°45'.00S 153°25'.00E	14
Z3	Sandy Cape	24°30'.00S 153°35'.00E	14
Z4	Port Alma	23°23'.00S 151°03'.00E	14
Z5	Gladstone (N)	23°45'.00S 151°31'.00E	14
Z6	Gladstone (E)	23°54'.00S 151°45'.00E	14
Z7	Bundaberg (W)	24°30'.00S 152°25'.00E	14
Z8	Bundaberg (E)	24°30'.00S 152°48'.00E	14

REEFVTS Reporting Points Chartlet 3

3. To respond quickly if an accident occurs.

The REEFVTS User Guide should be consulted for complete information and is available online at the following web site:

REEFVTS User Guide

http://www.amsa.gov.au/Shipping_Safety/REEFVTS/Documents/User_Guide.pdf

REEFREP

1. Ships of the following general categories are required to participate in the reporting system:

a. All ships of 50m or greater in overall length;.

b. All oil tankers, liquefied gas carriers, chemical tankers or ships coming within the INF Code, regardless of length (See paragraph 2 below).

c. Ships engaged in towing or pushing where the towing or pushing vessel or the towed or pushed vessel is a vessel prescribed within the categories in paragraphs "a" or "b" or where the length of the tow, measured from the stern of the towing vessel to the after end of the tow, is 150m or greater.

2. For the purposes of the requirement in sub-paragraph 1b "oil tanker" means ships defined at Regulation 1(4) of Annex I to MARPOL 73/78 together with those ships other than oil tankers to which Regulation 2(2) of Annex I to MARPOL 73/78 applies, that is, ships "fitted with cargo spaces which are constructed and utilized to carry oil in bulk of aggregate capacity of 200 cubic meters or more."

3. Any warship, naval auxiliary or any vessel operated by government is not subject to the mandatory participation requirements described for REEFVTS; however, SOLAS does state that any such vessels as described here are encouraged to participate in ship reporting systems on a voluntary basis.

See the diagram titled **REEFVTS Coverage Overview** for a graphical display of the area; also see the diagrams titled **REEFVTS Reporting Points Chartlet 1**, **REEFVTS Reporting Points Chartlet 2**, and **REEFVTS Reporting Points Chartlet 3** for the location and description of the mandatory reporting positions for REEFVTS.

The Modernized Australian Ship Tracking and Reporting System (MASTREP) is a ship reporting system designed to contribute to the safety of life at sea and is operated by the

Australian Maritime Safety Authority (AMSA) through the Australian Rescue Coordination Center (RCC Australia) in Canberra. The coverage area of MASTREP encompasses that of REEFVTS and includes waters generally E of 75°E, W of 165°E, N of 65°S and S of 5°S but staying S of Indonesia and Papa New Guinea. MASTREP provides automated positional data on vessels transiting Australia's Search and Rescue Region (SRR) via Automatic Identification System (AIS) technology.

The following types of vessels are required to participate in MASTREP while in the MASTREP coverage area (in addition to REEFREP):

1. Foreign vessels from their arrival at their first port in Australia until their departure from their final port in Australia.
2. All regulated Australian vessels while in the MASTREP area.

Vessels transiting the REEFVTS area while participating in MASTREP will continue to send their AIS positions.

See Pub. 120, Sailing Directions (Planning Guide) Pacific Ocean and Southeast Asia for more details about MASTREP. The MASTREP and Australian Mandatory Reporting Guide can be downloaded free of charge from the AMSA web site (http://ww.amsa.gov.au).

System overview.—The REEFVTS is based on a VHF voice reporting system employing a radio network, presently consisting of 14 sites (three of which are satellite VHF), along the Queensland coast and on islands in the Torres Strait. There are also four additional stand-by sites situated at High Peak, Mount Mackay, Palfrey Island, and Hammond Island.

Through this network certain categories of ships are required to report their entry into, and progress through, the REEFVTS area with reference to a series of designated points.

There are also radar sites at selected focal points within the REEFVTS area. The radar stations monitor vessels entering the REEFVTS area and their compliance with the reporting requirement.

In the Torres Strait there are two radars, one at Cairns and one in the S area of the inner route on Penrith Island.

The VHF radio sites are remotely controlled from a Ship Reporting Center (REEFCENTER), set up at Hay Point near Mackay, as are the radars. REEFCENTER, staffed by operators from Queensland Transport, manages the system on a 24-hour basis.

Mandatory Reporting Procedure.—The REEFVTS requires ships to report certain information to REEFCENTER, radio call sign "VZQ 641." Full details of the REEFVTS procedures, including message format, communications arrangements, and reporting points, are provided in the publication *REEFVTS User Guide*, available free of charge from:

1. Any office of the Australian Maritime Safety Authority (AMSA).
2. Queensland Transport (Maritime Division) in Brisbane.
3. Offices of the Regional Harbor Master in Queensland ports.

Australian Maritime Safety Authority

http://www.amsa.gov.au

Information required in REEFREP.—See the table titled **REEFREP—Required Information**.

REEFREP—Required Information

Field	Meaning
A	Name, call sign, and IMO/Lloyd's Number.
C	Name of Mandatory Reporting Point (MRP) at which they are reporting or the position in latitude and longitude if not at or in the vicinity of an MRP.
E	Name of next MRP or course if not tracking between MRPs.
F	ETA and next MRP or speed.
J	Whether coastal pilot on board ("Yes" or "No") and pilot details.
L	Name of final MRP at which ship is expected to leave the REEFVTS Area.
O	Draft.
P	Type of cargo being carried and whether it is classed as hazardous ("Yes" or "No").
Q	Any damage, defects, deficiencies, or other limitations affecting the ship when it enters the REEFVTS Area or which arise while the ship is in the area.
R	In the event of a Dangerous Goods (DG) incident, a Harmful Substances (HS) incident, or Marine Pollutants (MP) incident, the ship is required to report details.
U	Ship details comprising ship type, length, and gross tonnage.
X	Any additional information considered relevant to navigational safety in the REEFVTS Area.

MASTREP/REEFREP Interface.—REEFTVS automatically forwards regular position reports to RCC Australia. When a vessel departs a port within the REEFVTS area and intends to report to MASTREP when it exits the REEFVTS area, the vessel should ensure that Position Reports are transmitted by AIS in accordance with the International

Convention for the Safety of Life at Sea (SOLAS), Chapter 5, Regulation 19.2.4. When a vessel departs the REEFVTS area and is reporting to MASTREP, the master must report any malfunction of the vessel's AIS equipment to RCC Australia.

Entering the REEFVTS Area.—On first entering the REEFVTS operational area from outside the area or when sailing from a port within the reporting area, vessels are required to provide a position report (PR), including details such as identity, position, intended route, cargo, and other supplementary information, when at the first designated REEFVTS Reporting Point.

Ships reporting into the REEFVTS are to use voice on VHF channel 5, 18 or 19 with REEFCENTRE.

Masters who are concerned as to the security of providing cargo details over VHF can provide this information separately from the voice message by other means, such as telephone, prior to the first REEFREP report if so desired.

When, for any reason, communication is not possible, ships are to pass the required report in a timely manner by alternative means employing one of the following methods:

1. Other INMARSAT services.
2. Other satellite services.
3. Telephone: 61-7-4956-3581
4. Facsimile: 61-7-4956-3367
5. Telex: +7146483
6. E-mail: reefvts@rcsl.amsa.gov.au

If there is a failure with the ship's primary or alternate communications equipment and prevents the relaying of any required reports, it should be recorded in the ship's radio log or the Official Log Book.

Swain Reefs to Flinders Passage

7.4 **Swain Reefs** (22°00'S., 152°30'E.) lie with their S extremity about 120 miles E of Cape Townshend and 142 miles NNW of **Sandy Cape** (24°42'S., 153°16'E.). The sea breaks heavily on the outer edges of the reefs, and in good weather may be seen from a distance of 6 to 7 miles. Reefs and cays, S of latitude 21°34'S, and between the meridians 152°20'E and 152°42'E, have been reported.

Hixson Cay (22°21'S., 152°40'E.), near the S extremity of Swain Reefs, is awash at HW. Another small cay, 3.7m high, lies 1 mile SSW of Hixson Cay. Both Cays are bare of vegetation. When approaching Swain Reefs from the S, the bottom is irregular and caution is necessary. Small vessels may obtain anchorage, in a depth of 64m, coral, 1.5 miles SE of Hixson Cay. Caution is necessary at all times as these cays have been noted to disappear at certain tide conditions.

The reefs, which lie between 9 and 22 miles NNE of Hixson Cay, were reported to lie 4 miles farther W than charted.

Two openings in the reefs, with anchorage just within, lie 10 miles NE and 31.5 miles N, respectively, of Hixson Cay. The S opening is 0.7 mile wide, with depths 46 to 55m in mid-channel. As this opening lies obliquely to the general line of the reefs, it is not easily seen until well open. The N opening is 1 mile wide, with depths of 33 to 37m in mid-channel. A depth of 37m was reported to lie 10 miles E of the S opening. A stranded wreck was reported to lie 4.5 miles N of the S opening.

Drying reefs extend 7 miles WSW from Hixson Cay. Howard Patch lies 5 miles WSW of Hixson Cay. Discolored water has been reported S of Howard Patch and Hixson Cay.

Zodiac Cay (21°07'S., 152°40'E.), at the N extremity of Swain Reefs, is 2.4m high, composed of lumps of coral and sand, and lies on the middle of a reef. There are sand cays on the reefs, which extend between 4.5 and 6 miles E of Zodiac Cay. There are shoal patches in the area of Zodiac Cay, and extreme caution is necessary.

Anchorage is afforded, in a depth of 42m, about 1 mile NW of Zodiac Cay.

The inner edges of Swain Reefs extend NW from Howard Patch and consist of Herald No. 1 Reef, Heralds Prong No. 2 Reef, Heralds Prong No. 3 Reef, and Heralds Reef Prong. All the above reefs dry. A tower, conspicuous on radar, stands on Gannet Cay, 14 miles ENE of Herald No. 1 Reef.

The SW edge of a line of submerged coral reefs and foul ground extends NW for 7 miles from a position 11 miles W of Heralds Prong No. 3 Reef.

Bell Cay (21°46'S., 151°15'E.), a small sand cay near the N edge of a drying reef, lies 11 miles SW of Heralds Prong No. 3 Reef. The cay is covered with a sparse growth of bushes. There are large boulders on the E edge of the reef, on which the sea breaks heavily.

Anchorage may be obtained off the N side of the reef, in a depth of 37m, but the bottom is hard and uneven.

Great Barrier Reef—Outer Edges

7.5 From the NE extremity of Swain Reefs, located about 80 miles N of Howard Patch, the outer edge of the reefs curve abruptly in a WNW direction for about 150 miles to a position about 100 miles E of the N extremity of **Gloucester Island** (20°00'S., 148°27'E.). This area has been partially examined and little is known about this portion of the outer edge of the reefs. From the last position, the outer edge of the reefs continues in the same direction for a distance of about 140 miles to the entrance to Flinders Passage, the first important passage through the reefs from the S.

Numerous detached reefs exist from the outer edge of Great Barrier Reef between Flinders Passage and Grafton Passage, 165 miles NW. None of these reefs are of very large extent and nearly all the outer ones are awash or dry. Depths outside the line of reefs for a distance of about 1 mile are less than 73m. Farther outside, the depths increase sharply to more than 200m.

The principal passages through the reefs in this area are Flinders Passage, Magnetic Passage, Palm Passage, Flora Pass and Grafton Passage. Other openings are Geranium Passage and Noggin Passage. These passages all lead into the Inner Route and to the various ports on the NE coast of Australia.

Flinders Passage

7.6 The seaward entrance of **Flinders Passage** (18°55'S., 148°00'E.) lies to the E of the reef located with its N extremity in position 18°44'S, 147°58'E. The general direction of the channel is nearly N and S. It is about 20 miles long and from 1.5 to 7.5 miles wide, and bounded on either side by reefs.

The inner or S entrance lies between the SE end of **Bowden Reef** (19°03'S., 147°56'E.) and the W side of Mid Reef, 8 miles

to the ESE. Both of these reefs are marked by boulders and the sea breaks over Mid Reef. Depths in the channel are irregular.

Flinders Passage, although frequently used, has not been closely examined. Navigators should use the passage only under favorable conditions and it is imperative that a good lookout be maintained. The passage is not recommended for deep-draft vessels. The many reefs E and W of the passage can best be seen on the chart.

Magnetic Passage and Palm Passage

7.7 **Magnetic Passage** (18°30'S., 147°15'E.) lies with its N entrance about 50 miles NW of the N entrance to Flinders Passage. The passage is entered from seaward between **Myrmidon Reef** (18°15'S., 147°22'E.) and Needle Reef, 11.5 miles SW. Both reefs dry 2.7m. The passage extends in a S direction for about 22 miles and then in a SSW direction for about 11 miles to its S entrance, which lies between Lodestone and Keeper Reefs.

Thimble Shoal, with a depth of 7.9m, has been reported to lie 3 miles E of Needle Reef. Charts show the shoal close to the recommended track, therefore, it is recommended deep-draft vessels use Palm Passage.

The current sets ESE between the outer reefs, but its influence is generally lost after passing S of Needle Reef.

Palm Passage (18°19'S., 147°00'E.) lies with its seaward entrance about 8 miles WNW of Magnetic Passage. The passage leads SW into the Inner Route in the vicinity of the Palm Isles. The seaward entrance lies between Pith Reef and **Urchin Shoal** (18°20'S., 147°05'E.), and the S entrance between Bramble Reef and Rib Reef.

Pith Reef (18°12'S., 147°02'E.), which dries, lies on the W side of an area of foul ground on the W side of the seaward entrance. A light is shown on the SE side of the reef; a racon is situated at the light. In 1983, Pith Reef was reported to lie 0.5 mile E of the charted position.

Rib Reef (18°28'S., 146°52'E.), which dries, lies in the middle of the SW end of Palm Passage. There is a navigable channel 4 miles wide on each side of the reef. A light is shown on the NE side of Rib Reef.

Pilotage.—See paragraph 9.1 for applicable pilotage information.

When within the outer ends of the reefs, the tidal current, if any, will be found to set in the direction of the channel. The area NW of Pith Reef, Trunk Reef, and Bramble Reef is unsurveyed. A vessel reported (1972) that when outbound through the passage, the 191m summit on **Fantome Island** (18°42'S., 146°31'E.), bearing 230° astern, was a useful mark for maintaining the recommended track and was visible for a distance of 30 miles.

Between Pith Reef and the N entrance to Geranium Passage, 47 miles NW, the outer edge of the Great Barrier Reefs consists of a large number of detached reefs which have not been surveyed.

Geranium Passage and Noggin Passage

7.8 **Geranium Passage** (17°42'S., 146°30'E.) lies about 48 miles NW of Palm Passage. The seaward entrance lies between the N extremity of **Potter Reef** (17°40'S., 146°34'E.) and the S extremity of Gilbey Reef, 4.5 miles NNE. The passage has a length of about 12 miles and extends in a general SW direction. It is from 1.7 to 3 miles wide and leads into the Inner Route in the vicinity of Mourilyan Harbor. Navigators are cautioned that although this passage is apparently clear of dangers, it has only been partially examined. Eddy Reef and Ellison Reef form the SW entrance to Geranium Passage.

Between the N entrance to Geranium Passage and the NE entrance to Noggin Passage, 28 miles NNW, the outer edge of the Great Barrier Reef consists of a number of detached reefs which have not been surveyed.

Noggin Passage (17°13'S., 146°25'E.) is located about 28 miles N of Geranium Passage. The seaward entrance lies between Raaf Shoal and Noggin Reef, about 5 miles NW. The passage trends in a WSW direction for a distance of about 13.5 miles to its inner entrance, which lies between Flora Reef and Jackson Patches. The passage is from 2 to 3.5 miles wide and leads to the Inner Route in the vicinity of **Russell Island** (17°14'S., 146°06'E.). Depths of 16.4 to 69m are found in the fairway of the passage, the least depth being found about 3 miles E of the E side of **Coates Reef** (17°12'S., 146°22'E.). A 9.1m shoal lies in the seaward approaches of Noggin Passage, 3 miles NNE of Raaf Shoal.

Flora Passage

7.9 The seaward entrance to **Flora Passage** (17°00'S., 146°21'E.), located about 17 miles NNW of the seaward entrance of Noggin Passage, lies between Channel Reef and Northwest Reef, about 4.2 miles NNW. The passage extends about 19 miles SW to its inner entrance, which lies between Scott Reef, on the N, and the N side of Flora Reef, on the S. The passage is from 3.7 to 6 miles wide and leads to the Inner Route in the vicinity of Russell Island.

Great caution is necessary approaching Flora Passage from seaward, as the mainland, though high, is often obscured by haze, and should not be attempted unless the position is accurately known. A mid-channel course will lead a vessel clear of dangers in Flora Passage.

Cape Townshend

7.10 The coast between Cape Townshend and West Hill Island, about 60 miles WNW, is indented SSE by two large bays, each of which is about 30 miles long. Shoalwater Bay, the E of the two, is separated from Broad Sound, the W bay, by a large peninsula, the N end of which, Arthur Point, lies about 25 miles WNW of Cape Townshend. Several contiguous islands lie up to about 8 miles NNW of this peninsula, and the entrances of both bays are somewhat encumbered by small groups of islets.

There are depths of more than 10.9m in the N parts of the above bays, but in their S parts there are depths of about 7.3 to 10.9m. The depths decrease toward the S end of both bays where there are numerous dangers.

The tidal currents are strong on this part of the coast. In Broad Sound Channel, the flood current sets W and the ebb E at a rate of about 2 to 3 knots. In the entrances of the two above bays, the currents tend to follow the trend of the channel and attain a rate of 2 to 3 knots.

Shoalwater Bay

7.11 Shoalwater Bay (22°23'S. 150°23'E.) indents the coast about 30 miles SSE between Cape Townshend and **Arthur Point** (22°08'S., 150°04'E.). The bay is fairly easy to access through the deep channels on either side of the islands in the entrance. There are depths of 12 to 30m in North Channel and 3.6 to 15m in Northwest Channel. In the central part of the bay, there are depths of 0.3 to 12.5m.

Caution is advised when entering the bay because recent soundings indicate uncharted shoals exist in several areas.

Tides—Currents.—The flood current sets SW; the ebb current NE.

Pilotage.—No pilots are available for Shoalwater Bay.

Anchorage.—Anchorage, with shelter and good holding ground, may be obtained, in a depth of 16m, 1.5 miles N of **White Rocks** (22°12'S., 150°15'E.). Anchorage, with good holding ground, may be obtained, in depths of 13 to 18m in the blind channel, 2.5 miles SE of the NE extremity of **Akens Island** (22°21'S., 150°17'E.). Local knowledge is necessary for this anchorage. There is anchorage, in depths of 13 to 18m, 1 mile N of **Passage Patch** (22°22'S., 150°23'E.).

Anchorage, sheltered from SE winds and easy of access, may be taken 1.2 miles off the middle of the W side of **Leicester Island** (22°16'S., 150°27'E.), in depths of 13 to 18m.

Caution.—The flood currents set SW; the ebb currents set NE. The currents may attain rates of 2 to 6 knots in the anchorage W of Leicester Island.

A military training area has been established within Shoalwater Bay. The waters within the area are closed to public access during training exercises.

All creeks within the area are closed to public access. Shelter from storms may still be sought at Freshwater Bay, Port Clinton, Pearl Bay, and the mouth of Island Head Creek.

Broad Sound

7.12 Broad Sound (22°12'S. 149°45'E.) extends SSE for approximately 22 miles between the peninsula, of which Arthur Point is the N extremity, and the mainland W, and is entered between that point and **West Hill Island** (21°50'S., 149°29'E.). A chain of islands, islets, and rocks extends across the entrance, through which there are three main channels.

There are depths of 18m in the N part of the sound, decreasing gradually towards its head, but there are extensive banks and flats off the E shore and at its head.

Broad Sound Channel (22°07'S., 150°17'E.), the S approach to Broad Sound, trends WNW from Cape Townshend to the wide N entrance to the sound. This channel lies between the S side of the Northumberland Isles and the islands and dangers in the entrance of Shoalwater Bay and Broad Sound. It is about 10 miles wide between Cape Townshend and Steep Island, but it narrows to about 2.5 miles between the North Point Islands and Boomerang Shoal and Lake Shoal.

Tides—Currents.—The tidal range in Broad Sound reaches a maximum of 10.9m at the mouth of Herbert Creek and is much greater than anywhere else on this part of the coast. In the entrance to the sound the flood current follows the trend of the channels and sets between W and S into the sound, and the ebb sets in the opposite direction. They have a rate of 2.5 to 3 knots in the larger channels, where the channel is confined, as in Race Passage, where they attain a rate of 3 to 4 knots at springs.

In the sound, the tidal currents turn soon after HW and LW by the shore, that is about 30 minutes after HW and LW at Saint Bees Island. In the approaches, however, during strong SE winds, the flood current setting W runs for nearly 2 hours after the time of HW by the shore, that is 2 hours 30 minutes after the time of HW at Saint Bees Island.

In the entrances of Saint Lawrence Creek and Waverly Creek, the tide rises rapidly; the flood current runs for about 3 hours 30 minutes while the ebb current for about 8 hours 30 minutes. The wind considerably affects the tide, with N winds retarding and lessening them and SE winds accelerating and increasing the tidal rise.

Depths—Limitations.—There are depths of 10.9 to 20.1m over much of the N part of the sound. In the larger entrance channels, there are depths of more that 10.9m, but in the smaller ones, there are depths of less than 1.8m.

7.13 North Point Passage (22°02'S., 149°53'E.), which enters Broad Sound from the NE, lies between North Point and the North Point Islands. It has a least depth in the fairway of about 7.9m and a least width of about 0.5 miles between Gannet Rock and North Point Cays.

Main Channel, the best channel into Broad Sound, lies between the North Point Islands and **Middle Shoals** (21°57'S., 149°44'E.). It has depths of 11 to 18.3m and is about 4.5 miles wide. In 1974, a depth of 7.9m was reported in Main Channel, 2 miles ENE of the NE end of Middle Shoal.

Flat Island Passage (21°59'S., 149°37'E.) enters the sound from the N through the Flat Islands. Although it has depths of 10.9m to 14.6m, it should not be attempted without local knowledge.

Anchorage.—On the W side of the sound, the best anchorage, sheltered from all but N and NE winds, is in about 8.3 to 10.1m, about 1 mile NW of the N end of **Aquila Islet** (21°58'S., 149°35'E.).

Anchorage may be obtained midway between **Roundish Islet** (22°03'S., 149°37'E.) and Flock Pigeon Islet, in a depth of 9.1 to 10.9m, but although the tidal currents are weak, the anchorage is exposed.

At the head of the sound, small vessels with local knowledge may anchor, in 7.3 to 12.8m, close W of Turtle Islet. Anchorage may also be taken in the mouth of Herbert Creek, about 0.7 mile offshore and about 1 mile ESE of **Charon Point** (22°23'S., 149°49'E.), in 5.5 to 7.3m.

On the E side of Broad Channel, the bottom is rocky N of West Side Islet and unless vessels are able to anchor in Burkitt Roads, they should not anchor in this area.

Off-lying Islands

7.14 The Northumberland Isles consists of a number of groups of small islands and islets which lie between a position about 12.5 miles ENE of Cape Townshend and a position about 21 miles E of **Hay Point** (21°17'S., 149°18'E.). Within these limits there are many islands, islets, and dangers that are practically contiguous with some of the coastal islets and dangers.

The Northumberland Isles fall into two groups, the E group and the W group. High Peak Island, with the islets and dangers in its vicinity, and the Percy Isles make up the E groups. The W groups from S to N, consist of the Duke Islands, the Bedwell Group, the Guardfish Cluster, and the Beverly Group.

Several courses for the Inner Route pass between the E and W groups. This makes it possible for the navigator to concern himself only with the islands adjacent to his track and not necessarily with the coast itself. Many of the high steep-to islands are good navigation marks and lights are shown from them. The inner edge of the Great Barrier Reef lies about 20 to 31 miles NE of the E groups of the Northumberland Isles. The rates and directions of the tidal currents are shown on the charts.

The Northumberland Isles—East Groups

7.15 **High Peak Island** (21°57'S., 150°42'E.) lies about 18.5 miles NE of Cape Townshend. A conspicuous peak rises to a height of 221m on the N end of the island. The island was reported to give good radar returns up to 26 miles. A light is shown on the summit of the innermost of two, high, conical rocks, which lie close off the E end of the island. Berwick Island and Rothbury Island lie about 1.7 and 4 miles, respectively, SW of High Peak Island.

Anchorage, sheltered from SE winds, may be obtained with local knowledge off a small sand and coral beach at the head of the S cove on the W side of High Peak Island, in depths of 27 to 33m. Depths of less than 11m extend 0.4 mile from the beach.

Cheviot Island (22°05'S., 150°40'E.) lies 7 miles S of High Peak Island and 12 miles ENE of Cape Townshend. A drying rock lies 0.1 mile N of the island, and there are tide rips off the S side of the island. Cheviot Island is the SE island of the E group.

Low Rock, 6m high, lies about 11.5 miles W of High Peak Island. This dangerous rock lies close E of the track through the Inner Route. A 17.3m patch lies approximately 1 mile, bearing 211° from Low Rock. If Steep Island is identified, there is no difficulty in avoiding this danger.

Steep Island (22°02'S., 150°27'E.), with a double summit and thickly wooded, lies 12.5 miles WNW of Chevoit Island. The island is an excellent landmark when approaching this part of the Northumberland Isles and is easily distinguished at night in clear weather.

The **Percy Islets** (21°39'S., 150°19'E.) extend about 20 miles NW from the Southeast Islets to the Hotspur Islets. This distinct group of islands and islets consists of the Southeast Islets, South Island, Middle Island, the Pine Islets, and a number of rocks and shoals. A light is shown on the SW side of Pine Islets. Pine Peak Island lies 5.5 miles N of Middle Island and shows a light on its W side.The **Hotspur Islets** (21°29'S., 150°16'E.), two islets connected by a reef, lie 1.2 miles N of Pine Peak Island.

Vernon Rocks (21°28'S., 150°19'E.) are a small group of four low, rocky islets which lie about 1.7 miles ENE of the Hotspur Islets. The group is about 0.5 mile long. The largest and N islet, from which a light is shown, is 7.6m high. A detached drying rock lies about 0.1 mile E of this islet.

Tides—Currents.—The tidal currents set strongly through the Percy Islands.

At the anchorage on the W side of Middle Island, spring tides rise 5.5m; neaps tides rise 4.2m.

Sphinx Islet, with a bare peak, lies 9.5 miles WSW of Vernon Rocks. Overfalls occur W of the N extremity of the islet.

The Northumberland Isles—West Group

7.16 The W groups consist of the islands and dangers on the W side of that part of the Inner Route track. They extend about 67 miles NW from Steep Island, which is 10 miles N of Cape Townshend, to **Overfall Rock** (21°16'S., 149°38'E.).

The **Duke Islands** (21°58'S., 150°08'E.) lie between 19 and 29 miles NW of Cape Townshend, with the E islet about 6.5 miles WNW of **Otterbourne Island** (22°02'S., 150°18'E.). The group is about 10 miles in length and almost the same distance in width. They are surrounded by rocks, shoals, or sand bars, and unless necessary, vessels should avoid the area.

The tidal currents are strong through the Duke Islands. A rate of 5 knots has been experienced between the islands.

Anchorage.—Anchorage may be obtained with the help of local knowledge, 0.2 mile S of Iron Islet, off the W side of Marble Island, in depths of 10 to 11m. The nearer the anchorage is to the shore, the less the tidal current will be felt. This is the best anchorage in the Duke Islands.

Vessels with local knowledge can obtain anchorage 1 mile WNW of the W side of **Tynemouth Island** (22°00'S., 150°08'E.), in depths of 7 to 9m, out of the strength of the tidal current.

The Bedwell Group

7.17 The **Bedwell Group** (21°50'S., 149°48'E.) consists of five bare-topped islands, rocks, and shoals which lie 25 miles WSW of Pine Islets Light. **Poynter Island** (21°50'S., 149°48'E.), 122m high, is the largest islet in the group. Innes Island is the northernmost islet, George Island is the easternmost islet, and Calliope Island is the southernmost islet.

Smythe Shoals (21°44'S., 149°52'E.), with depths of less than 1.8m, are on a narrow steep-to ridge that extends about 9 miles NE from a position almost 2 miles NE of Innes Island. Emily Patches, the SW end of these shoals, is separated from the rest of the ridge by a 10.9m channel about 1 mile wide. The sea at times breaks over these dangers and they are usually marked by current rips. The tidal currents set obliquely across them at a rate of 1.5 to 2 knots.

Guardfish Cluster

7.18 The **Guardfish Cluster** (21°35'S., 149°51'E.) is a group of islets and dangers almost 10 miles long and about 6 miles wide. The cluster is centered about 14 miles N of the middle of the Bedwell Group.

Curlew Island (21°36'S., 149°48'E.), 458m high and the largest of the cluster, lies about in the center of the group. Peak Head, a prominent 138m hill at the N end of the island, is surmounted by a square boulder. The island is fringed by numerous islets, rocks, and shoal dangers.

Bluff Islet lies about 3 miles E of Curlew Island and is the easternmost of the group. It is rocky, flat-topped, and has a re-

markable overhanging bluff at its NW extremity. Tinonee Peak Island, with a prominent 187m peak, lies about 3.5 miles ESE of Bluff Islet.

Anchorage.—Vessels may obtain anchorage in Davidson Bay, midway between **Treble Islet** (21°36'S., 149°50'E.) and Peak Head, in depths of 9 to 15m. The anchorage is easy to access from the S, but is only recommended as a temporary anchorage.

Garfish Bay affords good anchorage, but it is restricted and local knowledge is necessary. Vessels anchor, in depths of 7 to 15m, with shelter from E and SE winds. The anchorage is difficult of access owing to the shoals in the vicinity.

The Beverly Group

7.19 The **Beverly Group** (21°29'S., 149°53'E.), a chain of small, high rocky islets, extends about 7.5 miles NE of Digby Island, the southeasternmost of the group. Most of these islets are steep-to on their NE sides, but shoal water extends SW from some. Several extensive shoals lie up to 8 miles SW of this group.

The tidal currents set through the group at a rate of 1.5 to 3 knots at springs. The flood current sets SW and the ebb NE, and they cause heavy tide rips at each end of the group.

Digby Island (21°30'S., 149°54'E.) lies about 7.5 miles NE of Curlew Island. A drying ledge extends about 0.1 mile N from the N end of the island. Keelan Island, lies less than 0.2 mile NE of Digby Island, and the passage between them, is obstructed by shoals. Henderson Island lies about 0.2 mile N of Digby Island, and Noel Island lies 0.5 mile W of Digby Island.

Sappho Roads lies between Noel Island and Henderson Island. Several islets lie up to 3.5 miles NW of Sappho Roads and can best be seen on the chart.

Sappho Roads affords a somewhat protected anchorage. The best anchorage is in a depth of 20m close to Henderson Island. Shoal water, with depths of 9 to 16m, are found in the middle of the roads, but the tidal currents attain a rate of 2.5 to 3 knots and it is not recommended.

The inner part of the roads affords anchorage, in a depth of 8m, near the center. Sappho Roads are easy to access and are recommended for small craft unable to proceed S against strong SE winds, which often occur in winter.

7.20 **Prudhoe Island** (21°19'S., 149°40'E.), the NW and largest of Northumberland Isles, rises to a prominent peak, 331m high near its center. The W part of the island, a grassy ridge, is separated from the main part by a low neck of swampy ground. On the SW part of the neck there is a sandy beach where landings can be made. **Prudhoe Shoal** (21°19'S., 149°41'E.), with a least depth of 2.7m near its center, extends 1 mile S from the neck.

Anchorage may be obtained in a bay on the NE side of Prudhoe Island, and off the W side, in a depth of 26m, but the tidal currents in the latter attain a rate of 3 knots at springs. Anchorage may also be obtained off the E side of Prudhoe Shoal.

Caution must be exercised when seeking shelter on the SW side of Prudhoe Island, as soundings are not a safe guide, and greater depths lie close on each side of Prudhoe Shoal.

Prudhoe Channel (21°23'S., 149°43'E.) lies between Prudhoe Island and Double Island, on the NE side, and Beverley Group and Reid Islet, on the SW side; there are depths of more than 11m in the fairway. The narrowest part is at the W end where it is 1.5 miles wide. Care must be taken to allow for the tidal currents which set across it at a rate of 1.5 to 2 knots.

Viscount Shoals consists of a number of narrow sand banks, with depths of less than 11m, which lie roughly parallel with one another in a general N-S direction, W of a line joining **Elamang Islet** (21°28'S., 149°39'E.) and the Reid Islets. The W shoal, with a least depth of 3.7m, lies between positions 4.5 miles W of Elamang Islet and 5 miles W of Reid Islet. The E shoal, marked by overfalls on its W side, has a least depth of 4m, and lies 2 miles NW of Elamang Islet.

Caution.—Viscount Shoals form the NW termination of numerous dangers among the Northumberland Islets. Their origin is to be traced to the silt deposits from Broad Sound as most of the banks radiate from the entrance to that sound. Their configuration and general direction indicate that tidal currents are active agents in the formation of these narrow sand and mud ridges, and it is highly probable that many changes will continue to take place in them.

Great Barrier Reef—Inner Edge

7.21 It must be remembered that the following reefs and islets are the prominent ones marking the limits of the inner edge of the Great Barrier Reef, and vessels should keep SW of a line joining them.

Alarm Reef (21°07'S., 150°15'E.), a steep-to reef that dries 0.3m, lies about 21 miles N of the Hotspur Islets.

Prince Reef, which dries, is a steep-to patch about 3 miles NNE of Alarm Reef.

Sandpiper Reef lies about 10 miles WNW of Alarm Reef. Redbill Islet lies about 3.2 miles NW of Sandpiper Reef.

Parker Reef (20°33'S., 149°45'E.), which dries 4.6m, lies on the W side of a coral reef about 0.7 mile in diameter. This part of the barrier reef between Alarm Reef and Parker Reef lies 8 to 19 miles E and NE of the E side of the S islets of the Cumberland Islands

Tideway Reef lies about 31 miles NNW of Parker Reef and has rocks and shoal water lying up to about 1 mile W of it. Vessels are cautioned to keep at least 5 miles W of a line from Parker Reef to Tideway Reef, as the area between them has not been examined.

Bait Reef (19°49'S., 149°04'E.), which dries, lies about 35 miles WNW of Tideway Reef. The reef is about 1.7 miles long and steep-to, with depths of over 37m close around, except on the NW side where there is a depth of 12.8m. The W end of Hook Reef, which extends about 8 miles E, lies about 1.5 miles E of Bait Reef. Beacons stand on the SE and SW extremities of the reef; two beacons stand on the NW extremity of the reef.

Hydrographer's Passage

7.22 **Hydrographer's Passage** (19°47'S., 150°24'E.) through the Great Barrier Reef allows deep-draft vessels access to the inner route. The passage, with a least depth of 25m, has a total length of 83 miles from the pilot boarding station at the seaward entrance to its junction with the Inner Route.

Pilotage.—See paragraph 7.2 for pilotage information fol-

lowing the heading "Navigation in the Great Barrier Reef."

Caution should be exercised when approaching the boarding ground as a line of shoals lies about 2 miles to the SW. The passage consists of a relatively narrow but well-surveyed corridor through the Great Barrier Reef, and extreme care should be taken to maintain a position within this channel, as the bordering areas are unsurveyed.

Caution.—Extensive local knowledge is required for the approach to, and the navigation of, this passage, particularly at the seaward entrance.

Vessels are strongly urged to contact local authorities before attempting passage.

West Hill Island to Hay Point

7.23 West Hill Island (21°50'S., 149°29'E.), 300m high near its E end, appears as a conspicuous detached wooded hill which lies less than 0.5 mile off the mainland. The W side of the island is low and connected to the mainland by a drying flat.

Anchorage may be taken, in 7.3m, about 1 mile off the E side of the island, with the summit of the island bearing about 277°.

Between West Hill Island and Cape Palmerston, about 18 miles N, the coast trends in that direction and is mostly low with a number of rocky points. Mount Funnel, 351m high, lies about 2.5 miles inland and about 7 miles SW of Cape Palmerston. This conspicuous mountain has been seen clearly for a distance of 42 miles.

Notch Point (21°44'S., 149°29'E.) lies about 5 miles N of West Hill Island, and the coast between these two features is indented about 3 miles W of a bight, most of which dries. Green Hill lies about 3 miles NNW of Notch Point.

The Temple Islets, fringed by rocks and foul ground, lie up to 2.5 miles offshore, about 7.5 miles N of Notch Point. These islets are separated from the mainland by a narrow channel encumbered with drying rocks.

Cape Palmerston (21°32'S., 149°29'E.), 43m high and bare, is a bluff, rocky headland, and the N extremity of a peninsula which extends 3.7 miles N from **Coconut Point** (21°36'S., 149°28'E.). The E side of the peninsula, fringed with rocks, an above-water reef, and drying rocks on which there are several stunted mangroves, extends 1.5 miles from the cape.

Between Cape Palmerston and **Freshwater Point** (21°25'S., 149°20'E.), the coast is indented about 4.5 miles SW by two inlets. Glendower Point, which separates these inlets, lies about 5 miles NW of Cape Palmerston. Cullen Islet lies about 6.5 miles N of Cape Palmerston. Phillips Reef, about 0.5 mile long, is a drying patch about 2.5 miles S of Cullen Islet.

Coaster Channel (21°26'S., 149°32'E.) lies between **Sandy Shoals** (21°50'S., 149°33'E.), Stony Shoals, Torch Shoals, Yaralla Shoals, and Viscount Shoals on the E side, and the mainland on the W side. The channel should not be used without local knowledge.

Hay Point (21°18'S., 149°18'E.), bare and rocky, lies about 9 miles NNW of Freshwater Point. A below-water rock lies 0.7 mile ESE of the point. Hay Reef, a coral ledge which dries 2.1m, extends 0.5 mile N from the point. A lighted buoy is moored 0.1 mile N of the reef.

Mount Griffiths, 74m high, lies 1.5 miles SW of Hay Point.

A light is shown at the Harbormaster's Office, a red brick building on Mount Griffiths.

7.24 Port of Hay Point (21°16'S., 149°19'E.) (World Port Index No. 53405) consists of conveyor jetties which extend 1 mile ENE and 2 miles NE from the vicinity of Hay Point. Hay Point Services (HPS) stands at the seaward end of the S conveyor, while Dalrymple Bay Coal Terminal stands at the end of the N conveyor; both are conspicuous. Together they are the largest coal export facility in the Southern Hemisphere.

North Queensland Bulk Ports Corporation

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Tides—Currents.—The tidal current sets 160° on the flood tide and 340° on the ebb tide. The maximum rate is 2 knots. Slack water occurs about 1 hour 30 minutes before HW and LW.

Depths—Limitations.—Vessels in ballast can approach the S wharf from any E direction. The approach to the N wharf from the SE is dredged to 13m.

The Hay Point Services (HPS) berths are situated at the head of the S conveyor jetty and consist of two dolphin berths. HPS Berth No. 1 has a total length of 397m, with an alongside depth of 16.2m. Vessels of up to 150,000 dwt can be accommodated. HPS Berth No. 2 has a total length of 450m, with an alongside depth of 16.1m.

Dalrymple Bay Coal Terminal is situated at the head of the N conveyor jetty and has three berths. Berth No. 3, the northernmost berth of the three, has a charted depth of 18.9m. Berth No. 1, located at the middle of the pier, has a length of 490m between the dolphins and depths alongside of 18.1m. Berth No. 2, just S of Berth No. 1, has a depth of 18.0m. The terminal will accommodate vessels of up to 200,000 dwt.

An expansion of the terminal is currently in progress. The expansion is being done in three phases, with the first phase having been completed in March 2008. The entire project is expected to be completed by the end of 2008, increasing capacity by 44 per cent.

The bottom at the berths is mud and silt.

Vessels should have an underkeel clearance of at least 1.5m while berthed alongside. On departure, ships can proceed directly to sea. They are required to have an underkeel clearance of 10 per cent of their draft plus 0.6m.

Pilotage.—Pilotage is compulsory, available 24 hours, and carried out by Maritime Safety Queensland (MSQ). Pilots usually board by helicopter, but there is a launch available if needed. Pilots are stationed at Hay Point and board vessels in the following positions:

1. Bravo—1°13.5'S, 149°20.7'E.
2. Charlie—21°17.3'S, 149°20.7'E.

Pilots can be contacted on VHF channels 14 and 16.

Regulations.—The ETA of a vessel is required 7 days, 48 hours, 24 hours, and 2 hours in advance.

There are two restricted areas located in the approaches to the port, as follows:

1. Restricted Area A is bound by lines joining the following positions:
   a. 21°16.6'S, 149°19.0'E.
   b. 21°14.2'S, 149°17.8'E.

c. 21°13.6'S, 149°19.0'E.
d. 21°14.8'S, 149°19.8'E.
e. 21°16.2'S, 149°20.4'E.

2. Restricted Area B is bound by lines joining the following positions:
a. 21°14.8'S., 149°19.8'E.
b. 21°13.2'S., 149°25.2'E.
c. 21°14.8'S., 149°25.6'E.
d. 21°16.2'S., 149°20.4'E.

Restricted Area A and Restricted Area B prohibit the mooring and anchoring of unauthorized vessels; Restricted Area A also prohibits the maneuvering of unauthorized vessels.

Vessels may transit Restricted Area B as long as no other vessel is maneuvering in the area; they should also monitor VHF channel 16.

Signals.—A port radio station is maintained at Hay Point.

Anchorage.—Numbered anchor berths are charted N1 through N15; the S anchorage has seven berths S of the approach route from the ENE. Berths are assigned by Harbor Control.

Caution.—A restricted area for ship loading, the limits of which are shown on the chart, lies NE of the wharfs. Unauthorized vessels are prohibited from mooring, anchoring, or maneuvering in this area.

Hay Point to Slade Point

7.25 Between Hay Point and Slade Point, about 13 miles NNW, the coast is indented about 4 miles WSW by a bight. Dudgeon Point lies about 2.7 miles NW of Hay Point; there are depths of less than 5.5m up to about 1 mile offshore between them. In 1973, two shoals of approximately 11m were reported to lie 3.5 and 4 miles NE of Hay Point.

Slade Point is described in paragraph 7.29

Mackay (21°09'S., 149°13'E.)

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7.26 Mackay Outer Harbor, the port facility for Mackay, is situated about 2.5 miles S of Slade Point. The town of Mackay lies on the S bank of the mouth of the Pioneer River, which is so shallow that it dries.

North Queensland Bulk Ports Corporation

http://www.nqbp.com.au

Winds—Weather.—Mackay lies within the section of the Queensland coast most frequently visited by typhoons. With the exception of these severe tropical storms, pressure systems usually pass without causing extremes in weather. Southeast winds are very common in this area.

High winds will at times build up heavy seas outside the harbor, causing vessels to surge excessively at their berths. The surge is generally accentuated during rising tides.

Tides—Currents.—At the entrance to Mackay Outer Harbor, the flood current sets S and the ebb current sets N, at a rate of 2.5 knots at springs and 1 knot at neaps. It has been found that vessels of 4,000 gt may enter safely when the rate of the current does not exceed 1.5 knots. Large vessels should not attempt to enter port when there is more than 0.5 knot of tidal current running at the entrance. Small vessels will have no difficulty entering at any time. Currents inside the harbor during the ebb are very weak. During flood tide, the current inside the harbor sweeps toward Breast Wharf and then veers W and eddies under the pier.

The tidal current in the river attains a rate of 3 to 4 knots. Slack water occurs about 1.5 hours before HW and LW. The ebb current reaches its maximum at about HW, but soon decreases.

The tidal rise is 5.5m at MHWS and 4.2m at MHWN.

Depths—Limitations.—Vessels utilizing the port enter at slack water. Vessels are limited to a length of 155m and must maintain an underkeel clearance of 0.6m.

The approach channel has a depth of 8.5m to the turning basin inside the breakwater, which has a maintained depth of 8.3m. Lesser depths may be encountered close to the Northern (Lee) Breakwater within the Harbor Swing Basin.

Berth 1 to Berth 4 offer facilities for handling bulk liquid, bulk solid, container, and general cargo. A molasses terminal is located at Berth 1. Berth 2 is disused.

Mackay Port Facilities

Berth	Length	Depth	Max. Length	Remarks
1	123m	11.0m	210m	Petroleum, molasses, tallow, and ethanol.
2	190m	10.1m	188m	General cargo, fertilizer, iron, and bulk liquid chemicals.
3	315m	12.9m	—	Bulk raw sugar.
4	225m	10.8m	—	Bulk refined sugar and general cargo.
5	165m	12.5m	270m	Bulk grain.

Bulk Grain Wharf Berth 5, on the N side of the harbor, handles bulk grain cargo. Love's Jetty, situated just W of Berth 1, has a depth of 3.4m, and accommodates passenger and pleasure craft.

A number of large mooring buoys lie in the N part of the harbor.

Depths at the Mackay Marina range from 4.5 to 3.5m.

Aspect.—Flat Top Island, SE of East Point, is marked by a light. Leading lights, in line bearing 288°, lead N of the Downward Patches to Mackay Outer Harbor.

Pilotage.—Pilotage is compulsory and should be requested 48 hours in advance. Pilots should be advised, via the agent, whether pilot transfer can be accomplished by helicopter or if a launch is required. Pilots board about 2 miles ESE of Southern Breakwater. Vessels should contact Mackay VTS 2 hours prior to arrival on VHF channel 14 or 16.

Regulations.—Vessels should maintain a continuous listening watch on VHF channels 14 and 16 while at anchor or

alongside a berth.

Prior to berthing, vessels are required to have:

1. The propeller fully immersed.
2. A trim of not more than 2.5m by the stern. Trim by the head is not permitted.

Vessels carrying more than 10kg of explosives shall not proceed past the anchorage.

An agent or master shall obtain a permit to handle dangerous cargo at least 24 hours in advance of the cargo movement.

Masters are advised not to maneuver W of a line between Slade Island and Flat Top Island.

Anchorage.—Anchorage may be taken, in depths of 12 to 14m, about 1.5 to 2 miles E of Slade Islet.

Vessels of light draft may anchor, in about 7.3m, about 0.5 to 0.7 mile NW of the NW side of Flat Top Island.

Anchorage is prohibited in the area, best seen on the chart, located S of Slade Island.

The Cumberland Islands—South Groups

7.27 The SE group of the Cumberland Islands is comprised of the S group and the Sir James Smith Group, a chain of islands which extends from Snare Peak Island to Silversmith Island, 56 miles WNW. The islands are mostly high, rocky, and thickly wooded, particularly with pine trees.

Snare Peak Island (21°06'S., 149°56'E.), the southernmost of the Cumberland Islands, rises to a peak 88m high. Snare Rocks, 1.2m high, lie 1.7 miles E of the island.

Penrith Island lies about 5 miles NNW of Snare Peak Island. It is steep-to on its NE side, but a reef fringes the S and W sides up to about 1 mile offshore. A light is shown on the summit of the island. Derwent Island lies 5.5 miles WNW of Penrith Island.

Bailey Island (21°02'S., 149°33'E.) has two rocks, which dry 1.2m, off its NW extremity. A light is shown from the summit of the islet.

Scawfell Island (20°52'S., 149°37'E.) rises to a peak, 397m high, SE of Duddon Point, the N extremity of the island.

Anchorage.—Anchorage with good shelter may be obtained, in a depth of 13m in Refuge Bay, on the NW side of the island. Calder Island, 143m high, lies 4 miles N of Scawfell Island.

St. Bees Island (20°55'S., 149°27'E.) lies on the W side of Cumberland Channel, about 8 miles WSW of Scawfell Island. Keswick Island is separated from St. Bees Island by Egremont Pass.

Anchorage.—Anchorage may be obtained in the N entrance of the pass, in a depth of 16m, 0.5 mile W of Schooner Rock. Small vessels with local knowledge can find shelter in the pass, but care must be taken.

Wigton Island (20°44'S., 149°28'E.), 127m high, wooded, and cliff-faced on its NE side, lies 8 miles WNW of Calder Island. Cockermouth Island lies 3.7 miles SW of Wigton Island.

Anchorage.—Anchorage may be obtained, in a depth of 27m, 0.5 mile N of the NW extremity of Cockermouth Island. Silloth Rocks lie on the E side of a drying reef between Cockermouth Island and Wigton Island.

Carlisle Island (20°47'S., 149°17'E.) is wooded and rises to Skiddaw Peak, 393m high, close within its N extremity. Brampton Island lies SW of Carlisle Island and is connected to it by a drying reef and sandbar.

Anchorage.—Maryport Bay, on the W side of Carlisle Island, affords a sheltered anchorage, except in winds from between NE and W. A light is shown from a rock lying off the W end of Brampton Island.

7.28 The **Sir James Smith Group** (20°38'S., 149°08'E.) consists of several groups of small islands and dangers which make up the northernmost of the S part of the Cumberland Islands.

Linne Island (20°40'S., 149°11'E.), 284m high near its N extremity and wooded, lies 0.5 mile NW of Tinsmith Island and is the highest and most remarkable of the Sir James Smith Group. The S part of the island is joined to the main part of the island by a low neck. A bank, with a least depth of 7.6m, lies 0.5 mile W of Linne Island.

Goldsmith Island (20°41'S., 149°09'E.), 194m high near its N end, lies 0.5 mile W of Linne Island. An islet, 7.6m high, lies close E of its N extremity.

Anchorage.—Anchorage, sheltered from SE gales, may be obtained off the NW side of Goldsmith Island.

Locksmith Island lies 0.5 mile N of Goldsmith Island. Depths of less than 20m extend 0.5 mile NE and SW, respectively, from the island. Overfalls occur between Locksmith Island and Goldsmith Island.

The **Ingot Islands** (20°43'S., 149°08'E.) lie on a spit with depths of less than 11m, which extends 1.5 miles S from Goldsmith Island. No attempt should be made to pass between the islands or between the N island and Goldsmith Island.

Anchorage.—Anchorage, with shelter from N winds, may be obtained 0.5 mile E of the N Ingot Island, with good holding ground.

Coppersmith Rock lies 3.7 miles NNW of Locksmith Island. It is located on the S end of a drying reef which extends about 0.1 mile NW from the rock. A light is shown from the rock.

A number of islets, rocks, and shoals lie off the above-mentioned islands and can best be seen on the appropriate charts.

Slade Point to Cape Conway

7.29 **Slade Point** (21°04'S., 149°14'E.) lies 2.5 miles N of Mackay Outer Harbor. The point consists of a hilly promontory fringed by rocks within less than 0.2 mile offshore. The E side of the point is fairly steep-to with depths of about 9.1 to 10.9m close to shore.

Shoal Point, about 5.5 miles NW of Slade Point, is the rocky extremity of a grassy projection that slopes down from the hills backing the coast. Several drying patches lie about 1.2 miles SE and SSE of the point. Green Islet lies about 1 mile N of the point and is connected by a drying reef.

Llewellyn Shoal (21°00'S., 149°19'E.), with a least depth of 4.5m, lies about 6 miles NE of Slade Point. Hunt Shoal, an 8.2m patch, lies about 1.7 miles ENE of Llewellyn Shoal.

Blackwood Shoals are a number of rocky patches, covered with light sand, with depths of less than 10.9m and with a least depth of 1.8m, extending about 8 or 9 miles off the coast between Slade Point and Cape Hillsborough. Vessels should not navigate in this area without local knowledge.

Cape Hillsborough (20°54'S., 149°03'E.) is a conspicuous, bold headland, 259m high, faced in places by steep sandstone

cliffs. Elsewhere, its seaward face is thickly wooded with large pine trees, but its summit is bare. The cape is connected to the mainland by a low scrub-covered isthmus. Pinnacle Rock, a conspicuous peaked hill, rises 3 miles WSW of the cape.

The Red Cliff Islets, two in number, lie on a drying reef which extends 1 mile N from **Finlayson Point** (20°53'S., 148°57'E.). The islets are very conspicuous.

Port Newry (20°51'S., 148°56'E.) is entered between Mausoleum Islet and Outer Newry Island. A safe harbor for small vessels lies between Outer Newry Island and Newry Island. The fairway between these islands is narrow and the bottom is soft mud.

Anchorage.—Anchorage in the channel S of Newry Island is exposed to E winds.

7.30 The **Stewart Peninsula** (20°47'S., 148°50'E.), 127m high and wooded, forms the N side of St. Helens Bay. Dewars Point, the SE extremity of the peninsula, forms the N entrance point of the bay. The peninsula is separated from the mainland by a mangrove swamp.

The Repulse Islands, a group of small rocky islands covered with grass and a few trees, lies near the middle of the entrance of Repulse Bay, 11 miles NNE of the Stewart Peninsula.

Anchorage.—Anchorage may be obtained by small vessels among the islands which afford good shelter if care is taken.

Repulse Bay (20°35'S., 148°48'E.) indents the coast between Midge Point and Cape Conway. The land is low and flat on the W side of the bay and hilly on its N and NE sides. The Proserpine River, navigable by small craft for about 9 miles, lies at the head of the bay. The whole of Repulse Bay, with the exception of the NE part, has depths of less than 11m. There are depths of less than 5.5m extending up to 2.5 miles from the W shore and the head of the bay.

The Cumberland Islands—The Lindeman Group

7.31 The **Lindeman Group** (20°30'S., 149°05'E.), the S group of the N group of the Cumberland Islands, is comprised of the islands between Thomas Island and Pentecost Island.

Thomas Island (20°33'S., 149°07'E.), 182m high and the S island of the group, lies 9.5 miles E of Cape Conway. This steep-to island has several smaller islets and foul ground fringing it up to a little over 0.2 mile offshore.

Anchorage.—Small vessels with local knowledge may obtain anchorage, in a depth of 4m, inside the islet off the bay on the N side of Thomas Island. Anchorage may also be obtained, in a depth of 20m, 0.5 mile NE of the W extremity of the island, but it is open to N winds.

Keyser Island (20°32'S., 149°05'E.) lies 2 miles NW of Thomas Island and is 79m high and bare. Long Rock lies on a drying reef, 0.2 mile SW of Keyser Island. Volskow Islet, with its upper part covered with trees, lies 0.7 mile NE of Keyser Island. Triangle Island, bare and rocky, lies 1.5 miles NE of Volskow Islet.

Mansell Island (20°28'S., 149°08'E.) is 192m high with a flat, grassy summit. Apart from the summit, the island is bare and cliff-faced. An 8.2m patch lies 0.5 mile W of the S extremity of the island. Comston Island, low and cliffy, lies 0.7 mile WNW of Mansell Island.

Shaw Island, with its SE end about 0.5 mile W of Keyser Island, is a narrow island about 6 miles long. Shaw Peak, 404m high, lies near the N end of the island, and a 253m peak lies near the S end. The E side of the island consists of cliffs and sandy bays, mostly fringed by drying coral reefs. The W coast forms the E side of Kennedy Sound. Shaw Island is reported to be uninhabited.

Anchorage.—Anchorage may be obtained in Neck Bay on the W side of Shaw Island, 1.2 miles NE of Yellow Rock.

The anchorage, sheltered from all except N winds, is in a depth of 13m, but is susceptible to strong sudden squalls during SE winds. The anchorage lies in the strong tidal currents in Kennedy Sound.

Anchorage may also be obtained, in a depth of 20m, 0.7 mile ENE of Burning Point, but it lies in the strong tidal current.

Lindeman Island (20°27'S., 149°02'E.) lies about 1.2 miles W of the N end of Shaw Island. The island, which is 212m high, is a tourist resort, and a hotel is situated near its S extremity. A light is shown from the SSW side of the island.

Seaforth Island (20°28'S., 149°02'E.), 51m high, lies 0.5 mile S of the S extremity of Lindeman Island. Spitfire Rock, which dries, lies about 0.2 mile WSW of Seaforth Island.

Anchorage.—Anchorage may be obtained, in a depth of 13m, about 0.5 mile E of the N extremity of Seaforth Island. It is one of the better anchorages of the Lindeman Group. An alternative anchorage, in a depth of 8m, lies 0.3 mile SE of the N extremity of Seaforth Island.

The Cumberland Islands—The Whitsunday Group

7.32 The **Whitsunday Group** (20°15'S., 149°00'E.), the N group of the N group of the Cumberland Islands, is comprised of the islands between Dent Island and Hayman Island, 19 miles to the NNW.

Dent Island (20°22'S., 148°56'E.) lies on the E side of Whitsunday Passage at the SW extremity of the Whitsunday Group. The island is steep-to on its S and W sides. Reefs and shoals almost connect the NE end of Dent Island with the S end and E side of Henning Island, about 0.7 mile to the N. A light is shown on the W side of Dent Island.

Anchorage.—Anchorage, in depths of 15 to 27m, may be obtained off the N end of Dent Island.

Anchorage is prohibited in most of Dent Passage.

Hamilton Island lies about 0.5 mile E of Dent Island from which it is separated by Dent Passage, a narrow strait. **Henning Island** (20°19'S., 148°56'E.) lies about 0.7 mile N of Dent Island.

Aspect.—A conspicuous mast stands on a hill 0.5 mile SE of the NW point of Hamilton Island.

An airfield is situated S of a marina, which is situated 1 mile S of the N point of the island. Vessels navigating Dent Passage are advised to keep clear of the runway when aircraft are taking off or landing.

A shoal depth of 2.4m lies close off the point 0.4 mile N of the runway beacon.

Anchorage.—Vessels with local knowledge may take sheltered anchorage about midway between Henning Island and Whitsunday Island, in a depth of 29m.

Whitsunday Island (20°15'S., 149°00'E.), the largest of the Cumberland Islands, lies with Reef Point, its W extremity,

about 1.5 miles N of Henning Island. The island is about 8.5 miles wide and 10.5 miles long. Most of the numerous bays and inlets which indent the island are encumbered with shoal water and reefs. Cid Island, which shows a light, lies about 0.5 mile N of Reef Point.

Anchorage.—Cid Harbor affords anchorage, in depths of 11 to 15m, good holding ground. Anchorage can also be taken in White Bay, on the E side of Whitsunday Island, in a depth of 13m, and, in a depth of 9m, 0.6 mile W of **Tongue Point** (20°14'S., 149°01'E.). An anchorage area has been established just E of Henning Island in Fitzalan Passage.

7.33 Edward Island (20°15'S., 149°10'E.), the SE island of the Whitsunday Group, is 106m high. Foul ground extends 0.7 mile E from the island, and near its outer end is a rock 6.1m high, with another above-water rock between it and the island. A light is shown from Edward Island. An isolated depth of 6.2m lies 19 miles ENE of the light.

Border Island, 228m high, lies 9 miles NW of Edward Island.

Anchorage.—Anchorage with shelter from S winds, may be obtained in **Cataran Bay** (20°10'S., 149°02'E.), on the N side of the island, in depths of 15 to 20m, 0.5 mile W of the NE extremity of the island.

Hook Island (20°06'S., 148°55'E.) lies N of Whitsunday Island, from which it is separated by a narrow channel. There is a least depth of 11m in the fairway of the channel, for which local knowledge is essential. Hook Island is wooded and rises to Hook Peak (20°06'S., 148°56'E.), the highest summit in the Cumberland Islands. The island is about 7 miles long and 3.5 miles wide.

The S coast of Hook Island is indented by Macona Inlet and Nara Inlet, which are separated by a peninsula. Both inlets extend N for 2.7 miles, and are fringed by drying coral reefs.

Macona Inlet is fronted by a bar, with depths of 3.7m in the fairway. Nara Inlet has depths of 6.7 to 8.5m, but its entrance is obstructed by a bank, with depths of less than 5.5m. In 1978, a dangerous rock was reported to lie in the fairway across the bar fronting Macona Inlet. A light is shown from the E entrance point of Nara Inlet. A lighted beacon stands close off the entrance point of Macon Inlet.

Pinnacle Point (20°03'S., 148°58'E.), on which a light is shown, rises to a height of 18m just within the NE extremity of Hook Island. Several rocks above and below-water extend about 0.2 mile NE from the point. There are tide rips E of these rocks.

Anchorage.—Butterfly Bay lies 1.5 miles WSW of Pinnacle Point and affords anchorage to vessels with local knowledge; the E side of the bay has the better anchorage.

7.34 Langford Islet lies about 5.5 miles WSW of Pinnacle Point. A steep-to drying reef extends 1 mile SE and S of the islet. Bird Islet lies on the W side of this reef about 0.5 mile S of Langford Islet. A light is shown from Bird Islet.

South Channel lies between Baird Point and the drying reef 1.1 miles NW. A detached shoal, with a depth of 7.3m, was reported (1990) to lie 0.2 mile NNE of Baird Point.

Hayman Island (20°03'S., 148°53'E.), 247m high, lies about 0.7 mile NW of the NW end of Hook Island and is the northernmost of the Cumberland Islands. A small harbor, dredged to 4.5m, is situated at the SW end of Hayman Island at the W end of a tourist resort.

Anchorage.—Anchorage may be taken, in 24m, with the S end of the harbor pier bearing 046°, 0.3 mile.

Stonehaven Anchorage (20°06'S., 148°53'E.) lies S of Hayman Island, between Hook Island and the Langford Islet reef. There are depths of about 12.8 to 28m throughout most of Stonehaven Anchorage and more than 18.3m in the fairways of all the channels leading into it. Although any of the channels may be used in entering, South Channel, between the SE end of the Langford Islet reef and Hook Island, is wide and easy to enter.

The tidal currents are weak in Stonehaven Anchorage but they may attain a rate of 1.5 knots in the narrower entrance channels. At the anchorage, the flood current sets S and the ebb current sets NW.

Vessels may take anchorage, with good holding ground, in 14.6m, about 0.4 mile NNW of Anchor Point. An aircraft mooring buoy is moored E of the anchorage. Depths at the anchorage vary from 11 to 27m.

Cape Conway to Pioneer Point

7.35 Between Cape Conway and Pioneer Point, about 20 miles NNW, the bold hilly coast trends quite regularly in that direction and rises abruptly to heights of 419m, about 0.5 mile inland. Although most of this coast is rocky, some of the bays and inlets have drying mud and sand flats bordered by mangroves. This part of the coast and its adjacent islands lie on the W side of Whitsunday Passage.

Round Head (20°29'S., 148°54'E.) lies about 3.5 miles NNW of Cape Conway and is the extremity of a peninsula that extends about 1.5 miles E from the mainland. Genesta Bay indents the coast about 1.2 miles W on the S side of Round Head.

Anchorage.—There is good anchorage in the bay, in depths of 5 to 9m. Anchorage may also be obtained by vessels with local knowledge, in depths of 5 to 11m, in Puritan Bay on the N side of the promontory of which Round Head is the SE extremity.

Long Shoal, composed of hard sand, which dries 0.6m near its S end, lies with that end 1.5 miles NE of Cape Conway, and extends 4 miles NNW. The shoal is steep-to, and the E and N end are marked by overfalls and eddies. The channel inshore of Long Shoal should not be used without local knowledge.

Long Island (20°22'S., 148°52'E.), 269m high, lies with its S end about 5 miles NNW of Round Head. This narrow island is about 5 miles long, S to N, and lies from about 0.2 mile to 1.2 miles offshore. East Rock, 10.4m high, lies a little over 0.2 mile off the E side of the island. Pine Island lies about 0.7 mile ENE of the S end of Long Island. Strong eddies occur off both ends of Pine Island and vessels should not approach within 0.5 mile of these points. Radio towers stand near the N end of Long Island.

7.36 Port Molle (20°19'S., 148°51'E.) is suitable for large vessels which use Whitsunday Passage or Molle Channel, entered between South Head (20°19'S., 148°52'E.) and Denman Island, 2 miles N. Only high-powered vessels of moderate draft should use Long Island Sound owing to the strong tidal currents.

Anchorage.—Anchorage out of the strength of the tidal currents may be obtained, in depths of 13 to 15m, mud, 0.6 mile N of **Humpy Point** (20°20'S., 148°51'E.).

Rooper Inlet lies between **Stripe Point** (20°19'S., 148°49'E.) and The Beak, 2.5 miles NNW. The shores of the inlet are fringed with mangroves and at its head is Shute Bay which is shallow. The inlet is encumbered with shoal water and a number of islets and dangers lie in its entrance. Shute Islet, the largest of these dangers, lies about 1.5 miles NNW of Stripe Point. A lighted beacon stands on the edge of the reef close off the N extremity of the islet. Low Reef lies 0.2 mile NNE of Shute Islet. Low Rock lighted beacon stands on the E side of the reef. Repair Island lies W of Shute Islet and shows a light. A light stands on The Beak.

Vessels without local knowledge should not attempt to navigate between the islets in the entrance of Rooper Inlet.

Anchorage.—Small vessels with local knowledge may take anchorage in Rooper Inlet, in 5.5m.

Molle Island (20°16'S., 148°50'E.), 194m high and the southernmost of the Molle Group, lies about 1.5 miles E of The Beak.

Anchorage.—Vessels may take anchorage on the W side of Molle Island about 0.3 mile NNW of Roma Point (20°17'S., 148°50'E.) and about 0.2 mile offshore, in depths of 18 to 24m, good holding ground. During the ebb current an eddy sets S in this anchorage.

7.37 Mid Molle Island is a narrow islet at the N end of Molle Island to which it is connected by a short causeway.

North Molle Island (20°13'S., 148°49'E.) lies 0.2 mile N of Mid Molle Island. The two islands are separated by a narrow channel, suitable only for boats, in which there is a strong tidal race.

West Molle Island (20°15'S., 148°49'E.) lies 1 mile SW of Mid Molle Island, and is 47m high and reef-fringed. There is a village on the W side of the island near the S end. West Molle Island and the dangers surrounding it are covered by the red sector of The Beak Light. Leading lights are shown close together at the N end of West Molle Island. In line bearing 240.5°, they lead through Unsafe Passage. The passage E of the island should not be used by low powered vessels.

Molle Channel, which lies between the Molle Islands on the E side and the mainland from Stripe Point to Pioneer Point on the W side, is deep and wide, the narrowest part being between the reef extending S from West Molle Island and The Beak. There are depths of more than 37m in the fairway.

Caution.—A submarine power cable and pipeline are laid across Molle Channel from a position 0.8 mile W of The Beak to West Molle Island. The submarine power cable then crosses to SE to Molle Island.

Pioneer Point (20°14'S., 148°46'E.), a rocky tree-covered islet, is connected to the mainland S. Pioneer Rocks, which dry 3m, lie 0.5 mile NW of Pioneer Point, with below-water rocks extending 0.1 mile S. A lighted beacon stands on the rocks.

Anchorage.—Anchorage may be obtained, in a depth of 11m, W of Pioneer Point, sheltered from S winds.

Pioneer Point to Cape Edgecumbe

7.38 **Pioneer Bay** (20°14'S., 148°42'E.), entered between Pioneer Point and Grimston Point, 6 miles NW, has depths of less than 11m within a line joining the entrance points. Pigeon Islet, 9.1m high, lies at the head of the bay on the edge of a drying bank. The villages of Cannonvale and Airlie, each with a small jetty, lie 0.7 mile S and 1 mile E, respectively, of Pigeon Islet. A marina, with a breakwater marked by lighted beacons, is situated close N of Airlie.

Grimston Point is the N extremity of a narrow peninsula, 24m high and 2.7 miles long, which projects NNE from the mainland, and is covered with rocks and grass. The point is 84m high; the E side is steep-to.

Anchorage.—Anchorage may be obtained in the lee of the point during SW gales.

A series of small bays and inlets indent the coast between Grimston Point and George Point, about 9 miles NW. Although most of these are clear of dangers, some of them are fringed with reefs, which can best be seen on the chart.

Grassy Island (20°09'S., 148°37'E.) lies about 3.7 miles N of Grimston Point and about 1.2 miles offshore. A drying reef fringes the S side of the island up to about 0.5 mile offshore.

Anchorage.—Anchorage may be obtained, in a depth of 7m, 0.7 mile off the S side of the island. This anchorage is sheltered from N winds.

Gumbrell Island (20°06'S., 148°36'E.), doubled-peaked and 91m high, lies about 2.2 miles N of Grassy Island. Depths of less than 10.9m lie up to 0.5 mile N and S of the island; a reef extends about 0.1 mile from its SW point. The Armit Islands and Double Cone Island lie about 1.7 miles and 5.5 miles E of Gumbrell Island, respectively.

Anchorage.—Anchorage may be obtained, in a depth of 24m, mud, NW of Double Cone Island.

Eshelby Island lies 5 miles N of Gumbrell Island. Overfalls occur off the NE side of the island during the flood tide. A light is shown from the island. Rattray Island lies 4 miles WNW of Eshelby Island. There are tide rips off the N extremity of Rattray Island.

Anchorage.—Anchorage may be obtained, in a depth of 18m, off the W side of Rattray Island. There is also good anchorage off the S side, in depths of 11 to 15m, mud.

7.39 **George Point** (20°04'S., 148°34'E.) is the NE extremity of a cliffy promontory, which rises to a height of 296m about 1.2 miles SSW. A bank, with a depth of 17.7m, lies 0.5 mile NE of George Point.

Saddleback Island is doubled-peaked and lies 1 mile WNW of George Point.

Anchorage.—Anchorage may be obtained in SW winds in the lee of George Point.

Cape Gloucester lies 5 miles W of Saddleback Island and is the N termination of a range of hills and peaks. Gloucester Passage lies between Cape Gloucester and the S side of Gloucester Island and has a least depth of 1.8m in the fairway at its W end. The passage should only be used with great caution by small vessels with recent local knowledge, and never at night.

Gloucester Island (20°00'S., 148°27'E.) extends about 5 miles N from Gloucester Passage to Gloucester Head, the N extremity of the island. Mount Bertha, 577m high, lies in the middle of the island.

Anchorage.—Anchorage, with shelter from S and E winds, may be obtained, in depths of 7 to 13m, in Bona Bay on the

SW side of the island. Anchorage may also be taken in the lee of Cape Gloucester, in depths of 5 to 9m.

Middle Island, 55m high, lies in the middle of the entrance to Edgecumbe Bay, between Gloucester Head and Cape Edgecumbe. The island is rocky, reddish colored, flat-topped, and sparsely wooded. A drying reef extends 0.2 mile S from the island. Caution should be exercised approaching this reef as it is steep-to.

Edgecumbe Bay (20°05'S., 148°22'E.) indents the coast between Middle Island and the head of the bay. The E side of the bay rises abruptly, but the head of the bay is a low mangroved shore. Ben Lomond, 438m high, is a remarkable sugarloaf hill that rises at the SE end of the bay. The W side of the bay is low, but is backed by a number of hills.

Port of Bowen (20°01'S., 148°15'E.), formerly a coal-exporting port, is no longer used by commercial vessels, its trade having been taken over by Abbot Point Coal Wharf. The wharves are run down and are only used by fishing vessels and by tugs which service Abbot Point Coal Wharf.

Cape Edgecumbe to Cape Bowling Green

7.40 Cape Edgecumbe (19°59'S., 148°16'E.), the W entrance point of Edgecumbe Bay, is low and fringed with reefs up to about 0.5 mile offshore. North Rock, 1m high, lies on the NE edge of the reefs, almost 0.5 mile NNE of the cape. Edgecumbe Heights is a short range of hills that extend about 1 mile S from the cape. A prominent boulder is located on the highest summit of these hills.

Holbourne Island, 112m high, is covered with grass and bushes on its S side and lies about 16 miles offshore, NNE of Cape Edgecumbe. A light is shown from the island.

Anchorage.—Temporary anchorage is afforded, in a depth of 16m, on the W side of the island.

7.41 Abbot Bay (19°51'S., 147°57'E.) lies between and the NE extremity of the peninsula of which Cape Upstart is the NW extremity, 16 miles NW. The shores of the bay are low, sandy, and intersected by creeks, except on the E side of the promontory, which is high and steep. A light is shown on Bald Hill.

There is a coal exporting terminal at Abbot Point. A trestle jetty and coal conveyor extend 1.5 miles NNE from Abbot Point, terminating at a wharf aligned 109°-289°.

North Queensland Bulk Ports Corporation

http://www.nqbp.com.au

Winds—Weather.—Winds from the SE can average 20 to 30 knots for periods of as long as two continuous weeks. Northeast to SE winds average 15 to 20 knots for much of the year.

Depths—Limitations.—There is a depth of 17.1m in the approaches.

The trestle jetty has two wharfs. Wharf No. 1 is 268m in length, with mooring dolphins at its W end. Wharf No. 2 is 268m in length, with mooring dolphins at the E end. The alongside depth at both berths is 19.1m.

The terminal accommodates vessels of up to 165,000 dwt.

Aspect.—Lights mark the E and W approaches to the wharf.

Leading lights, in line bearing approximately 225°, are shown near Abbot Point; the rear light of this pair is Bald Hill Light.

Range lights, in line bearing approximately 164°, are shown near Abbot Point; the rear of this pair is the front light of the 225° alignment above. A lighted beacon stands 2 miles NNW of Abbot Point.

Pilotage.—Pilotage is compulsory. The pilot boards about 3.7 miles NNW of the Abbot Point trestle jetty. The vessel's ETA should be forwarded 7 days, 48 hours, 24 hours, and 6 hours prior to arrival.

There is a port radio station at Abbot Point.

Anchorage.—The anchorage, in 19.3m, is situated 4.2 miles NNE of Abbot Point.

Anchorage is afforded small vessels with local knowledge, in a depth of 5m, 0.3 to 0.4 mile W of Mount Luce, but the swell frequently causes a vessel to roll heavily.

7.42 Cape Upstart (19°42'S., 147°45'E.) is a hilly promontory that extends about 8 miles N from the mainland and rises abruptly to heights of 738m. The cape is conspicuous and has been reported to give good radar returns up to 17 miles.

Anchorage.—Anchorage can be obtained by vessels with local knowledge, in depths of 7 to 13m, off a small sandy beach close S of Cape Upstart.

Upstart Bay is entered between Cape Upstart and **Beach Hill** (19°44'S., 147°35'E.), 9.5 miles WSW. Depths of less than 5.5m extend up to 1 mile offshore for a distance of 3.5 miles S of Cape Upstart. The SE and E part of the head of the bay are formed by drying mud banks, which extend 1 mile offshore. A number of shallow creeks and inlets intersect the low mangrove shore at the head of the bay. A light is shown from the E side of the entrance to Molongle Creek located at the head of the bay.

The Burdekin River, navigable only by boats with local knowledge, flows into the sea about 3 miles N of Beach Hill. Although the river mouth is about 1.5 miles wide, it is encumbered with sandbanks and bars that extend about 2 miles offshore. During E winds, the sea breaks heavily over these dangers. A light is shown from the S entrance, about 9 miles WSW of Cape Upstart.

Plantation Creek (19°32'S., 147°30'E.), about 7 miles NNW of the Burdekin River mouth, is accessible by small craft with local knowledge. This part of the coast is fronted by shoals and partly drying sandbanks.

Cape Bowling Green (19°18'S., 147°26'E.), low and sandy, is the N extremity of Russel Island. This island is located close N of a low narrow neck that extends about 6.5 miles NNW from the mainland close N of the mouth of Alva Creek. It forms the E side of Bowling Green Bay. A light is shown near the S end of Russel Island. The cape has been reported to give good radar returns up to 14 miles.

Anchorage.—Small vessels with local knowledge can take anchorage in the lee of Russel Island. Larger vessels may take anchorage W of a shoal, located about 4 miles W of Cape Bowling Green Light, in depths of 3.6 to 7.3m, mud and sand.

A wreck over which there is a depth of 11.4m lies about 13 miles due E from Cape Bowling Green.

Bowling Green Bay to Luncinda Point

7.43 Bowling Green Bay (19°22'S., 147°15'E.) indents the coast about 10 miles S between Cape Bowling Green and Cape Cleveland, about 25 miles WNW. Shoals, with irregular depths of less than 1 to 5.5m, encumber much of the bay and lie up to 5 miles offshore in its E and central parts. In the W part of the bay they lie up to 1.5 miles offshore.

Several high mountains back the low coast to about 4.5 miles inland from the SW side of the bay. Saddle Mountain, 868m high, lies about 15 miles S of Cape Cleveland. A conspicuous tower stands on the N slope of this mountain. **Mount Eliot** (19°29'S., 146°58'E.), a conspicuous level-topped mountain, 1,233m high, lies about 19 miles S of Cape Cleveland.

Chunda Bay lies about 7 miles SSE of Cape Cleveland. The bay is filled by a drying sandbank and fringed with mangroves. A lighted radio mast stands 3 miles WSW of the S entrance point to the bay and a light is shown from a jetty on the N side of the bay.

Cape Cleveland (19°11'S., 147°01'E.) is the N extremity of a hilly peninsula that extends about 6 miles N from the mainland. The cape has been reported to give good radar returns up to 23 miles. A light is shown on the N end of the cape and is an excellent visual aid in approaching Townsville. There is a signal station at the light. Salamander Reef, which dries 1.2m, lies about 3 miles E of Cape Cleveland.

Cleveland Bay indents the coast about 8 miles S between Cape Cleveland and Cape Pallarenda, about 13.5 miles W. The shores of the bay are fronted by sand and coral grit, or sand and mud banks, which dry up to 2.1m, and are backed by mangroves. A number of creeks enter the bay through shallow entrances at the head of the bay. The port of Townsville lies on the SW side of the bay.

Anchorage.—Anchorage for small vessels may be obtained off the W side of Cape Cleveland.

7.44 Magnetic Island (19°09'S., 146°50'E.) lies with Nobby Head, its S extremity, 3.5 miles E of Cape Pallarenda, and is separated from it by West Channel. The island is studded with peaks which are thickly wooded and covered with immense granite boulders. Mount Cook, 495m high, the highest peak, rises near the middle of the island and has a light, which is an excellent visual aid in the approach to Townsville. The SE side of the island forms the NW side of Cleveland Bay and is indented by a number of small bights.

Bremner Point (19°09'S., 146°52'E.), with a jetty on its SW side, lies about 2.5 miles SSW of the NE end of the island.

A conspicuous stranded wreck lies about 0.7 mile NW of Nobby Head.

Picnic Bay, which lies between Nobby Head and **Hawkins Point** (19°11'S., 146°51'E.), is filled by a drying reef, near the middle of which is a beacon which marks a submarine cable. A jetty extends from the SW side of the bay. A lighted beacon marks the E end of a spur of the coastal reef, about 0.5 mile ESE of Nobby Head.

Bay Rock (19°07'S., 146°45'E.), on which a light is shown, lies about 1.5 miles WNW of West Point, the W extremity of Magnetic Island. It lies in the approach to West Channel and the Port of Townsville.

Townsville (19°15'S., 146°50'E.)

World Port Index No. 53380

7.45 The port of Townsville, the principal port in northern Queensland, includes all of Cleveland Bay, as well as Magnetic Island. The port is relatively small but remains fairly busy, with a rather high volume of merchant traffic. The harbor for the port is located at the city of Townsville, on the SW side of Cleveland Bay, about 11.5 miles WSW of Cape Cleveland. The main approach is made through Cleveland Bay from the NE, but light draft vessels from the N may use West Channel.

Townsville Port Authority

http://www.townsville-port.com.au

Winds—Weather.—The climate is dry and tropical. The region has a high summer rainfall, with an average annual total of 1,134mm. July is the coolest month, with an average temperature of 20°C, while January is the warmest month, with an average temperature of 28°C.

Tides—Currents.—The tidal rise at the wharves is 2.9m at MHWS, and 1.9m at MHWN. The currents in the vicinity do not appear to be a hindrance. Flood currents generally run WSW, in the direction of Palm Passage, shifting to the S between Magnetic Island and the Great Barrier Reef. Ebb currents flow opposite, running N to Palm Passage, then turning ENE through the passage. During the flood tide, it has been reported that there is a strong set to the W upon exiting the Eastern Breakwater.

Depths—Limitations.—Sea Reach Channel, the first leg of the approach fairway, is entered 0.7 mile SE of Bremner Point. Platypus Channel only allows traffic in one direction at a time. Both Sea Reach Channel and Platypus Channel are extremely well marked with large channel markers. The deepest water lies in the centers of the channels and therefore critical for deep draft vessels to use the fixed ranges (leads) to keep within the center of the channels. The width of the channel averages only about 68m.

The approach depths were reported (2005), as follows:

1. Sea Reach Channel—11.6m
2. Platypus Channel—11.3m
3. Outer Harbor Arrival Channel—5.7m
4. Outer Harbor Departure Channel—10.0m (Less depth at SE corner 9.1m)
5. Harbor—11.4m

West Channel, which lies between the shore bank extending NE and NNW from Cape Pallarenda and the dangers fringing the SW side of Magnetic Island, trends SE into Cleveland Bay. The channel is about 1.2 miles wide between these dangers. Middle Reef, marked by lighted beacons, lies about in the middle of the inner end of this channel. The channel has depths of 3.6 to 6.1m and is suitable only for shallow-draft vessels. It should not be used at night without local knowledge.

Ross River Channel, which runs parallel to the W breakwater, trends SW from the harbor entrance and over a rocky bar into the mouth of Ross Creek. The channel is marked and had a least depth of 2.3m (2013) at the entrance, marked by beacon No 6, continuing upstream of beacon No 6, and into

Ross Creek. After heavy rains, a considerable amount of silt may be deposited in this channel.

The harbor complex offers nine berths, with the facilities to handle a variety of cargo types; for details see table titled **Townsville Port Facilities.**

Townsville Port Facilities				
Berth	**Length**	**Depth**	**LOA**	**Remarks**
1	250m	11.9m	238m	Outer end of E breakwater. Bulk petroleum products.
2	281m	12.2m	238m	General cargo.
3	283m	11.4m	238m	Containers and ro-ro.
4	220m	10.4m	238m	Ro-ro and molasses.
6	122m	—	—	Condemned. Not in use.
7	183m	11.2m	195m	West side of E pier. Bulk ore.
8	213m	10.8m	220m	East side of W pier. Freezer.
9	230m	11.4m	228m	West side of W pier. Bulk sugar.
10	160m	12.0m	152m	Ro-ro.
11	240m	10.8m	195m	Bulk ore.

Note.—The following underkeel clearances are required:
1. All vessel movements—0.9m.
2. Alongside all berths—0.6m.

Pilotage.—Pilotage is compulsory for the following vessels unless operating under a Pilotage Exemption Certificate:
1. Vessels of 50m length and greater.
2. A vessel towing another vessel where the combined length is greater than 50m.
3. A vessel whose owner or master requests the services of a pilot.
4. A vessel whose master is directed by the Regional Harbormaster to use the services of a pilot.

Vessels requiring the services of a pilot are required to give a minimum of 48 hours notice for arrivals and 24 hours notice for departures. Pilots should be ordered via ship's agent using the internet-based Queensland Shipping Information Planning System (QSHIPS).

Vessels with an arrival draft exceeding 8m should proceed to Pilot Boarding Ground A. Vessels with a draft of between 7m and 8m should seek advice from the duty pilot as to which pilot boarding ground to use. Vessels with a draft less than 7m will be accepted at Pilot Boarding Ground B. Pilot transfer instructions will be given prior to the pilot boarding by Townsville VTS.

Pilots board, as follows:
1. Boarding Ground A—position 19°06'34.2"S, 146°54'09.6"E.
2. Boarding Ground B—position 19°09'10"S, 146°55'30.0"E.

Regulations.—The port limits line is best seen on the chart.

The quarantine line is drawn across the channel about 2 miles NNE of the breakwater heads.

Explosives are usually discharged to lighters at the anchorage off Bremner Point.

Vessel Traffic Service.—This service is mandatory for all vessels 35m long and greater.

Notice of ETA must be sent 48 hours prior to arrival with further messages 24 hours and 12 hours if necessary.
1. Call sign: Townsville VTS
2. VHF: VHF channels 12 and 16
3. Telephone: 61-747263600
4. Facsimile: 61-747210633
5. E-mail: vtstownsville@msq.qld.gov.au

Vessels carrying dangerous cargo must give 48 hours minimum notice prior to arrival and 3 hours minimum notice prior to departure.

Vessels are not to move within the pilotage area unless satisfactory two-way communications are maintained with Townsville VTS.

Vessels are to report to Townsville VTS to obtain clearance and arrival information 2 hours before ETA at the pilotage area. Pilotage exempt vessels are to report 2 hours prior to ETA at the Fairway Lighted Beacon. The information required is, as follows:

Vessels are to report to Townsville VTS to obtain clearance and removal information before commencing movement within the pilotage area.

Vessels are to report to Townsville VTS to obtain clearance and departure information before commencing movement from the pilotage area. The information required is, as follows:
1. Vessel's name.
2. Radio check.
3. Destination port/anchorage.
4. Draft fore and aft.
5. Changes to vessel's details.

Vessels are only to anchor in the area designated by Townsville VTS. Upon anchoring, vessels are to advise Townsville VTS of their anchoring time and position as a bearing and distance from the north cardinal lighted beacon (19°07'42"S., 146°54'23"E.). Vessels at anchor in the pilotage area are to maintain a continuous listening watch on VHF channel 16 and report if dragging their anchor. Vessels departing the anchorage are to advise Townsville VTS of the vessel's name and time of weighing anchor.

Changes requested by the master/agent to scheduled movements may be made via QSHIPS, telephone, or e-mail and are to be communicated to Townsville VTS and the relevant marine services as soon as practicable, advising of the revised schedule. Changes within 8 hours of the scheduled start time must be reported by telephone (61-7-47263610).

Any marine incident, collision, grounding, or fire occurring within the port should be reported to Townsville VTS immediately on VHF channel 12.

Signals.—Berthing signals are displayed from the Port Control Tower on W pier. A green quick flashing light placed on

top of a vehicle on the pier indicates the final position of the vessel's bridge when docking.

The Port Closed signal is displayed from the tower and consists of the answering pennant, by day, or an occulting red light, at night.

Anchorage.—Anchorage may be obtained, in a depth of 9.1m, good holding ground, 0.7 mile SSW of Bremner Point. Small vessels using West Channel may obtain good anchorage sheltered from NE winds, in a depth of 5m, 1.2 miles NNE of Cape Pallarenda.

Directions.—Cleveland Bay is easily distinguished and entered. The approach channels are well-marked by lighted ranges and lighted beacons.

Caution.—Care is advised, as the channel and berths are subject to silting. The latest Notice to Mariners, and the local authorities, if possible, should be consulted for any changes in depths.

The beacons are situated 18 to 27m outside the limits of the dredged channel.

The pilot will call harbor control to turn on range lights when necessary. The ranges are hard to distinguish when the lights are not activated.

Cape Pallarenda to Lucinda Point

7.46 Between Cape Pallarenda and Lucinda Point, about 47 miles NNW, the coast recedes about 12 miles SW to form a long bight known as Halifax Bay. This coast consists of a low wooded shore from which numerous creeks empty. There are numerous lagoons behind the coast at the head of Halifax Bay, and there are mangrove swamps in the vicinity of Lucinda Point.

Burdekin Rock (19°08'S., 146°42'E.) lies 5.2 miles NNW of Cape Pallarenda. The rock is about 15m long and awash at LWS. Paluma Shoals, consisting of a number of rocks, some of which are awash, lies 9 miles WNW of Burdekin Rock. A submarine pipeline, marked at the shore end and the seaward end by lights, extends about 1 mile NE from the shore, about 4.5 miles WSW of Burdekin Rock.

Eleanor Creek (18°52'S., 146°17'E.), navigable by boats for about 6 miles, empties into the head of Halifax Bay. Lady Elliot Reef, with a depth of less than 1m, lies about 11 miles NNE of the mouth of Eleanor Creek. Victoria Creek lies about 14 miles NNE of Eleanor Creek.

Off-lying Islands and Dangers

7.47 Rattlesnake Island (19°02'S., 146°37'E.) lies 13 miles NW of Cape Pallarenda.

Anchorage.—Vessels can take anchorage during SE winds in the W part of the bight on the N side of the island, in 7.3 to 9.1m, 0.7 mile NW of the summit of the island. Lorne Reef, which dries 0.3m, lies 1 mile W of Rattlesnake Island.

Bramble Rock lies about 0.5 mile NE of the E end or Rattlesnake Island. Submerged rocks extend almost 0.2 mile from the S and NW sides of Bramble Rock. **Herald Island** (19°02'S., 146°38'E.) lies about 0.5 mile E of Rattlesnake Island. Reefs fringe the island up to 0.2 mile off its S and W sides, but its E side is steep-to. There are depths of 1.8m between Herald Island and Rattlesnake Island.

In 1990, a rock, awash, was reported to lie 0.1 mile W of Bramble Rock.

Cordelia Rocks (19°00'S., 146°41'E.), several rocks on a steep-to coral reef, lie about 3.2 miles ENE of Herald Island. Vessels should not pass within less than 0.5 mile of the W side of Cordelia Rocks.

Acheron Island lies about 4 miles NNE of Rattlesnake Island. The N and W sides of the island are fringed with rocks. Phillips Reef, a 1.8m patch, lies almost 1.2 miles SW of the W end of this island.

A submerged wreck, with a depth of 9.1m, was reported in 1986 to lie 0.9 mile SE of the E end of Acheron Island. **Havannah Island** (18°50'S., 146°33'E.) lies about 8.5 miles NW of Acheron Island. The island has two peaks separated by a low gap. Rocks and reefs fringe the island up to about 0.2 mile offshore. Fly Islet lies 0.5 mile NW of Havannah Island.

Pandora Reef, almost 0.7 mile long E to W, lies about 5.5 miles W of Fly Islet. A coral cay on the E end and a sandbank on the W end of the reef are awash at high water.

7.48 Great Palm Island (18°45'S., 146°38'E.), the largest of the Palm Isles, is about 8.5 miles long. A ridge of hills, which extend the length of the island, rises abruptly from the coast to the 554m summit of Mount Bentley, in the middle of the island. The S and NE sides of the island and its E end are fringed by reefs and rocks up to almost 0.7 mile offshore. Rocks and reefs fringe the W side up to 1 mile offshore. Barber Islet lies off the S side of the island.

Albino Rock (White Rock) is a steep-to pinnacle that lies about 1.5 miles SE of the SE end of Great Palm Island. A light is shown on the summit of the rock; the light structure has been reported to give good radar returns up to 10 miles.

Challenger Bay (18°44'S., 146°34'E.) lies on the W side of Great Palm Island. The bay affords anchorage, in depths of 7.3 to 9.1m, sand.

Eclipse Island lies about 1 mile SW of Great Palm Island from which it is separated by Steamer Passage, a clear deep channel. Foul ground fringes this islet up to about 0.1 mile offshore; a drying coral reef extends 0.5 mile NW from the islet.

7.49 Curacoa Island (18°40'S., 146°33'E.) lies about 0.5 mile NW of the NW end of Great Palm Island. These two islands are separated by Calliope Channel. This channel is not recommended, but may safely be used by favoring the E side of Curacoa Island. Curacoa Channel lies on the W side of Curacoa Island, and separates Curacoa Island from Fantome Island.

Fantome Island (18°41'S., 146°31'E.) lies about 0.7 mile W of Curacoa Island. The island has two wooded summits separated by a low, narrow neck of land. The N summit slopes down to a low, sandy plain on which there is a hillock. A leprosy hospital is situated on the hillock.

Anchorage.—Anchorage may be obtained on the W side of the island in Juno Bay, in depths of 11 to 15m, 1.2 miles SSW of the NW extremity of Fantome Island.

A depth of 16.6m lies at the E extremity of a bank, with lesser depths W of it, extending NE for about 1.5 miles from the S point of Fantome Island.

Orpheus Island is separated from the NW extremity of Fantome Island by a narrow channel, 0.2 mile wide, with a depth

of 2.7m. A jetty, 15m long, is situated on the W side of the island 2.2 miles N of Harrier Point. The channel to the jetty is marked by small buoys.

Hazard Bay and Pioneer Bay on the W side of the island, afford good anchorage, in a depth of 13m, coral, 0.7 mile offshore.

Pelorus Island (North Palm Island) (18°33'S., 146°30'E.), 282m high and wooded, lies 0.5 mile N of Orpheus Island, and is steep-to. In 1978, a depth of 14.6m was reported 1 mile W of Pelorus Island.

Tides—Currents.—Tidal currents in the channel between Orpheus Island and Pelorus Island are strong, usually setting in the opposite direction to that of the tidal current outside at that time.

Caution.—An isolated depth of 15.4m lies 0.7 mile W of Pelorus Island.

Lucinda Point to Double Point

7.50 Lucinda Point (18°31'S., 146°20'E.) on which a light is shown, is a low point on the S side of the S entrance of Hinchinbrook Channel. The town of Lucinda is situated close W of the point. A pier and some conspicuous tanks and warehouses are situated in the town. Drying sandbanks extend about 2 miles E from Lucinda Point, and a shorebank, with depths of less than 1.8m, extends about 2.7 miles ENE from the point.

Hinchinbrook Island (18°22'S., 146°15'E.), about 19 miles long, S and N, and about 6 to 13 miles wide, is contiguous with the coast, about 0.5 mile to 3 miles S and SW from which it is separated by Hinchinbrook Channel. The island is high and rugged and has a range of hills and mountains extending from SE to NW across most of its length. Mount Bowen, about in the middle of the island, is the most prominent peak.

Hinchinbrook Channel is composed of two entrances, N and S. The S entrance lies between Lucinda and George Points and is obstructed by a bar, which extends 3 miles offshore, across the greater part of the entrance. There is a least depth of 3.3m in the channel over the bar. Small vessels use this entrance, but deep-draft vessels use the N entrance. A pair of leading lights bearing 247° lead into the S entrance.

During fresh NE winds, a heavy surf breaks over the bar. The flood current sets through the N and S entrances at a rate of 1 to 3 knots.

Within the bar, there are depths of more than 2.7m in the channel to the wharf at Lucinda.

After bad weather, some of the navigational aids may be out of position or missing.

The N entrance to Hinchinbrook Channel is obstructed by a bar, which extends W from Goold Island to the mainland, and SW from the island to the N shore of Hinchinbrook Island. In 1989, there was a least depth of 3.3m in Hinchinbrook Channel, and a 3.7m patch close E of the fairway, 0.6 mile WNW of Lucinda inshore berth. Depths are liable to change and for the latest information on depths in the Hinchinbrook Channel and the berths, see the Australian Temporary Notices to Mariners.

The N entrance is sheltered from all winds except those from the N.

7.51 Port of Lucinda (18°31'S., 146°20'E.) (World Port Index No. 53370), formerly known as Hinchinbrook, is mainly used to export raw sugar. The port is administered by Townsville, Queensland.

Townsville, Queensland

http://www.townsville-port.com.au

Depths—Limitations.—The inshore molasses wharf, which lies in the town of Lucinda, is L-shaped with a 133m face and an alongside depth of 9m. The pier is no longer in use and has been in disrepair since 1989.

Extending from the root of this wharf, a 3-mile long jetty extends seaward; at the outer end is a 213m long bulk sugar-loading facility. A vessel of up to 50,000 dwt can berth at this wharf. The depth alongside the berth is 13.6m. An obstruction, with a depth of 12m, lies close to the N end of the berth.

Pilotage.—Pilotage is compulsory and should be arranged through Cairns in advance. Pilots for the bulk sugar facility are boarded 4 miles ENE of Lucinda Point. Vessels using the N entrance to Hinchinbrook Channel board the pilot off **Cardwell** (18°15'S., 146°02'E.).

Contact Information.—The port can be contacted as follows:

1. VHF: VHF channels 6, 12, and 16
2. Telephone: 617-4781-1500
3. Facsimile: 617-4781-1525
4. E-mail: info@townsville-port.com.au

Anchorage.—Vessels can take anchorage inside the N entrance of Hinchinbrook Channel, E of Cardwell and about 1.2 miles S of Hecate Point, in 7.3 to 14.6m. Small vessels may anchor, in a depth of 6m, 0.7 mile WSW of Hayman Point, the NW extremity of Goold Island.

Caution.—A dangerous wreck lies in position 18°10.3'S, 146°04.9'E.

Rockingham Bay to Double Point

7.52 Rockingham Bay (18°08'S., 146°07'E.) is entered between Cape Sandwich and **Dunk Island** (17°57'S., 146°10'E.), 17 miles NNW. Although open to the E, shelter may be obtained W of Goold Island or W of Dunk Island. The Brook Islands, four in number, lie on the SE side of Rockingham Bay. A light is shown on the S island of the group.

A number of rivers and creeks empty into the bay. The **Murray River** (18°05'S., 146°02'E.) is navigable by small craft with local knowledge and a draft of not more than 2.4m.

Anchorage.—Anchorage may be obtained in the Murray River close S of the N entrance point, in a depth of 4m.

The **Family Islands** (18°02'S., 146°12'E.) form a line of seven high, rocky islets that extend about 5.5 miles SE from a position about 2 miles E of Tam O'Shanter Point.

Dunk Island, about 3.2 miles long, lies with its SE end about 4.5 miles E of Tam O'Shanter Point. The island rises to a 270m summit near its N end. The island has been reported to give good radar returns up to 20 miles. A rock, 12.2m high, lies close off the SE end of the island.

Mound Islet lies about 0.5 mile W of the N end of Dunk Island.

Anchorage.—Vessels can take anchorage about 1 mile W of

Mound Islet, in 9.1 to 14.6m, good holding ground. Small craft can anchor SW of the islet.

Between Tam O'Shanter Point and Double Point, about 19 miles N, the coast trends in that direction and consists mostly of sandy beaches. In places, it is closely backed by a number of hills; higher mountains are farther inland.

Clump Point (17°52'S., 146°08'E.), a low rocky point that extends about 1 mile NE from the coast, lies about 7.5 miles N of Tam O'Shanter Point. Clump Mountain, about 716m high, lies about 2 miles WNW of Clump Point.

Murdering Point (17°46'S., 146°07'E.), low and sandy, lies about 5 miles N of Clump Point. Foul ground and coral heads, awash at LW, fringe the point up to about 2 miles offshore and extend E to King Reef.

King Reef (17°47'S., 146°10'E.), a number of rocks that dry about 1.8m, lies almost 3 miles E of Murdering Point. Foul ground lies between the reef and the coast. A current sets toward the land in the vicinity of King Reef during SE winds and particularly with the rising tide.

The **South Barnard Islands** (17°45'S., 146°10'E.), two adjacent islets, lie on a reef about 3.5 miles ENE of Murdering Point. Stephens Island is the N islet and has been reported to give good radar returns up to 16 miles.

Anchorage.—During SE winds, vessels of moderate draft may take anchorage in the lee of Stephens Island, in a depth of about 6m.

7.53 Double Point (17°39'S., 146°09'E.) rises abruptly from the sea to an isolated hill and is prominent because of the low flat country in its vicinity. Several rocks fringe the point within about 0.2 mile offshore. Except for the North Barnard Islands, the point is clear of dangers and is fairly steep-to.

The North Barnard Islands, several high and fairly steep-to islets, form a line that extends about 2 miles SE from a position about 0.5 mile SE of Double Point. Vessels without local knowledge should not attempt to use some of the passages between the islets. Vessels should pass at least 1 mile E of Kent Island.

Kent Island, 95m high and on which a light is shown, lies about 2.5 miles SE of Double Point. The island has been reported to give good radar returns up to 18 miles.

Jessie Island, 58m high, and Hutchison Island, 85m high, lie almost 0.2 and 0.5 mile W, respectively, of Kent Island. Bresnahan Islet, 19.2m high, lies about 0.2 mile N of Hutchison Island.

Lindquist Island (17°39'S., 146°09'E.), 39m high, lies almost 0.7 mile NW of Bresnahan Islet and its NW end lies 0.5 mile SE of Double Point. A rock, awash, lies midway between this island and Bresnahan Islet. Foul ground lies up to a little over 0.2 mile W of Lindquist Island.

Anchorage.—Vessels with local knowledge can take anchorage, sheltered from SE winds, NW of Kent Island, in about 14.6m.

Between Double Point and a point 1.2 miles NNW, there is a sandy beach, backed by land similar to that S of Double Point. An islet, 25m high, lies close offshore, 0.5 mile NW of Double Point. The coast to the entrance of

Harbor, 1.7 miles NNW, is steep and rock fringed.

7.54 Mourilyan Harbor (17°36'S., 146°08'E.) (World Port Index No. 53360) lies just inside the estuary of the Moresby River and includes all navigable waters within the entrance which lies between two headlands. The harbor lies just within this entrance and is deep but confined. A wharf lies on the N side just inside the entrance and is used to load sugar and molasses. Live cattle exports also take place.

Far North Queensland Ports Corporation

www.portsnorth.com.au

Tides—Currents.—The tidal current at the harbor entrance can attain a rate of 3 knots at springs. The stronger incoming current sets towards the S between Hall Point and Camp Point, then WNW across the harbor towards the berth.

The outgoing current from the Moresby River sets onto the berth, turning E through the entrance channel, then N along Hall Point.

Depths—Limitations.—Vessels berth and depart at slack water, day or night, depending upon draft. The entrance channel (2002) has a width of 91m and a depth of 9.6m. Vessels having a beam of up to 28m are authorized to carry a draft of 8.5m; vessels of up to 32m of beam may carry a draft of 7.4m, according to the tide.

The swinging basin is 366m wide, with a depth of 6.7m. The bottom of the entrance channel is rock, but the swinging basin has a bottom of soft mud.

The Sugar Terminal consists of Government Wharf, a concrete pier running parallel to the shore. It is 193m long and has a depth of 10.1m alongside. The maximum ship size accommodated had a length of 187m, a beam of 32m, and a draft of 10m.

Pilotage.—Pilotage is available 24 hours a day by Cairns, Queensland and is compulsory for the following types of vessels:

1. All foreign vessels 35m in length or greater unless a current PEC (Pilotage Exemption Certificate) is held for this port.
2. All Australian vessels, 50m in length or greater, unless a current PEC is held for this port.
3. Vessels towing other vessels where the combined length of the vessels is 50m or greater.
4. All vessels for which the owner or master has requested the use of a pilot.
5. All vessels directed to use the services of a Pilot by the Harbor Master.

Any vessel requiring pilot services should make this request to Cairns VTS via e-mail at least 48 hours prior to expected arrival.

The pilot will make initial contact with the ship through VHF channel 16 about 30 minutes prior to boarding time.

The pilot will normally board the vessel 30 minutes prior to the forecast time of slack water in position 17°35.9'S, 146°10.3'E, which lies approximately 2 miles E of the harbor entrance.

Departing vessels should request a pilot at least 24 hours prior to expected movement. Pilots will board the vessel 30 minutes prior to the forecast time of slack water and vessels should be ready to depart with no delay when the pilot arrives on board.

Contact Information.—See the table titled **Mourilyan**

Harbor—Contact Information.

Mourilyan Harbor—Contact Information	
Duty Pilots	
VHF	VHF channel 16
Regional Harbormaster of the Port	
Telephone	617-4052-7400
Facsimile	617-4035-1127
E-mail	rhmcairns@msq.qld.gov.au
Sugar Terminal	
Telephone	617-4078-2101
Facsimile	617-4078-2122
Port Authority (Far North Queensland Ports Corp.)	
VHF	VHF channels 12 and 16
Telephone	617-4052-3888
E-mail	enquiries@portsnorth.com.au
Cairns VTS	
Call sign	Cairns VTS
VHF	VHF channels 12 and 16
Telephone	617-4052-7470
Facsimile	617-4052-7460
E-mail	vtscairns@msq.qld.gov.au
Tugs	
VHF	VHF channels 6 and 8

Regulations.—Large vessels should only enter the harbor during daylight hours. A minimum depth of 0.9m under the keel is required when navigating through the entrance channel.

A reporting point (labeled as "Q1" on the chart in position 17°35'S, 146°10'E lies approximately 2 miles E of the harbor entrance and in close proximity to the pilot boarding point. This reporting point is mandatory for vessels entering or departing the port and is called in on VHF channel 18.

Vessels should advise their ETA to the Sugar Terminal via facsimile at least 7 days prior to expected arrival and include the following information:

1. Vessel name.
2. Vessel type.
3. ETA.
4. Total quantity of cargo to be loaded.
5. Hatch loading sequence required.

Vessels with dangerous cargo on board must follow the following procedures:

1. Provide a manifest of the dangerous cargo to the port not less than 48 hours prior to the ETA at the pilot boarding area.
2. The manifest of dangerous cargo on board must also be provided to the regional harbormaster of the port prior to departure from the pilot boarding area.
3. Permission must be received from the Port Authority in order to transport dangerous cargo across any wharf. The master will be responsible for complying with all the international and local authority regulations needed.
4. Any tanker or products carrier which has previously carried a dangerous cargo will not be considered 'gas-free' unless a gas-free declaration has been received at least 48 hours prior to arrival at the pilot boarding area. The gas-free declaration will need to be sent by the master via facsimile to the regional harbormaster.

Anchorage.—Anchorage may be obtained S of the entrance lead in the swinging basin, in a depth of 7m.

Mourilyan Harbor to the Fitzroy Islands

7.55 The coast between the entrance to Mourilyan Harbor and **Thompson Point** (17°32'S., 146°05'E.), 5 miles NW, is formed by rocky points, with sandy beaches between, backed by steeply rising hills of the Moresby Range. Etty Bay, a village, is situated on the coast, 1.7 miles SE of Thompson Point.

Meaburn Rock (17°34'S., 146°10'E.), with a depth of 3m, and steep-to except on its W side, lies about 2.5 miles NE of the entrance of Mourilyan Harbor and almost 3 miles ENE of **Mount Leeper** (17°35'S., 146°06'E.). This steep-to danger is marked on its S side by a lighted buoy. Two wreck, with depths of 16.2 and 8.5m, lie 0.5 mile NNE of Meaburn Rock.

From Thompson Point to the S entrance point of Gladys Inlet, about 1.5 miles NNW, a partly-drying shore bank extends up to 1 mile offshore.

Flying Fish Point (17°30'S., 146°05'E.), about 1.5 miles N of Thompson Point, lies on the N side of the entrance of Gladys Inlet and the Port of Innisfail. A white lighted beacon is shown from Flying Fish Point. A lighted buoy is moored about 0.1 mile E of the lighted beacon.

Port of Innisfail (17°31'S., 146°02'E.) includes all the navigable waters of Gladys Inlet and the Johnstone River inside the 7m curve off the entrance to the inlet. The entrance, less than 0.2 mile wide, lies between two points 0.7 mile W of Flying Fish Point. The entrance and the river are encumbered with sandbanks and are navigable only by small craft with recent local knowledge, and a draft of not more than 2.4m at springs, and 1.2m at neaps, for a distance of 12 miles.

Range lights are situated on Flying Fish Point. These lights are moved as necessary to indicate the deepest water available. There are several small wharves in the river at the town of Innisfail, with depths alongside of 1.5 to 3.6m.

Anchorage.—Anchorage may be obtained by small vessels with local knowledge off Croquette Point, in depths of 4 to 5m.

Between Flying Fish Point and **Cooper Point** (17°24'S., 146°04'E.), about 6.5 miles to the N, a dangerous rock, with a minimum depth over it of 1.8m, lies close NW of Cooper Point. Heath Point, about 1.5 miles N of Flying Fish Point, rises abruptly to the summit of Mount Maria, about 0.5 mile to the W. The rest of the coast is low, but backed by hills about 2 miles inland. A patch of rocks, which dries 1.2m, lies about 0.5 mile E of Heath Point.

Caution.—Because of the steep-to nature of the above shore bank, which also extends offshore from the coast N of Cooper Point, vessels should not approach the coast within 2.5 miles in this vicinity.

7.56 Cooper Point rises abruptly from the sea to the conical summit of Mount Cooper. A ridge of hills connects the point with the summit of Mount Arthur. This mountain is the highest of the coastal range in this vicinity.

Bramston Point (17°15'S., 145°59'E.), which is rocky, lies about 10 miles NNW of Cooper Point. The land rises abruptly to several summits up to 730m high, within 1.5 miles SSW of the point. The estuary of the Mulgrave River indents the coast about 1 mile W from its narrow entrance, about 1.7 miles NNW of Bramston Point. The estuary and the rivers are navigable only by small craft with local knowledge.

The **Frankland Islands** (17°13'S., 146°05'E.) are a group of islets that lie about 7 miles E of the estuary of the Mulgrave River and the Russell River.

Russell Island (17°14'S., 146°06'E.), which shows a light from its summit, lies about 6.5 miles ENE of Bramston Point. Russell Island has been reported to give good radar returns up to 18 miles. A small islet lies close NE of the NE end of Russell Island, to which it is connected at LW. Foul ground extends up to 0.5 mile NW from the island and elsewhere fringes the island for a distance of 0.2 mile.

Mabel Island and **Normanby Island** (17°12'S., 146°05'E.) are two adjacent islets on a coral reef that lies about 1.7 miles NW of Russell Island. Foul ground fringes both of the islets. Grange Rock and Jones Patch lie up to 0.5 mile S of Mabel Island.

High Island (17°09'S., 146°01'E.) lies about 4.5 miles NW of Normanby Island. The N and W coasts of the island are fringed with rocks.

Tobias Spit (17°08'S., 146°00'E.), with depths of less than 9.1m, sand and mud, extends 1.2 miles N from High Island.

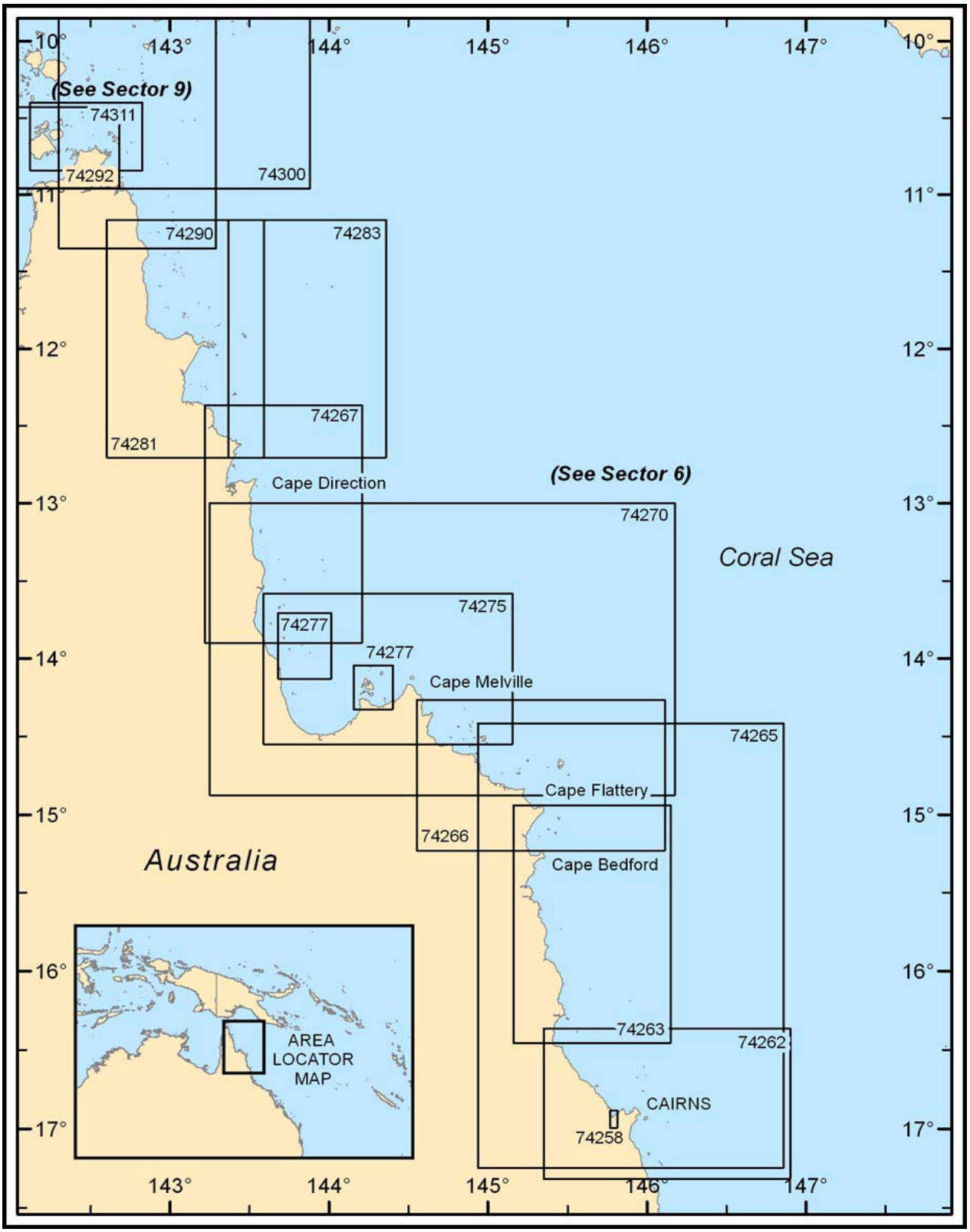
Anchorage.—Anchorage may be obtained on Tobias Spit, but with strong winds there is a rough sea. In S winds, anchorage may be made close to the island.

7.57 **Palmer Point** (17°10'S., 145°58'E.) is a rocky point at the foot of a spur of the coastal range that attains a height of 791m about 2 miles inland and 3 miles WNW of the point. Between Palmer Point and Deception Point, about 13.5 miles NNW, the coast forms a bight that recedes about 3 miles to the W. The coastal range closely backs this part of the coast to a position about 2.5 miles SW of Deception Point.

Fitzroy Island (16°56'S., 145°59'E.) lies about 3 miles ENE of Deception Island. The island has been reported to give good radar returns up to 21 miles. The dangers fringing the island are contained within the 5m curve, which lies up to 0.2 mile offshore. An islet lies close off the NE end of the island. A light is shown from the NE side of the island. A signal station is situated at the light. A light is also shown from the head of a jetty on the W side of the island. The channel between the island and the mainland is about 2 miles in width and has depths of about 26 to 33m.

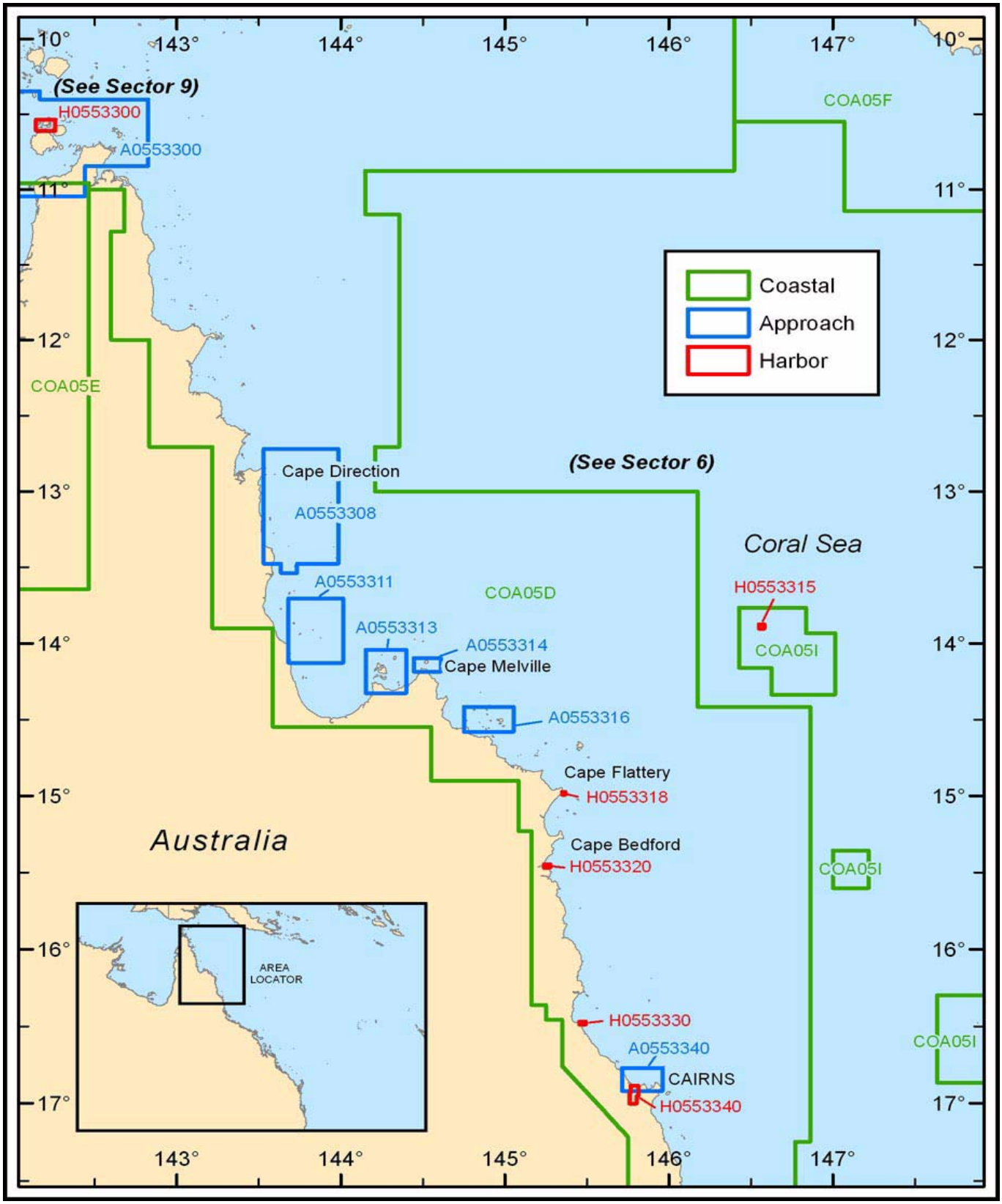
Anchorage.—Anchorage can be taken nearly 0.5 mile off the NW side of the island, in 14.6 to 18.3m.

Caution.—A dangerous wreck, in 20m and best seen on the chart, lies 5 miles S of Fitzroy Island.



Additional chart coverage may be found in NGA/DLIS Catalog of Maps, Charts, and Related Products (Unlimited Distribution).

SECTOR **8** — CHART INFORMATION



Additional DNC library coverage may be found in NGA DNC 5 (Limited Distribution) disc within the README\GRAPHICS folder.

SECTOR 8 — DNC LIBRARY INFORMATION

SECTOR 8

AUSTRALIA—CAPE GRAFTON TO CAPE YORK

Plan.—This sector describes the E coast of Australia from Cape Grafton NNW to Cape York. The dangers on the inner and outer edges of the Great Barrier Reef and the islets and dangers between them and the coast are described in the respective parts of the sector off which they lie. That part of the Inner Route that lies within the limits of this sector is also described, and the passes through the Great Barrier Reef N of Cape Grafton.

General Remarks

8.1 The coast trends about 183 miles NNW from Cape Grafton to Cape Melville, and consists of numerous small bights separated by prominent points and headlands. Although there are a number of short stretches of low coast, particularly between Cape Flattery and Cape Melville, most of the coast is high and rugged.

The coast recedes about 26 miles S between Cape Melville and Claremont Point, about 50 miles WNW, and then it trends somewhat irregularly NNW about 210 miles to Cape York. The numerous bights that indent this section of the coast are almost all separated by prominent headlands. Most of this coast consists of sandy beaches and low mangrove shores on which numerous creeks and minor rivers empty.

Most of the dangers fringing the coast are contained within the 10m curve which follows the coastal trend. From Cape Grafton to Cape Melville, this line lies from 0.3 to 9 mile offshore, and between Cape Melville and Cape York it lies between 0.3 mile and 6.2 miles offshore, except that it lies up to 13 miles seaward of the heads of some of the larger bays. Many steep-to islands and other dangers lie between the 10m curve and the inner edge of the barrier reef. The depth curves cannot be entirely relied on to give adequate warning of the dangers.

The inner edge of the Great Barrier Reef lies 3.5 to 26 miles offshore. Between Claremont Point and Cape Grenville, the inner edge of the reef lies 3.7 to 10 miles offshore, with many intervening dangers. Vessels proceeding along the coast should follow the recommended two-way route (2004) as shown on the chart.

Winds—Weather.—During the summer months along the NE coast of Australia, S to the vicinity of Cooktown, the dominant wind is the Northwest Monsoon. It is sufficiently characteristic for the summer months to be termed the Northwest Season. South of the monsoons lies the belt of the Southeast Trades which are prominent as far S as Brisbane.

In winter, the monsoons have withdrawn and the region is dominated by the trade winds. The winds are steady and are occasionally of considerable strength, but as a rule are accompanied by fair weather.

The Coral Sea and the adjacent Australian coast comprise an area over which tropical cyclones are well known and often destructive. The height of the hurricane season is reached during the months of December through April.

Hurricanes affecting the coast normally approach from an E or NE direction and frequently reach the mainland between 15°S and 20°S, or from the Cape Flattery area S to Gloucester Head.

Hurricane damage may be caused in several ways. At sea the winds, often reaching 50 to 80 knots, with gusts appreciably higher, whip up mountainous waves. Along the coast, high winds and storm tides occasionally reaching 3.7 to 4.6m, lash vessels and pound and undermine shore installations. After the passage inland of a severe hurricane, violent floods, often resulting in loss of life, may be expected along rivers of the affected region. As a rule, the diameter of the destructive winds and seas is between 100 and 200 miles, although it is sometimes less.

Tides—Currents.—The currents between the coast and the Great Barrier Reef are a result of the prevailing seasonal winds. From April to November, the Southeast Trade Wind produces a current setting N and NW, following the general direction of the channels, at a rate of about 0.5 to 1.2 knots, depending on the strength of the wind. From December to March, the wind and the resulting currents are variable. The NW wind is more prevalent, particularly N of Cape Flattery, and tends to produce a current setting S at a rate of up to about 0.7 knot.

The tidal currents on that part of the coast contained within the limits of this sector set N during the rising tide and S during the falling tide, following the trend of channel between the coast and the barrier reef. They have a rate of about 0.5 to 0.7 knot, except in the entrances of some of the inlets, where they may be stronger.

The diurnal inequality of the tidal currents is relatively large. When the moon has large a N or S declination, the rate of the stronger tidal current of the day will be about 50 per cent more than the average and that of the weaker current correspondingly less.

The effect of the tidal current is to increase or decrease the prevailing wind-driven current. During the Southeast Trades, the tidal current is less than the wind-driven current, except in a few channels, and the resultant current sets N. During the NW wind, from December to March, the rate of the wind-driven current is less and the tidal current becomes more important.

Through the openings in the Great Barrier Reef, the flood currents set W and SW, and the ebb currents set E and NE. The rate of these currents is slight in the wider passages, but in the narrower ones they attain a rate of 2 to 3 knots at springs.

Pilotage.—Pilotage is compulsory for all vessels of 70m in length and longer. All loaded oil, chemical, and liquefied gas tankers, regardless of length, are to carry a pilot when transiting the northern waters of the Great Barrier Reef, between latitude 10°41'S and 16°40'S, Whitsunday Passage, the Whitsunday Group, and Hydrographers Passage. For more information, see paragraph 7.2 under the heading "Navigation in the Great Barrier Reef."

Restricted areas.—The Commonwealth of Australia has established a system of regulated zones within the waters comprising the Great Barrier Reef.

Further information can be found in Pub. 120, Sailing Directions (Planning Guide) Pacific Ocean and Southeast Asia.

These areas, established as the Great Barrier Reef Marine Park, are designed to control the movement of all vessels within specific size categories and geographic locations.

The limits of these areas, accompanied by amplifying information, are seen on the appropriate chart. Complete information regarding the Great Barrier Reef Marine Park Zoning Plan, which includes Designated Shipping Areas and Particularly Sensitive Sea Areas, can be found on the Authority's website.

Great Barrier Reef Marine Park Authority

http://www.gbrmpa.gov.au

For information regarding the mandatory ship reporting systems and vessel traffic service which cover the Torres Strait region and the Inner Route of the Great Barrier Reef, see paragraphs 7.2 and 7.3.

Cape Grafton to Cape Tribulation

8.2 Cape Grafton (16°52'S., 145°55'E.) is the NW point of a bold headland that extends about 3 miles NE from the mainland; it is separated from the coastal hills by a low plain. The cape rises abruptly to a height of 375m about 1 mile SE. There are two other peaks, one SSE of the above peak and the other SW. In clear weather the land around the cape may be identified at a distance by its appearance as three lofty islands.

The cape is clear of danger on its NE side; the 11m curve lies about 0.7 mile offshore, and the 20m curve lies about 1.5 miles offshore.

Caution.—Caution should be exercised by vessels from the N, particularly during hazy weather, in order that False Cape is not mistaken for Cape Grafton.

The coast between Cape Grafton and Cape Tribulation, about 54 miles NNW, forms a bight. Port Cairns lies at the S end of the bight between False Cape, about 4 miles W of Cape Grafton, and Ellie Point, about 4 miles farther N. From the latter point, the coast trends about 30 miles NNW to Island Point, then about 12 miles N to Cape Kimberly. Cape Tribulation lies 12 miles N of Cape Kimberly.

The coast between Cape Grafton and Cape Tribulation consists of sandy beaches separated by rocky points and fronted in some places by coral reefs and a few small islands. Many creeks and rivulets empty from this coast.

Most of the coast rises abruptly to coastal ranges, which are up to 783m high in the S part and up to 1,092m high in the N; the range lies parallel to the coast within about 1 mile inland. The coastal range is low SW of Cairns, in the vicinity of Island Point, and between Island Point and Cape Kimberly there is another low stretch. However, a range rises abruptly from the sea about halfway between the point and the cape.

The Great Barrier Reef—Inner Edge—Green Island to Mackay Reef

8.3 The inner edge of the Great Barrier Reef trends about 47 miles NNW from Green Island, 6.7 miles NNE of Cape Grafton, to a position 6.5 miles SE of the Low Islets and then about 23 miles N to Mackay Reef. Vessels should keep SW and W of a line connecting the following reefs which mark the edge of the inner edge of the Great Barrier Reef. These dangers are steep-to on their W sides with depths of 18.3m close off them.

Courtesy of the USS GERMANTOWN

Cape Grafton from N

Upolu Cay (16°40'S., 145°56'E.), 2.4m high, lies on the NW edge of Arlington Reef, 11.5 miles N of Cape Grafton.

Oyster Reef, about 1.7 miles long, lies 1.5 miles N of Upolu Cay. Detached heads lie up to 1.2 miles W of the main body of the reef; the reef dries on its E side.

Trinity Opening lies with its inner entrance between Oyster Reef and Batt Reef, about 11 miles NW.

Pixie Reef, a small drying pinnacle, lies in the middle of the inner entrance of Trinity Opening, 6 miles NW of Oyster Reef.

Batt Reef, about 10 miles long, uncovers at half tide; it has many large boulders on its SW side.

Satellite Reef (16°26'S., 145°41'E.), with a least depth of 2.7m, lies 2 miles off the W side of Batt Reef and 6.2 miles SE of the Low Islets.

Caution.—Caution should be exercised in the vicinity of Satellite Reef because of the current that frequently sets offshore from the coast toward Trinity Opening when the NW winds prevail or during the rainy season.

8.4 Tongue Reef, an extensive partly drying reef, lies with its W extremity 6 miles NNW of Batt Reef. A depth of 6.7m is charted 3.5 miles NW of the N extremity of Batt Reef.

Rudder Reef is separated from Tongue Reef by a channel 3 miles wide. Foul ground, with a depth of 3m, lies 2.5 miles off the W side of Rudder Reef.

Pratt Rock (16°09'S., 145°37'E.), with a least depth of 3.7m, lies 4 miles NNW of the SW extremity of Rudder Reef.

Undine Reef lies 2 miles NNE of Pratt Rock. A detached patch, with a depth of 8.5m, lies 1 mile NNW of the W end of Undine Reef.

Mackay Reef (16°03'S., 145°39'E.), which dries, lies 3.7 miles N of the sand cay on Undine Reef. A sand cay, 1.2m

high, is located near the W end of the reef. Foul ground extends 1.2 miles S and 0.7 mile N from the reef.

The Great Barrier Reef—Outer Edge—Euston Reef to Anderson Reef

8.5 The outer edge of the Great Barrier Reef, between Grafton Passage and Trinity Opening, 24 miles NW, consists of a broken and irregular barrier. Detached reefs and irregular depths lie outside the general direction of its length. The same formation continues for a distance of about 14 miles farther N.

Off Crispin Reef, 18 miles NNW of Trinity Opening, the outer edge of the Great Barrier Reef assumes a uniform and well-defined character and continues N 18 miles to Anderson Reef.

Grafton Passage

8.6 **Grafton Passage** (16°40'S., 146°12'E.), a clear and straight passage about 5 miles wide, lies with its seaward entrance between the NW extremity of Euston Reef and the SE side of Fin Reef, about 6.5 miles NW. It is the best and most used passage from New Guinea. The passage is well marked by a series of lights and radar landfall.

Grafton Passage extends in a general SW direction for a distance of 20 miles and joins the recommended track of the Inner Route in a position about 1.2 miles NE of Fitzroy Island.

8.7 **Dangers on the SE side.—Euston Reef** (16°41'S., 146°15'E.), a small reef on which the sea always breaks, lies 22 miles NE of Cape Grafton. A light, equipped with racon, is situated on the reef.

Thetford Reef lies about 7.5 miles SSW of Euston Reef; the S part dries 2.4m, and the N side is foul to a distance of 1.2 miles. This reef forms the SE side of the inner entrance of Grafton Passage.

8.8 **Dangers on the NW side.—Fin Reef** (16°36'S., 146°10'E.), a small patch with a least depth of 5.5m, lies 6.5 miles NW of Euston Reef. In 1968, depths of 6.1 to 9.1m were reported about 12.5 miles NE of Fin Reef.

Arlington Reef, an extensive reef which uncovers at half tide, lies with its N extremity 3.5 miles SW of Fin Reef. This reef is steep-to on its E and S sides.

Green Island (16°46'S., 145°58'E.) is a wooded islet, 20m high, located 3 miles SW of the SW side of Arlington Reef and 7 miles NNE of Cape Grafton.

Tides—Currents.—Currents setting SSE at a rate of 4.5 knots have been observed off the seaward end of Grafton Passage.

Vessels transiting Grafton Passage, should refer to the chart.

From seaward in hazy weather it is better to keep slightly to the S side of the channel, as the reefs in that direction are more easily seen, and the changes in depths are less abrupt.

Pilotage.—See paragraph 9.4 for pilotage information.

Caution.—A reef has been reported to exist in the vicinity of the pilot boarding ground. Vessels are urged to exercise caution when in the vicinity, and to contact local authorities for further information.

8.9 **Hope Reef** (16°32'S., 146°08'E.), with a least depth of 4.1m, lies about 5 miles NNW of Fin Reef. It is one of several small reefs and shoal patches which lie on the outer edge of the Great Barrier Reef between the seaward entrances of Grafton Passage and Trinity Opening.

Nicholas Reef, a small patch with a depth of less than 1.8m, lies 2 miles NW of Hope Reef. Depths of 12.8 to 19.5m extend 0.8 mile SW from the reef.

Onyx Reef, small in area and with a least depth of 2.9m, lies about 3.5 miles NNW of Nicholas Reef. A 12m patch lies 1 mile NE of Onyx Reef.

Spur Reef (16°24'S., 146°03'E.), located about 2 miles NW of Onyx Reef, forms the SE side of the seaward entrance of Trinity Opening. The reef has a least depth of 1.8m.

The Great Barrier Reef—Inner Edge—North Warden Reef to Iris Reef

8.10 Trinity Opening is a wide, deep channel, but it has not been closely examined; it lies between the N side of Spur Reef and the E side of Tongue Reef, 7.5 miles NW. The opening trends SW for a distance of about 20 miles.

8.11 **Dangers on the SE side.—Norman Reef** (16°25'S., 146°00'E.), which dries, lies 2.5 miles WSW of Spur Reef. A beacon is situated on the N side of the reef. Foul ground lies between the two reefs. Saxon Reef, a small drying reef, lies 1.2 miles SSW of Norman Reef.

Hastings Reef, which dries in places, lies with its N extremity 2.7 miles SSE of Saxon Reef. A shoal, with a depth of 0.2m, lies 2 miles WSW of its SW extremity.

Michaelmas Reef dries 0.9 to 1.2m and lies with its NE extremity 2 miles SE of Hastings Reef. A cay, 2.4m high and covered with vegetation, lies near the SW extremity of the reef. Foul ground fringes the NW side of the reef to a distance of 1.7 miles NW.

Oyster Reef lies 1.7 miles SW of Michaelmas Reef; it forms the SE side of the inner entrance of Trinity Opening.

8.12 **Dangers on the NW side.—Linden Bank** (16°18'S., 146°00'E.), with a depth of 11m, restricts the channel entrance about 6 miles N of the beacon on Norman Reef. Tongue Reef, a large reef, of which only the seaward side has been surveyed, lies on the NW side of Trinity Opening. There are many large boulders on the SE side of the reef; this side of the reef is steep-to.

Batt Reef, whose SE side dries from 0.9 to 1.2m, is separated from the S extremity of Tongue Reef by a partially-surveyed channel about 1 mile wide.

General depths of 33 to 69m are found in the fairway, which is clear of dangers and passes between Pixie and Batt Reefs. The channel between Pixie and Oyster Reefs is also clear of dangers and has depths of 24 to 40m.

There are two submarine cables laid through Trinity Opening.

Tidal currents attain a rate of 0.5 knot on the springs between Saxon and Batt Reefs. The flood sets SW; the ebb sets NE.

From seaward, care should be taken to approach Trinity Opening from outside the 200m curve on the parallel of 16°20'S, then steer a mid-channel course as required.

Opal Reef (16°14'S., 145°53'E.), which dries, lies 7 miles NW of Linden Bank. A large boulder lies on the N part of the

reef. A beacon stands in the middle of a reef which lies 0.5 mile N of Opal Reef.

St. Crispin Reef, Agincourt Reef, and Escape Reef extend in a N direction along the seaward edge of the barrier reef from a position 4 miles NNW of the boulder on Opal Reef. These three reefs are separated from the reefs forming the inner edge of the barrier reef by an extensive area of unsurveyed water reported to be full of coral reefs.

Anderson Reef (15°47'S., 145°48'E.) lies 1 mile N of Escape Reef. Shoals, with a least depth of 2.7m, fringe the NW side of the reef. A detached 3.7m patch lies 1.7 miles SW of the reef, and a small reef lies 0.5 mile S of the detached patch.

Cape Grafton to Buchan Point

8.13 False Cape (16°52'S., 145°51'E.) lies 4 miles W of Cape Grafton and rises abruptly to a height of 335m less than 1 mile S. A range of mountains trend S from the point. Mission Bay, which is shallow, indents the coast 2.5 miles S between the two capes. An island, 42m high, lies 1.7 miles SW of Cape Grafton, on the N side of drying sand and mud flats.

Spoil grounds are situated 1.7 miles NE and 4.7 miles NNW, respectively, from False Cape.

Ellie Point lies about 4 miles W of False Cape, and Taylor Point lies 7.5 miles NW of Ellie Point. Taylor Point, a steep, rocky point, marks the N limit of the Port of Cairns.

From Taylor Point, the coast trends 2.7 miles NNW to Buchan Point. A small bight is formed on the W side of Taylor Point.

Buchan Point (16°44'S., 145°40'E.) is a rocky point about 20m high and rises quickly to Mount Buchan, 671m high, 1.2 miles W.

Double Island, 0.7 mile NE of Buchan Point, rises to a height of 82m on its W and 79m at its E end. Haycock Islet, 34m high, lies 0.5 mile SE of Double Island.

Cairns (16°56'S., 145°47'E.)

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8.14 The main part of the port of Cairns lies in the narrow entrance of Trinity Inlet, which is located at the S end of a shallow bay that indents the coast about 3 miles S between False Cape and Ellie Point.

The city of Cairns and the berthing facilities lie on the W side of the entrance to Trinity Inlet. The port of Cairns includes all the navigable waters contained within a line from Cape Grafton to a position about 2 miles N and then WNW to Taylor Point.

Port of Cairns
http://www.cairnsport.com.au

Winds—Weather.—The winds at Cairns are predominantly from the S throughout the year. As a result, the Murray Prior Range, S of the city, acts as a wind shed with cumulus clouds almost always apparent at the top of these mountains. These rain clouds, which bring heavy rains along the higher slopes, seldom reach across Cairns Harbor unless S or SE winds attain velocities of 15 to 20 knots.

During the rainy season, Cairns is situated within the region frequented by the equatorial front and experiences conditions of low clouds, occasional poor visibility, and intermittent light rain. In the rainy season, when an equatorial front has been established, such weather usually persists for periods of 2 or 3 days or until S winds reach sufficient force to cause a N displacement.

During the dry season, low pressure areas moving across the continent to the S are too weak to have any appreciable effect at Cairns. In anticyclonic conditions, if a high passes to the N, the sky remains clear for several days with only a few fair weather cumulus clouds forming in the afternoon and dissipating at night. The daily range of temperature is greater, and haze accumulates with light to variable winds. When a high pressure area passes to the S, it brings a strong SE flow of moist air from the ocean. This condition may prevail for days at a time and is the cause of winter rains in this area. Fogs are rare and those that occur are usually associated with rain.

Tides—Currents.—The tides are influenced by the wind; springs rise from 1.8 to 2.9m, and neaps from 1.2 to 2.1m.

The tidal currents change at the time of HW and LW and, at springs, may attain a velocity of 2 knots. The flood current sweeps around False Cape and sets W across the channel toward Ellie Point, then it gradually turns S into the line of the channel. The ebb current sets in the opposite direction, as described above.

A 5 to 6 knot ebb current is encountered in the harbor during the wet season and, after heavy rains, the flood water from the Barron River, close N of Ellie Point, sets strongly E toward False Cape.

Depths—Limitations.—The approach channel, which has a minimum charted of a depth of 8.3m, leads from seaward to the harbor facilities at Trinity Inlet. It is well marked by leading lights. The channel is extremely narrow at 90m of navigable width for approximately 7 miles in length.

The following minimum under-keel clearances (UKC) are required when navigating in the Cairns Channel and Trinity Inlet:

1. Vessels up to 30,000 gt:
   a.) In the Channel—UKC of 10% of the draft or a minimum of 9m, whichever is greater.
   b.) In the Swing Basin—UKC of 0.6m, or one based upon actual squat figures provided for a channel similar to Cairns at 10 knots + 0.6m.
2. Vessels up to 40,000 gt:
   a.) In the Channel—UKC of 1.3m.
   b.) In the Swing Basin—UKC of 0.6m.
3. Vessels over 40,000 gt:
   a.) In the Channel—UKC of 1.5m.
   b.) In the Swing Basin—UKC of 0.6m.
4. Vessels over 90,000 gt:
   a.) In the Channel—UKC of 2.0m.
   b.) In the Swing Basin—UKC of 0.6m.
5. Vessels over 90,000 gt:
   a.) In the Channel—UKC of 2.0m.
   b.) In the Swing Basin—UKC of 0.6m.

The following speed limits are in force for vessels with a draft in excess of 3m, with the Cairns Channel, Trinity Inlet and Smiths Creek, as follows:

1. Entrance channel seaward of Beacon C15 (16°53.4'S., 145°47.8'E.)
   a.) 12 knots.
2. Trinity Inlet inshore from Beacon C15:
   a.) 8 knots.
3. Smiths's Creek:
   a.) 6 knots.
4. Smith's Creek between Senrab Point (16°56.5'S., 145°46.7'E.) and Chinamans Creek (16°57.7'S., 145°45.9'E.):
   a.) 6 knots, no wash.

Marlin Marina is the first berthing area within Cairns Harbor and is designed for recreational boating. The marina maintains a depth of 4.2m alongside the concrete jetty that surrounds the facility. Twelve berths are available to ocean-going vessels for the handling of a variety of cargo. The Main Wharf, Berth No. 1 through Berth No. 6, is a continuous quay, 595m in length, providing berths for vessels in excess of 200m in length. Wharf No. 7 and Wharf 8 have a combined length of 250m, capable of accommodating one or two vessels of variable length not to exceed the total length. Berthing information can be seen in the accompanying table titled **Cairns—Berth Information.**

Cairns—Berth Information

Berth No.	Depth Alongside	Nominal Length	Remarks
1	8.4m	91.5m	Passenger and Naval vessels
2	8.5m	91.5m	Passenger and Naval vessels
3	8.4m	91.5m	Passenger and Naval vessels
4	8.4m	91.5m	Passenger and Naval vessels
5	8.2m	91.5m	Passenger and Naval vessels
6	8.1m (between 500m & 550m)	138m	Containers
	7.7m (between 500m & 550m)		
7	9.3m	250m	Containers, bulk fertilizer, and break bulk cargo
8	10.0m		Passenger and Naval vessels

Wharf No. 10 will accommodate tankers with a maximum length of 189m, in depths of 9.3m alongside, for oil and LP gas. This wharf is also utilized for bunkering.

Wharf No. 11, located close S of Wharf No. 10, lies in an area of Naval Waters in Trinity Inlet and is controlled by the Royal Australian Navy.

Wharf No. 12, 183m in length, with depths of 10.5m alongside, is owned and operated by Sugar Terminals Ltd. for loading bulk molasses and sugar.

Crystal swing basin, the first turning basin in the channel from seaward is located in Trinity Inlet past Marlin Marina, serving berths No. 1 through No. 6 and has an approximate depth of 6.8m along the 360m diameter circle and an approximate depth of 6.4m along the 380m diameter from the center of the swing circle which can best be seen on the chart.

The S swing basin in Trinity Inlet, abeam of berth No. 11, maintains an approximate depth of 8.7m at the 310 diameter and an approximate depth of 7.8m at the 320 diameter from the center of the swing circle.

Smith Creek Wharf No. 1, with an alongside depth of 4.7m, handles general cargo and seafood. The berth can accommodate vessels up to 65m in length.

Two barge ramps are situated about 1 mile upstream in Smiths Creek. Both ramps accommodate vessels up to 55m in length, with a maximum beam of 13.2m and a maximum of 500gt.

Smiths Creek has two commercial fishing bases identified as CFB1 and CFB2. CFB1 can accommodate 59 fishing vessels while CFB2 can accommodate up to 35 vessels. Loading and unloading takes place at CFB2 or at the main wharf.

Aspect.—False Cape and Cape Grafton are prominent in the approach to Cairns Harbor. Mount Sheridan, 633m high, and Mount Whitfield, 381m high, lie 5 miles SW and 2.7 miles WSW, respectively, from Ellie Point. Red Peak, 611m high, lies 6 miles WNW of Ellie Point. Saddle Hill, 652m high, lies 2 miles N of Red Peak.

Cairns has been reported to give good radar returns up to 10 miles.

Courtesy of the USS GERMANTOWN

Cairns—Entrance Channel

Pilotage.—Unless the Master holds a current Pilotage Exemption Certificate, pilotage is compulsory for all vessels greater than 50m in length or if transiting Smiths Creek, all vessels greater than 35m in length. Pilotage should be requested at least 48 hours in advance for arrival in the port and 24 hours in advance for removals and departures. All pilot bookings are to be made through Cairns VTS via e-mail and should

Courtesy of the USS GERMANTOWN

Cairns—Berth 7 and Berth 8

Courtesy of the USS GERMANTOWN

Cairns—Tanker Wharf

include the following information:

1. Vessel name including previous name if there is one.
2. Lloyd's number for vessel.
3. ETA and ETD.
4. Draft forward and aft (for arrival and departure).
5. LOA, beam, and gt of vessel.
6. Destination of vessel for which the pilotage is needed.
7. Type and number of propellers.
8. Type of propelling machinery.
9. Type and number of rudders.
10. Number, arrangement, effective power of thrusters.
11. Preferred side alongside for mooring.

Courtesy of the USS GERMANTOWN

Cairns—Berth 1 to Berth 6

12. Confirmation of having ordered the lines launch.
13. Confirmation of pratique being granted.
14. Identify ships agents and address for billing.
15. Clarification of pilot boarding ladder accommodations and if standard arrangements exist.

Pilots will contact the vessel 30 to 45 minutes prior to the designated boarding time.

Pilots board in one of the positions listed in the table titled **Pilot Boarding Positions.**

Pilot Boarding Positions		
Boarding Place	**Position**	**Remarks**
A	16°47.5'S, 145°53.5'E	Vessels 180m or greater in length
B	16°49.0'S, 145°51.0'E	Vessels less than 180m in length
C	16°50.0'S, 145°490'E	Adverse weather

Contact Information.—The pilots and port can be contacted 24 hours, as follows:

Duty Pilots	
VHF	VHF channel 16
Telephone	617-4041-4214
Facsimile	617-4040-6368
E-mail	cnspilot_duty@bigpond.com
Regional Harbormaster of the Port	
Telephone	617-4052-7400
Facsimile	617-4035-1127
E-mail	rhmcairns@msq.qld.gov.au

Port Authority (Far North Queensland Ports Corp.)	
Call sign	Cairns Harbor
VHF	VHF channel 16
Telephone	617-4052-3888
E-mail	enquiries@portsnorth.com.au
Cairns VTS	
Call sign	Cairns VTS
VHF	VHF channels 12 and 16
Telephone	617-4052-7470
Facsimile	617-4052-7460
E-mail	vtscairns@msq.qld.gov.au
Tugs	
VHF	VHF channels 6 and8

Regulations.—The quarantine line for the port is drawn through the seaward beacons of the entrance channel. Vessels are boarded seaward of this line.

Explosives are discharged at Berth 1 through Berth 8.

There is a speed limit of 10 knots in the entrance channel, 8 knots in Trinity Inlet, and 4 knots in Smiths Creek.

Arriving vessels should contact Cairns Harbor on VHF channel 16 to advise of final ETA. All vessels transiting the port must maintain a radio watch on VHF channel 16. All vessels greater than 35m long should notify Cairns Harbor on VHF channel 16 prior to departing or shifting berths.

Anchorage.—The only designated anchorages within Trinity Harbor are for small vessels. Ocean going vessels requiring anchorage must do so outside the Cairns Port Security Limit demarcation line. Designated Anchorages are depicted on the chart in positions as shown in the table titled **Trinity Harbor Outside Designated Anchorages**:

Trinity Harbor Outside Designated Anchorages	
Designation	
CA1	16°46.6'S 145°50.4'E
CA2	16°48.6'S 145°52.7'E
CA3	16°48.9'S 145°54.2'E
CA4	16°49.6'S 145°48.0'E
CA5	16°46.6'S 145°50.0'E
CPS1	16°46.6'S 145°44.7'E
CPS2	16°46.6'S 145°51.1'E

Buchan Point to Cape Tribulation

8.15 From Buchan Point, the coast trends in a NW direction 20 miles to Island Point. In general, the range of coastal mountains follow the trend of the coast. Most of the coast consists of sandy beaches with intervening rocky points. Except for Egmont Reef, the dangers along this coast are contained within the 10m curve.

White Cliff Point (16°39'S., 145°34'E.), 25m high, lies 8 miles NW of Buchan Point. The cliffs that form the point are particularly conspicuous during the early part of the day.

Unity Reef, parts of which are awash, extend 1 mile ESE from the coast, 1 mile S of White Cliff Point.

Mount Harris, 1,080m high, lies on the coastal range 4.5 miles W of White Cliff Point; it has been reported to give good radar returns.

Yule Point (16°35'S., 145°31'E.), 5.2 miles NW of White Cliff Point, rises abruptly to a hill, 102m high. Reefs, which dry in parts, fringe the coast to 0.7 mile offshore, between the S side of Yule Point and a position 4.5 miles NW. Korea Reef, which partly dries, lies just inside the 10m curve, 2.5 miles NE of Yule Point.

Egmont Reef (16°31'S., 145°32'E.), a small steep-to reef which dries, lies just outside the 10m curve, 1.5 miles NNW of Korea Reef.

The Mowbray River enters the sea about 2 miles NW of Yule Point. Mangroves fringe the coast in the vicinity of the river. A drying bar and reefs encumber the river and its approach, but small craft with local knowledge can enter it.

Island Point (16°29'S., 145°28'E.), 4 miles NNW of the Mowbray River, lies at the N end of a low, sandy, and mangrove-covered promontory. It rises to a height of 74m, 0.3 mile SSE of its N extremity. From seaward, the point appears as an island.

Morey Reef, which dries, lies 0.3 mile NW of Island Point, on the W side of the entrance range to Port Douglas.

Port Douglas lies in the entrance to Dickson Inlet, on the W side of Island Point. The port is available to small craft.

Pilotage is compulsory for all foreign vessels 35m long and over, and is available 24 hours. Pilots are ordered through Cairns; see paragraph 8.14 for further requirements. Pilots will contact the vessel about 30 minutes prior to boarding time and board on the range line about 0.4 mile NE of Entrance Lighted Buoys. Vessels approaching and transiting the harbor should maintain a listening watch on VHF channel 16.

Anchorage may be taken in 7 to 9m, mud, 0.5 mile N of Island Point.

8.16 Between Island Point and Cape Kimberley, 12 miles N, the coast forms a bight that recedes about 4 miles; between Cape Kimberley and Cape Tribulation, 12 miles farther N, a similar bight is formed.

The 10m curve trends N from a position 1.7 miles NE of Island Point to a position close off Cape Kimberley. Most of the dangers lie within the 10m curve.

From Island Point to **Dayman Point** (16°23'S., 145°25'E.), 6 miles NNW, the land is low, and several creeks empty into the sea. A conspicuous water tower stands on the coast 2.2 miles S of Dayman Point.

The Daintree River empties into the sea 6 miles NNE. An extensive bar, with a depth of 0.9m, encumbers the river mouth and extends about 0.5 mile offshore.

The coast between the entrance to the Daintree River and Cape Kimberley, a bold and steep promontory, 1.7 miles ENE, is formed by a sandy beach fronted by below-water rocks, and backed by low land covered with bush.

Off-lying islands.—The **Low Islets** (16°23'S., 145°34'E.) lie 8.5 miles E of Dayman Point. The two islets are located on a

steep-to drying reef about 1 mile long. A light and a signal station are situated here. The islets have been reported to give good radar returns up to 14 miles.

Anchorage.—Vessels may take anchorage, in 12.8 to 14.6m, mud, good holding ground, 0.5 mile NNW of the Low Islets.

Snapper Island lies 1 mile SSE of Cape Kimberley, just inside the 20m curve. The island rises to a height of 115m in the W part. A narrow reef fringes the island in places, and depths of less than 10m extend 1.2 miles N from it.

Anchorage.—Anchorage may be obtained off the NW end of Snapper Island during SE winds, but the swell sets around the island making it uncomfortable. With NE or SW winds there is good anchorage in the lee of the island.

8.17 From **Cape Kimberley** (16°17'S., 145°29'E.) to Cape Tribulation, the coast consists primarily of sandy beaches separated by rocky points. The coastal range backs this part of the coast, and several hills rise abruptly from the sea. Thornton Peak, 1,374m high, lies 9 miles NW of Cape Kimberley; it has been reported to give good radar returns.

The dangers fringing the coast between Cape Kimberley and Cape Tribulation lie within the 5m curve which follows the coastal trend up to about 0.7 mile offshore. The 10m curve follows the coastal trend from less than 0.5 mile to almost 2 miles offshore.

Black Rock, 1.5m high, lies 0.4 mile offshore, 2 miles N of Cape Kimberley.

Bailay Point, 4.2 miles NNW of Cape Kimberley, is the S entrance point of Alexandra Bay. Bailay Hill, 293m high, rises about 0.5 mile W of the point.

Alexandra Bay occupies the S part of a bight that indents the coast about 1 mile W, between Bailay Point and a position on the coast 5 miles N. The bay is shallow and affords no shelter.

Cape Tribulation (16°05'S., 145°29'E.) is a grassy hill, 102m high, 8 miles N of Bailay Point; it juts out from a bold headland and is steep-to.

Caution.—There is a two-way route shown on the chart between Cape Kimberley and Cape Flattery. The route is not mandatory and is not a traffic separation scheme; it indicates the best route for vessels up to 9m having regard to the charted depth and dangers. For more information, see paragraph 7.2 under the heading "Navigation in the Great Barrier Reef."

Cape Tribulation to Cape Flattery

8.18 The coast between Cape Tribulation and Cape Flattery, about 67 miles N, consist of a series of bights that recede up to 6 miles W. Most of the coast consists of sandy beaches separated by rocky points, and in places is fronted by reefs. The coast is bold and precipitous in several places.

Several coastal ranges rise abruptly from the coast between Cape Tribulation and Archer Point, but there is a low 4.5 mile stretch of coast about 12 miles NNW of Cape Tribulation. Between Archer Point and Cooktown Harbor, 9 miles farther N, the coast is low, however, a peak rises to a height of 429m, about 1 mile S of Cooktown Harbor. From the low land immediately N of Cooktown Harbor, a range of high hills rises abruptly from the sea; between Cape Bedford and Cape Flattery, this range of hills is lower.

A number of reefs and islets lie between the coast and the inner edge of the Great Barrier Reef, which lies from 5.5 to 10 miles off this part of the coast.

Many of the steep-to islets and dangers off this coast are contained within the 20m curve, which irregularly follows the coastal trend between 0.5 mile and 8 miles offshore. Some parts of the inner edge of the Great Barrier Reef lie only about 2 miles outside the 20m curve.

The Great Barrier Reef—Inner Edge—Mackay Reef to Heldson Reef

8.19 The inner edge of the Great Barrier Reef trends about 27 miles NNW from Mackay Reef to Bee Reef, and then about 40 miles N to Helsdon Reef, which lies about 7.5 miles E of Cape Flattery. Vessels should keep W of a line connecting the following reefs, which are the dangers marking the inner edge of the Great Barrier Reef. These dangers are steep-to on their W sides, with depths of over 20m close off them.

Spitfire Reefs (16°01'S., 145°38'E.), several detached reefs with a least depth of 1.1m, lie with the W reef 2.5 miles NW of the sand cay on Mackay Reef. Bonner Rock, with a depth of 5.6m, lies 1.7 miles N of Spitfire Reef.

Pickersgill Reef, about 3 miles long, lies 5 miles NNW of Bonner Rock; a sand cay is located on the NW extremity of the reef. A light stands on the NW extremity of the reef.

Papuan Pass and Cruiser Pass lie with their W entrances between Pickersgill Reef and Cairns Reef.

Endeavour Reef (15°47'S., 145°35'E.), in the middle of the W entrances of Papuan Pass and Cruiser Pass, lies with its W end 4 miles N of the W extremity of Pickersgill Reef.

Cairns Reef, a large coral reef shaped like a horseshoe, lies 2.5 miles N of the W extremity of Endeavour Reef. There are boulders on its S and SW sides, which dry 1.5 to 2.4m. Malcolm Patch, with a depth of 8.2m, lies 0.7 mile N of the NW extremity of Cairns Reef.

Bee Reef (15°38'S., 145°26'E.), which dries, lies about 0.7 mile W of the NW extremity of Cairns Reef, and about 6 miles SE of the light on Archer Point. The reef is steep-to except for shoal water off the N and S ends.

Egret Reef lies 8.5 miles N of Bee Reef; it is a partly drying reef that is always visible because of discoloration or ripples. This reef is steep-to, except for a number of coral patches that lie within 0.5 mile of its NW side. There is a 4.3m patch which lies close off its S side. A lighted beacon stands on the middle of the W side of the reef.

Boulder Reef is a steep-to reef lying 1.5 mile N of Egret Reef. The reef has some large black boulders on its E and SE side and is always visible.

Anchorage.—Good anchorage may be taken, in 24m, mud, sand, and shells, about 0.5 mile NW of Boulder Reef.

Lark Reef, 7.2 miles NNE of Boulder Reef, is dangerous, as it can only be seen in good weather at LW, when part of its SW side dries. Several coral heads which lie off the W edge of the reef are not visible until close to.

Lark Pass lies with its W entrance between Lark Reef and Swinger Reef.

8.20 **Swinger Reef** (15°15'S., 145°32'E.), which dries, lies 1.2 miles NNE of Lark Reef. A detached 3.7m patch lies about 0.5 mile W of the NW end of the reef.

Startle Reefs, which are difficult to see, lie with their W extremity about 3 miles NW of Swinger Reef.

Forrester Reef (15°10'S., 145°30'E.), 1 mile NW of Startle Reefs, is always visible and is steep-to except on its N side, where there are several detached heads.

Anchorage.—Anchorage may be obtained, in a depth of 27m, mud and sand, in the lee of Forrester Reef, 0.5 mile offshore.

Strickland Reef lies about 5 miles NNE of Forrester Reef; the reef does not show up well when submerged.

Pasco Reef, which has a patch of sand that uncovers 0.6m, lies 1.2 miles NNE of Strickland Reef. Tilbrook Bank, a 14.6m patch, lies 2.2 miles NNW of Pasco Reef.

Helsdon Reef (14°57'S., 145°29'E.), a well-defined reef which dries in patches around its edge, lies 3 miles NNW of Tilbrook Bank and 7.5 miles E of Cape Flattery. A depth of 8.2m lies 4.5 miles NW of Helsdon Reef.

The Great Barrier Reef—Outer Edge—Anderson Reef to Ribbon Reef

8.21 From Anderson Reef, the outer edge of the Great Barrier Reef extends in a N direction about 51 miles to the S end of **Ribbon Reef** (14°56'S., 145°42'E.). Ribbon Reef is 16 miles long and about 0.7 mile wide. For more information, see paragraph 7.2 under the heading "Navigation in the Great Barrier Reef."

There are a great number of unnamed reefs in this area. The reef has not been completely examined and adequate soundings are lacking.

Papuan Pass (15°46'S., 145°49'E.) is entered between Anderson Reef, on the S, and Ruby Reef, 1.5 miles NW. The navigable channel between the reefs is about 1 mile wide and has depths of 24 to 48m. From the pass the deep-water channel extends in a general W direction for a distance of about 20 miles to a position some 5 miles ESE of Rattlesnake Point, at a junction point with the recommended track of the Inner Route.

The dangers in Papuan Pass, in addition to Anderson Reef, are Ruby Reef, to the N of the seaward entrance, and Pickersgill Reef and Endeavour Reef on the S and N side, respectively, of the inner entrance.

Ruby Reef is 1 to 2 miles wide and extends about 2.7 miles NNE from its S extremity. The S and E sides of the reef are steep-to, but the W side is foul to a distance of 1.5 miles W.

Pickersgill Reef, previously described in paragraph 8.19, lies with its E extremity 12 miles WSW of the SW extremity of Anderson Reef; from its E extremity it extends 3 miles WNW.

Endeavour Reef lies with its S extremity 4 miles N of Pickersgill Reef and 8.5 miles W of the E extremity of Ruby Reef. A fringe of sunken coral encloses the reef, and at its E extremity; foul ground extends up to 1 mile from it.

The flood current sets WSW and the ebb current sets ENE. The rate at springs is 1 knot.

Vessels may enter Papuan Pass midway between Anderson Reef. and Ruby Reef. Steer to pass midway between Pickersgill Reef and Endeavour Reef, and join the Inner Route farther W.

Cape Bedford bearing 348°, distant 7 miles

8.22 **Pearl Reef** (15°43'S., 145°48'E.), which is foul, lies close N of Ruby Reef.

Cruiser Pass is entered between Ruby Reef and Lena Reef, which dries, 3 miles N. Lena Reef is steep-to, with the 200m curve less than 0.5 mile from it.

From its seaward entrance, Cruiser Pass trends in a general WSW direction for about 24 miles to its intersection with the Inner Route, SW of the Hope Islands. The fairway passes between the W extremity of Endeavour Reef and the S extremity of Cairns Reef, 2.5 miles N. The fairway has general depths of 20 to 55m.

Irene Reef (15°39'S., 145°43'E.), a danger on the N side of Cruiser Pass, lies 4.5 miles W of Lena Reef. The S side of the reef is foul to a distance of 0.5 mile off. The E extremity of Cairns Reef lies 8 miles WSW of Irene Reef.

Vessels approaching Cruiser Pass from seaward should pass in mid-channel between Pearl and Lena Reefs, and then steer to pass midway between Endeavour Reef and Cairns Reef, to a position 2.2 miles SW of the Hope Islands.

The reefs from Lena Reef extend about 30 miles N to a reef on the S side of the entrance to Lark Pass. They are a series of drying reefs lying from 20 to 30 miles off the coast. The 200m curve has not been delineated and the waters inside the reefs are unsurveyed.

Lark Pass is entered between the N end of a drying reef in position 15°08'S, 145°44'E, and a similar reef 1.2 miles NNW.

Harrier Reef (15°08'S., 145°42'E.), with a sand cay on it, lies 1.5 miles W of the S entrance point of Lark Pass. A 4.6m coral head lies 0.5 mile SE of the reef.

Marx Reef, which dries, lies on the N side of Lark Pass, 5 miles SW of Harrier Reef.

A steep-to drying reef lies 1 mile WSW of Marx Reef, with a 3m patch between them.

Startle Reefs lie 2.7 miles W of the drying reef WSW of Marx Reef. They lie on the N side of Lark Pass at its SW end.

Pullen Reefs (15°15'S., 145°35'E.), which dry, lie on the S side of the fairway, 3.2 miles SSW of Marx Reef.

8.23 Swinger Reef lies on the middle of the SW entrance of Lark Pass. Foul ground extends 1 mile E from Swinger Reef; a 4.6m patch lies 0.5 mile farther E.

Caution.—Mariners are cautioned that the reefs in Lark

Pass are difficult to make out at HW when the sea is smooth. Several vessels have grounded on the N side of Lark Reef where the below-water edge is difficult to see. Swinger Reef is nearly always visible.

Vessels entering Lark Pass should steer a mid-channel course through the entrance, then steer a course to the SW to pass SE of the 4.6m patch of the SE side of Harrier Reef, then pass between Marx Reef and Pullen Reef on the S. Care must be taken to clear the 4.6m patch E of Swinger Reef. When S of Swinger Reef, steer for South Cape Bedford on a course of 264°. Continue on 264° until reaching the Inner Route, then steer N or S as required.

The outer edge of the Great Barrier Reef continues in a general N direction from Lark Pass for 11.5 miles to the S extremity of Ribbon Reef. There are openings between the reefs, but none of them have been examined.

Cape Tribulation to Archer Point

8.24 From Cape Tribulation to the S entrance of Weary Bay, about 9 miles NNW, the coast trends in that direction and consists mostly of a series of sandy beaches separated by rocky points.

Donovan Point (16°01'S., 145°27'E.), with a rock 3m high close off, lies 4 miles NNW of Cape Tribulation. Mount Owen, 914m high, lies 6.2 miles W of Donovan Point.

Cowie Point, bold and cliffy, lies about 2.5 miles NNW of Donovan Point. From Cowie Point the coast trends about 2.5 miles NW to the S entrance point of Weary Bay. A dangerous wreck lies 1.5 miles due N of Cowie Point.

Weary Bay indents the coast about 2 miles and extends 6 miles from its S entrance point to Rattlesnake Point at its N end. Foul ground extends about 0.9 mile N of the S entrance point, and Lake Reef, with a least depth of 0.7m, lies 0.7 mile farther N. The Bloomfield River, navigable only by boats, empties into the head of the bay, about 2.5 miles WNW of the S entrance point.

Rattlesnake Point (15°50'S., 145°23'E.) a steep, bold bluff, attains a height of 286m less than 0.5 mile inland. It is clear of dangers, and the 10.9m line lies about 0.3 mile E.

Between Rattlesnake Point and Archer Point, about 15 miles NNW, a range of mountains up to 871m high, backs the coast within 1.7 miles inland. Coral reefs fringe most of this coast. In some places, particularly between Obree Point and Forsberg Point, the fringing reef is steep-to, with depths of 10.9m close offshore.

Obree Point (15°46'S., 145°22'E.) lies about 4.5 miles N of Rattlesnake Point. The intervening coast is mainly sandy in its N and S parts, with rocky ledges in the middle, then to Thomas Point, 4 miles NNW, it is fringed by drying coral reefs.

8.25 Off-lying dangers and islands.—The **Hope Islands** (15°44'S., 145°28'E.) are two sand cays, 8.5m high, located on drying reefs 4.2 to 6 miles ENE of Obree Point; the islands lie E of the recommended course. The reefs on which the islands lie are always visible, but the passage between them is not recommended. Tidal currents set through the passage between the reefs sometimes causing a short confused sea.

Anchorage.—Anchorage may be obtained, in a depth of 15.8m in the lee of the Hope Islands, 1 mile NW of the NE island. Care must be taken not to anchor in the current and to avoid the shoal patches off the N end of the passage between the reefs and Stonor Patch.

Gubbins Reef, a narrow coral reef which dries 0.9 to 1.5m in places, lies 2.7 miles SE of Thomas Point. Delius Patch, with a depth of 4.9m, lies 0.5 mile E of Gubbins Reef. Ottaway Patch, with a depth of 6.3m, lies 1 mile E of Delius Patch, and Stonor Patch, with a depth of 5.5m, lies 0.4 mile farther E.

Forsberg Point (15°40'S., 145°20'E.), a rocky point with a conspicuous knob, lies 2.2 miles NNW of Thomas Point.

Archer Point (15°36'S., 145°20'E.), 4 miles N of Forsberg Point, is a prominent rocky point, 61m high. Archer Hill, 158m high, lies 0.5 mile W of the point.

Rocky Islet, 50m high, lies 0.5 mile off the coast, 0.7 mile SSE of Archer Point. The islet is steep-to off its E side, but there is foul ground off the other sides.

Archer Point to Cape Flattery

8.26 From Archer Point, the coast trends in a NNW direction for 1.5 miles to Walker Point, then 2.7 miles farther NNW to Grave Point. Walker Hill, 177m high, rises close inland, 0.5 mile NW of Walker Point.

Walker Bay indents the coast about 1.5 miles between Grave Point and **Monkhouse Point** (15°30'S., 145°17'E.), 3.7 miles NNW. The Annan River empties into the W side of Walker Bay. Most of the bay is shallow and foul ground occupies its S part.

Caution.—Cowlishaw Reef (15°32'S., 145°19'E.) lies 2.7 miles ENE of Grave Point; it has a sand cay on its N end which dries 2.4m. Dawson Reef, which dries 1.5m, lies 1.7 miles NW of Cowlishaw Reef.

8.27 Cooktown (15°28'S., 145°15'E.) lies on the E side of the entrance to the Endeavour River, at the foot of Grassy Hill, 2.7 miles NNW of Monkhouse Point.

The port is closed to commercial shipping and is only used by small craft, fishing vessels operating off Cape York, and by tourist craft operating from Cairns. The maximum size vessel which can enter the port is 300 gt, with a draft of 2.5m.

A channel, marked by lighted beacons and maintained to a depth of 3.1m, leads to the wharf at Cooktown.

Vessels not having local knowledge are strongly advised against entering the port. From the S, a pilot may be embarked off Cairns. If approaching from the N, the harbormaster at Cairns should be advised in sufficient time to allow a pilot to proceed to Cooktown.

Pilotage is compulsory for all foreign vessels 35m long and over and is available 24 hours. Pilots will contact the vessel about 30 minutes prior to boarding time and board 2.75 miles ENE of Grassy Hill Light (15°28'S., 145°15'E.). Vessels approaching and transiting the harbor should maintain a listening watch on VHF channel 16.

Indian Head (15°23'S., 145°17'E.), 5.5 miles NNE of Grassy Hill, rises to Rocky Mountain, 335m high, 0.7 mile W.

Nob Point, 60m high, lies 2.2 miles NNE of Indian Head, and South Cape Bedford lies 5 miles farther NE.

Caution.—The dangerous wreck of a fishing vessel lies 0.5 mile SSE of Nob Point.

8.28 **Cape Bedford** (15°14'S., 145°20'E.), at the N end of a headland 3.2 miles NNW of South Cape Bedford, rises almost perpendicularly to a 251m high flat-topped summit.

Although South Cape Bedford is steep-to and has depths of more than 20m less than 0.2 mile SE, several 5.5m patches lie up to 0.5 mile E of the headland and 1 and 1.5 miles NE, respectively, of South Cape Bedford. Petty Patch, a 5.5m patch, lies 0.6 mile NE of Cape Bedford.

Between Cape Bedford and Cape Flattery, 16 miles N, a bight indents the coast about 6 miles W. A series of scrubby hills up to 171m high lie along this coast. The McIvor River flows into the bight, 7.7 miles NW of Cape Bedford. A conspicuous white sand patch is located in a position less than 0.5 mile inland, 1.5 miles N of the mouth of the McIvor River. Casuarina Hill, 84m high, is located 6.5 miles NNE of the white patch, and a conspicuous white sand hill, 72m high, is located 1.7 miles N of Casuarina Hill.

Most of the dangers in the bight between Cape Bedford and Cape Flattery lie within the 10m curve.

Conical Rock (15°08'S., 145°20'E.), 12m high, is a black rock located on the E end of a reef that lies on the edge of the 10m curve, 5.2 miles NNW of Cape Bedford.

The **Three Isles** (15°07'S., 145°25'E.), low and wooded, lies on a reef 8 miles NNE of Cape Bedford. Low Wooded Isle lies 2 miles NW of the Three Isles. The Two Islets are located on a reef 5.5 miles N of the Three Isles.

Cape Flattery to Cape Melville

8.29 **Cape Flattery** (14°57'S., 145°21'E.), a bold headland formed by an isolated range of hills which stand out from the low land in its vicinity, appears as an island when seen from a distance.

Caution.—The dangerous wreck of a fishing vessel lies 0.5 mile W of Cape Flattery.

The coast between Cape Flattery and Cape Melville, about 67 miles NW, is considerably broken by a series of bights that recede as much as 6 miles SW.

From Cape Flattery to North Bay Point, much of the coast is low and consists mostly of sandy beaches lined with mangroves. From North Bay Point to Cape Melville, the coast consists of sandy beaches that are separated by rocky points. It is backed by a range of hills that rise abruptly to heights of more than 305m, about 1.2 miles inland.

The inner edge of the Great Barrier Reef lies 2 to 17 miles offshore. In the vicinity of Lookout Point, there are a number of dangers that lie between the coast and the inner edge of the barrier reef. In the vicinity of Murdoch Point, the recommended inner route is encumbered with islands and reefs.

The Great Barrier Reef—Inner Edge—Heldson Reef to North Warden Reef

8.30 The inner edge of the Great Barrier Reef trends about 3 miles NW from Helsdon Reef and then about 10.5 miles NNE to North Direction Island. Between North Direction Island and Fly Reef, about 24 miles NW, the inner edge of the barrier reef forms a bight that recedes 12 miles NE. From Fly Reef the inner edge of the barrier reef trends 25 miles WNW to Switzer Reef, and then 14 miles NNW to North Warden Reef, about 12 miles E of Cape Melville.

Caution.—Vessels are advised to keep W and SW of the dangers described below; the exception to this is the bight formed NE of Lizard Island. The dangers marking the inner edge of the barrier reef are mostly steep-to and have depths of more than 20m close to the sides adjacent to the Inner Route.

Foul ground and detached dangers, with depths of less than 1.8m, lie up to 3 miles NW of Helsdon Reef. A 10m patch lies 3.7 miles NNW of the reef; this patch lies less than 1 mile E of the track through the Inner Route.

8.31 **Eye Reef** (14°54'S., 145°29'E.), with a rock on its S end which dries 1.8m, lies 2 miles N of Helsdon Reef.

The Rocky Islets, three in number, lie on a reef 1.5 miles N of Eye Reef. The largest islet rises to a height of 46m. A 2.9m patch lies about 0.2 mile SSE of the 15m high rock.

South Direction Island (14°50'S., 145°31'E.), 177m high, lies 3 miles NE of the Rocky Islets. The island is steep-to on its S and W sides, but reefs extend 1.2 miles N.

High Rock, 52m high, lies 1.5 miles E of South Direction Island.

Kedge Reef, an area of foul ground, lies between 1.7 and 3.7 miles N of South Direction Island.

North Direction Island (14°45'S., 145°31'E.), a steep bare dome-shaped island, 188m high, lies 4.7 miles N of South Direction Island. A reef fringes the island and extends about 0.1 mile offshore.

A submerged reef lies with its NW end about 2.5 miles NE of North Direction Island. The limits of this reef are not certain and vessels should stay N of a line drawn from the NW end to the reef on the S side of Cormorant Pass, 8 miles ENE.

The Great Barrier Reef—Ribbon Reef to Jewell Reef

8.32 Between the N end of Ribbon Reef and **Jewell Reef** (14°23'S., 145°22'E.) 22 miles NW, the Great Barrier Reef is formed by a single line of reefs, through which are a number of passes.

Cormorant Pass lies with its seaward entrance 28 miles N of Lark Pass and about 9.5 miles NE of North Direction Island. The reefs on either side show clearly, but the pass is only about 0.3 mile wide.

Tidal currents are reported to set through the pass at a considerable rate.

Fishing, other than trolling, is prohibited in Cormorant Pass.

Yonge Reef (14°36'S., 145°37'E.) extends about 3.7 miles NNW from a position 2 miles N of Cormorant Pass; a boulder lies on its NW end.

Carter Reef lies 0.5 mile NNW of Yonge Reef, and extends 3.2 miles NNW from its S extremity.

Half Mile Opening, a small clear passage with a least depth of 14.6m, is about 0.3 mile wide. The pass is entered between Yonge Reef and Carter Reef. The summit of Lizard Island, bearing 237.5°, leads to the entrance.

The inner approach to Half Mile Opening has only been partially examined.

Cooks Passage lies between the N end of Carter Reef and the S extremity of Day Reef, 1 mile NW; both reefs are steep-to. The depths in the passage vary from 12.8 to 42m. Immediately

outside the passage, the depths increase rapidly to more than 200m. The summit of Lizard Island, bearing 215.5°, leads through the entrance.

There is a heavy swell with SE winds and the reefs are well-defined by breakers.

The tidal currents off the SW entrance of Cooks Passage set NE and SW and attain a rate of approximately 2 knots at springs. Outside the entrance, the current sets NW at a rate of 1.5 knots.

8.33 One Mile Opening (14°28'S., 145°31'E.) is entered between the NW extremity of Day Reef and the SE extremity of Hicks Reef, 0.7 mile NW. Hicks Reef is a crescent-shaped drying reef, with foul ground extending 1.5 miles from its SW side. The seaward side is steep-to, though pinnacles up to 200m off the outer edge have depths of 13m, with lesser depths likely. At the outer entrance, the SE edge of Hicks Reef breaks heavily in SE winds. Both sides of the entrance are steep-to, and there is a least depth of 12.2m off the S entrance, close N of Day Reef.

The opening is approached with the summit of Lizard Island bearing 195°. Vessels then alter course to 215° to proceed through the center of the channel.

One and a Half Mile Opening is entered between a drying rock on the NW end of Hicks Reef and the E side of **Hilder Reef** (14°26'S., 145°24'E.), 1.2 miles W. Hilder Reef dries 0.9 to 1.8m and is steep-to on all sides except the SW sides. The fairway is deep except for a 12.2m patch off the NW extremity of Hicks Reef.

The tidal currents off the S entrance set N and S and attain a rate of approximately 2 knots. During strong SE winds, a heavy sea and strong irregular tidal currents are experienced.

Vessels approaching from seaward should steer for the summit of Lizard Island bearing 174°. Once clear of the opening, vessels may join the Inner Route by passing W of the dangers N of Lizard Island.

Two Mile Opening is entered between the N end of Hilder Reef and the E end of Jewell Reef (14°24'S., 145°24'E.). The latter reef dries 1.5 to 1.8m and its SE side is steep-to. A conspicuous boulder, 0.9m high, lies at the seaward edge of the reef, 2 miles WNW of its E end. Parke Reef lies on the NW side of the opening, 0.5 mile SW of Jewell Reef. Waining Reef, which dries 1.5m in places, lies 0.5 mile farther SW and extends 8.5 miles WSW.

Vessels enter Two Mile Opening on a SW heading proceeding through the center of the channel; the reefs on either side are normally visible.

The Great Barrier Reef—Inner Reef Northwest of North Direction Island

8.34 Fly Reef (14°30'S., 145°10'E.) lies 1.5 miles W of the W extremity of Waining Reef and 25 miles NW of North Direction Island. From this reef and from Jewell Reef, 10.5 miles NE, the Great Barrier Reef resumes its inner and outer reef characteristic.

Snake Reef, which dries, lies 6.5 miles WNW of Fly Reef. A conspicuous rock, which dries 0.9m, lies on the E end of Snake Reef and a sand cay, which dries, lies on the NW end of the reef.

Mid Reef, which dries, lies 1.2 miles W of the W extremity of Snake Reef. A depth of 8.2m lies 1.2 miles WSW of the NW point of Mid Reef. It is steep-to, with foul ground that extends 0.5 mile off its W end.

Megaera Reef (14°29'S., 144°58'E.), which dries, lies 0.4 mile off the middle of the S side of Mid Reef.

The Beanley Islets, about 6.1m high, lie on the S side of a steep-to reef, 2.5 miles NW of Mid Reef; they are part of the Howick Group. Ingram Islet, a sand cay 9m high, lies on the N extremity of the reef. Stapleton Islet, 4m high, lies on the NW side of a reef, 6.5 miles NNW of Ingram Islet.

Ingram Island (14°24'S., 144°52'E.) is a wooded sand cay. Anchorage Area II is situated 0.8 miles NW of Ingram Island, in a depth of 20m.

Switzer Reef (14°22'S., 144°45'E.), a steep-to reef which dries 1.2m, lies on the W side of the S entrance to Waterwitch Passage, 7 miles NW of Ingram Islet.

A shoal, with a least depth of 11m, lies 0.5 mile off the middle of the SW side of Switzer Reef, and 7m and 7.9m patches lie between the outer and inner track, 2.2 miles SW of the same reef.

Davy Patches (14°20'S., 144°43'E.) lie 1 to 2 miles NW of Switzer Reef. There is a least depth of 1.8m at their NW end. The Inner Route passes about 1.5 miles W of Davy Patches.

Munro Reef, which dries, lies 0.5 mile N of Switzer Reef. Foul ground extends 0.5 mile from the SW side of Munro Reef.

Unison Reef (14°18'S., 144°41'E.) lies 1.5 miles NW of Munro Reef. A boulder, 1.5m high, lies on the N extremity of the reef.

South Warden Reef is an extensive reef which is steep-to on its W side. It is separated from Unison Reef by a channel 0.7 mile wide. Below-water reefs, which never dry but are always visible, extend 2 miles N from South Warden Reef, and foul ground extends 1 mile farther N.

Broomfield Rock (14°12'S., 144°39'E.), awash, lies 1.5 miles NNW of South Warden Reef, on the edge of the foul ground which extends N from the reef.

North Warden Reef lies 2.7 miles N of Broomfield Rock and 7 miles E of Cape Melville. The reef is fouled with rocks on all sides.

The Great Barrier Reef—Jewell Reef and Waterwitch Passage

8.35 Between Jewell Reef and Waterwitch Passage, 32 miles WNW, the outer edge of the Great Barrier Reef is formed by reefs of various sizes and shapes, between which are many narrow openings. None of these openings should be attempted as the area between them and the Inner Route has not been properly examined.

Waterwitch Passage (14°11'S., 144°53'E.) is entered between No. 1 Sandbank, which is 0.6m high, and a similar reef 1.2 miles NW.

A shoal, with depths of 5.5 to 8.5m, with a below-water rock off its SW end, lies off the NW entrance point of the passage. Heavy tide rips occur over this shoal. Another reef, with a depth of 5.5m, lies 0.7 mile farther SW.

Vessels entering Waterwitch Passage should steer for Stapleton Islet bearing 190°. When about 4 miles N of Stapleton Islet, steer to pass 1 mile W of it, then to the Inner Route, passing

about 1.2 miles SE of Switzer Reef.

Cape Flattery to Lookout Point

8.36 From Cape Flattery, previously described in paragraph 8.29, the coast trends 9.5 miles NW to Lookout Point, then 23 miles farther NW to Murdoch Point. The coast in the first 9.5 miles consists of sandy beaches and low mangrove shores. Northwest of Lookout Point, the coast consists of a low mangrove shore with numerous creeks.

The 10m curve lies 3 miles offshore in the S part of this coast and 7.5 miles off in the N part. There are numerous dangers inside and outside the 10m curve.

Cape Flattery bearing 297°, distance 4 miles

Cape Flattery Harbor (14°57'S., 145°21'E.)

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8.37 Cape Flattery Harbor is located on the W side of Cape Flattery, which shows a light, and is an open roadstead. Cape Flattery Inner Harbor is located on the W side of the spit extending 2 miles NNW from the N extremity of Cape Flattery and consists of a small jetty for local traffic.

Cape Flattery Offshore Wharf extends about 400m from the SE extremity of the cape. The port was developed for the export of silica sand.

Far North Queensland Ports Corporation
www.portsnorth.com.au

Tides—Currents.—It is reported that the current normally sets NE under the wharf at rates of up to 1 knot, but may be stronger during the wet season, which is December to March. Following N winds, the set is occasionally S or SW. Berthing may be suspended in wind velocities exceeding 20 knots.

Depths—Limitations.—The offshore wharf and trestle jetty has a berthing length of 230m and an alongside depth of 15m. Vessels of up to 60,000 dwt and a maximum length of 250m can be accommodated.

Vessels are usually berthed starboard side-to on the NE side of the wharf using the ship's anchor.

Aspect.—A beacon on the knuckle of the offshore wharf, and a lighted beacon 90m NE, in line bearing 215°, lead to the inshore end of the berth.

Lights are shown from the mooring dolphins.

Pilotage.—The Cape Flattery Pilotage Area is a clearly delineated area that is best viewed on the chart. Pilotage is available 24 hours a day and is compulsory for the following:

1. All foreign vessels 35m in length or greater unless a current PEC (Pilotage Exemption Certificate) is held for this port.
2. All Australian vessels, 50m in length or greater unless a current PEC is held for this port.
3. Vessels towing other vessels where the combined length of the vessels is 50m or greater.
4. All vessels for which the owner or Master has requested the use of a pilot.
5. All vessels directed to use the services of a Pilot by the harbormaster.

Any vessel requiring pilot services should make this request to Cairns VTS via e-mail at least 48 hours prior to expected arrival.

The pilot will make initial contact with the ship through VHF channel 16 about 30 minutes prior to boarding time.

The pilot will normally board the vessel in position 14°56.8'S, 145°23.0'E, which lies approximately 2 miles E of Cape Flattery.

Departing vessels should request a pilot at least 24 hours prior to expected movement.

Cape Flattery is within the compulsory Reef Pilotage Area (REEF VTS) and therefore must have a Reef Pilot on board. Pilots are ordered through the agent and usually board from Cairns in the S or Thursday Island in the N. For more information about the REEFVTS system and its requirements, see paragraphs 7.2 and 7.3.

Contact Information.—The pilots and port can be contacted 24 hours, as follows:

Duty Pilots	
VHF	VHF channels 6 and 16
Regional Harbormaster of the Port (Cairns)	
Telephone	617-4052-7400
Facsimile	617-4035-1127
E-mail	rhmcairns@msq.qld.gov.au
Berthing and Loading Operations	
VHF	VHF channel 6
Port Authority (Far North Queensland Ports Corp.)	
VHF	VHF channels 12 and 16
Telephone	617-4052-3888
E-mail	enquiries@portsnorth.com.au
Cairns VTS	
Call sign	Cairns VTS

VHF	VHF channels 12 and 16
Telephone	617-4052-7470
Facsimile	617-4052-7460
E-mail	vtscairns@msq.qld.gov.au

Regulations.—Vessels should advise ETA at least 7 days prior to expected arrival, and include the following information:

1. Vessel name.
2. Vessel type.
3. ETA.
4. Total quantity of cargo to be loaded.
5. Hatch loading sequence required.

Anchorage.—Anchorage may be obtained by vessels of suitable draft about 1.5 miles N of the inner harbor jetty, in depths of 6 to 7m, locally known as No. 1 Anchorage Area. The approach to this anchorage is made E of the dangerous wreck lying 2.75 miles NNW of this jetty. Alternatively, No. 2 Anchorage Area can be used in good weather, in depths of 27m, in position 14°56.8'S, 145°22.2'E, lying on the W side of the two-way route, about 2.5 miles NNE of the offshore wharf.

An anchorage, with a least depth of 8m, is established in the lee NW of Cape Flattery within the area delimited by the following coordinates:

a. 14°52'48"S, 145°15'42"E.
b. 14°53'00"S, 146°16'42"E.
c. 14°54'30"S, 145°18'50"E.
d. 14°54'02"S, 145°16'42"E.

Vessels awaiting berthing instructions should proceed to the above anchorage.

Vessels in ballast anchor on the range as convenient for their draft, outside the 5m line.

8.38 Lookout Point (14°50'S., 145°14'E.) is a bare red-colored hill, 84m high, that appears as an islet from a distance. The land in the vicinity of the point is low and has numerous sandhills. A conspicuous white sand hill, 49m high, lies about 4 miles WSW of Lookout Point.

Although the point is closely fringed with foul ground, it is fairly steep-to on its NE side, with the 10m curve less than 0.5 mile offshore. A detached patch, with a least depth of 1.2m, lies 2.5 miles NW of Lookout Point.

Decapolis Reef (14°51'S., 145°16'E.), marked by a light, dries 1.5m; it is a small reef which lies on a 9.1m patch, 2.7 miles SE of Lookout Point.

Four Foot Rock, with a depth of 1.2m, lies 0.7 mile W of Decapolis Reef.

Sim Reef (14°49'S., 145°17'E.), with a depth of 0.6m, lies 2 miles NNE of Decapolis Reef, and is not easily seen unless marked by tide rips. A coral head, with a depth of 4m, lies 0.7 miles SE of the reef, and a 6.4m patch lies 0.5 mile NW of the reef. The alternative course for the Inner Route lies W of Sim Reef.

8.39 Off-lying dangers and islands.—Linnet Reef (14°47'S., 145°21'E.), which dries in places, lies 6.7 miles ENE of Lookout Point. The reef is steep-to on its SW and SE sides. A reef, with depths less than 1.5m, lies 1 mile W of Linnet Reef and is difficult to make out.

Martin Reef, a drying reef, lies close N of Linnet Reef. Boulders, which dry, lie on the SE side of the reef and a drying sand cay lies on its NW end.

Eagle Islet, low and covered with bushes, lies near the N end of an extensive reef, 3.7 miles NNE of Martin Reef. The reef is steep-to and has sand banks on it extending S from Eagle Islet, which uncover at low water springs. Depths of 7.3m and 8.5m are charted 6.5 miles WSW and 5.7 miles W, respectively, of Eagle Islet.

Lizard Island (14°40'S., 145°28'E.), 359m high, with a bare dome-shaped summit, lies 4 miles ENE of Eagle Islet. This island forms a good mark when approaching the passes in the Great Barrier Reef that lie NE of it.

Lizard Island

Palfrey Island, 137m high and South Islet 123m high, are located on reefs, 0.5 mile SSW and 1 mile S, respectively from Lizard Island. The recommended Inner Route passes between Palfrey Island and Eagle Islet, 3.5 miles W.

A reef, which dries in places, lies 2 miles E of the N extremity of Lizard Island.

Petricola Shoal (14°38'S., 145°28'E.), with a depth of 4.9m, lies 1.5 miles NE of Lizard Island.

Stewart Shoal, with a least depth of 5.8m, lies 2 miles NNE of Lizard Island. A 10.4m shoal lies 1 mile W of Stewart Shoal.

Underwood Shoal (14°35'S., 145°28'E.) has a charted depth of 4.9m about 3.2 miles NNE of Lizard Island.

Caution.—The shoals charted N and E of Lizard Island lie on an extension of the recommended courses through the Great Barrier Reef.

Lookout Point to Murdoch Point

8.40 From Lookout Point to Murdoch Point, the coast recedes about 4.5 miles and is fronted by a mud bank which extends up to 1.2 miles offshore in places.

North Sand Hill, 59m high, rises 5.5 miles W of Lookout Point.

Round Hill (14°48'S., 145°01'E.), a distinctive dome-shaped hill, 175m high, which is prominently in front of the rest of the hills, lies 7.7 miles WNW of North Sand Hill.

The **Pethebridge Islets** (14°44'S., 144°06'E.), two wooded islets about 6.1m high, lie about 9.5 miles NW of Lookout

Point. The E islet, marked by a light, lies outside the 5m curve. These islets are located on the SW side of an alternative navigational track that passes between the islets and Turtle Reef, about 3.7 miles ENE.

The **Turtle Group** (14°43'S., 145°12'E.), six low, wooded islets and shoals, lie between 5.5 and 10 miles NNW of Lookout Point; all the islets are reef fringed. Depths of less than 2.7m lie about 2 miles NE of the largest islet.

Gunga Shoal, a below-water coral patch, lies 9 miles NNW of Lookout Point. A 2.7m patch lies 1 mile WNW of Gunga Shoal. Both of these dangers are steep-to and as the water in the vicinity is much discolored, they are difficult to distinguish even when close to.

Nymph Island (14°39'S., 145°15'E.), a low, wooded island fringed by reefs, lies 3.7 miles NE of the NE islet of the Turtle Group. A 9.8m patch lies 2.7 miles N of Nymph Island. Patches, with depths of 8.6m and 11.7m, lie 2.7 miles N and 2.2 miles NNE of Nymph Island. These patches lie within 0.4 mile N of the Two-way Route. The recommended Inner Route lies 1.5 miles NE of Nymph Island.

Turtle Reef lies 3.7 miles ENE of the light on Pethebridge Islet. A sand cay, sometimes awash at HW, but always visible, lies on the NW end of the reef. A detached sandbank, which dries at LWS, lies 0.5 mile SSW of Turtle Reef.

8.41 **Murdoch Point** (14°37'S., 144°55'E.) is a low, sandy, ill-defined, and rounded projection fronted by a drying reef extending 0.7 mile offshore. A detached drying reef, 2.5 miles long, lies parallel with the coast S of the point and 1.2 miles from it.

Murdoch Island, a low island, lies on the N part of the detached reef, 1 mile ENE of Murdoch Point. From Murdoch Point, the coast trends 22 miles NW to Barrow Point.

Beatrice Reef, 2 miles N of Murdoch Island, dries in places, but is difficult to distinguish when covered.

Miles Reef (14°32'S., 144°55'E.), two steep-to reefs, 0.2 mile apart, lies 1.7 miles N of Beatrice Reef.

The Cole Islands, a groups of four islets, lies on the edge of a bank, 3.5 miles NNW of Murdoch Point.

Sand Islet (14°31'S., 144°51'E.), 1.8m high, lies 2 miles NNW of the NW islet of the Cole Islands.

Off-lying Islands

8.42 **Howick Island** (14°30'S., 144°58'E.), part of the Howick Group, is the largest island of this group. Howick Island is 56m high and lies 7 miles NNE of Murdoch Point.

Houghton Island, 9.1m high, lies 0.5 mile S of Howick Island; it is steep-to and reef fringed, with depths of 10m within 0.3 mile of the shore.

Anchorage.—Vessels may take good anchorage in a position a little over 0.3 mile N of the W end of the island, in a depth of 16.5m.

Coquet Island (14°33'S., 144°59'E.), the farthest SE of the Howick Group, is 16m high. A reef fringes the islet to 0.3 mile distant. A light is shown from the W side of the island. A channel 0.7 mile wide separates this islet from Houghton Island.

Anchorage.—Vessels may anchor, in 12.8m, 0.3 mile NNW of the light on the W end of the islet.

Wilson Rock, a detached pinnacle with a depth of 5.5m, lies 0.7 mile W of Houghton Island.

Newton Island (14°30'S., 144°55'E.), 2 miles W of Howick Island, is fringed by a reef, and is mangrove fringed except on its NW side, where there is a sandy point. The alternative route lies 0.5 mile SW of this island.

Watson Island, 7m high, lies on the S end of a drying reef 2.2 miles NW of Newton Island. A light is shown from the island.

Bewick Island (14°26'S., 144°49'E.), 12m high, lies 4.5 miles WNW of Watson Island.

Anchorage.—Anchorage may be obtained, in 13 to 15m, mud, close off the NW side of Bewick Island.

A wreck, with a depth of 8.7m, lies near the alternative track, 2 miles WSW of Bewick Island.

Murdoch Point to Barrow Point

8.43 **Red Point** (14°33'S., 144°46'E.), 9.1m high and cliffy, lies 9 miles WNW of Murdoch Point. Brown Peak, 200m high, lies 1 mile inland, midway between these two points. A range of hills extends 4 miles S of Red Point.

From Red Point to Barrow Point, the coastal dangers are contained within the 10m curve, which lies up to 5.5 miles offshore N of Red Point. There are a number of detached dangers off this coast.

Noble Island (14°30'S., 144°46'E.), 2.2 miles N of Red Point, rises to a height 122m. A reef fringes the island.

Wooden Patch, a sand and mud patch with a depth of 6.4m, lies on the edge of the 10m curve, 2.2 miles N of Noble Island.

Baron Reef, which dries at LW, lies 3.7 miles WSW of Wooden Patch, and Weigall Reefs, which lie close offshore, lie 2.7 miles farther W. A patch, with a depth of 6.7m, lies 4.5 miles NNW of Baron Reef.

Cape Bowen (14°31'S., 144°40'E.), a cliffy ill-defined point, 6.1m high, lies 6.7 miles WNW of Red Point. It lies at the NE end of a detached range of rocky hills that are remarkable for the basaltic columns on them. Cone Peak, 534m high, the E summit of the range, lies 1.5 miles SW of Cape Bowen; it is conspicuous from the E and N.

Barrow Point (14°22'S., 144°39'E.), 8.7 miles NNW of Cape Bowen, is the E extremity of a peninsula that extends NE from the plain S of it. The point is 130m high and presents a barren appearance.

A 7m patch, lying 4.7 miles SE of Barrow Point and close SW of the Two Way Route, is covered by the red sector of South Barrow Island Light.

The Barrow Islets are located 0.5 mile NE of the peninsula, on a drying reef. The 20m curve lies about 0.3 mile off the SE islet.

Barrow Point to Cape Melville

8.44 From Barrow Point, the coast trends NNW 14 miles to Cape Melville. The coastline is irregular. Ninian Bay is formed between Barrow Point and North Bay Point, 6 miles NNW, and smaller indentations are formed between North Bay Point and Cape Melville.

Ninian Bay is shallow, and formed by sandy beaches separated by rocky points, and backed by low, wooded ground. The head of the bay is reef-fringed. A reef, which dries 1.2m, lies off a cliffy point, 11m high, 3.7 miles WNW of the Barrow Is-

lets.

Beabey Hill, 145m high and prominent, rises 3.5 miles SSW of North Bay Point.

North Bay Point (14°16'S., 144°36'E.) rises abruptly to a hill, 131m high, about 0.3 mile W. The 323m high summit of Temple Hill, the highest in the vicinity, rises 2 miles W of North Bay Point. The 10m curve lies 0.4 mile E of this point, but depths shoal to less than 3.7m immediately within this curve.

Between North Bay Point and Cape Melville, the coast trends fairly regularly in a NNW direction and consists of sandy beaches separated by rocky points. This section of the coast rises abruptly to a range of hills about 0.5 mile inland, with higher peaks, up to 414m, less than 2.5 miles inland. The Melville Range rises to a summit of 613m, about 6 miles WSW of North Bay Point.

The 10m curve, which contains the coastal dangers, lies 1 to 2 miles offshore on this coast.

A dangerous steep-to shore bank, with depths of less than 1.8m, extends about 3.2 miles NNW from North Bay Point. This shore bank is just inside the 10m curve and there are depths of more than 12.8m close off it.

Rocky Point Islet, 20m high, lies close to the shore, 2 miles NW of North Bay Point.

Singleton Patch (14°10'S., 144°35'E.), a steep-to 8.3m pinnacle, lies on the N side of the Inner Route, 4 miles N of Rocky Point Islet.

Hales Islet lies on a dangerous steep-to shore bank, 1 mile SE of Cape Melville and about 0.3 mile offshore. An obstruction, with a depth of 9.9m, lies 1 mile NE of Hales Islet.

8.45 **Cape Melville** (14°10'S., 144°31'E.) rises to a height of 118m a short distance SE; it lies at the N termination of the high range of rocky hills that backs the coast N from North Bay Point. The cape is remarkable for the immense granite blocks on it.

Anchorage Area designated CM is situated 3.5 miles due W of Cape Melville, in a depth of 6m.

Wedge Rocks, 9.1m high, lies close off the NE extremity of the cape. Several rocks fringe the N end of the cape and Cape Rock, 14m high lies off the NW extremity of the cape.

Boulder Rock, 24m high, lies just inside the 10m curve, 1 mile NNW of the NW end of Cape Melville. A detached rock, almost awash, lies less than 0.5 mile NE of Boulder Rock.

Channel Rock (14°08'S., 144°29'E.), which covers 0.9m, lies 0.7 mile N of Boulder Rock, just inside the 20m curve.

Cape Melville to Claremont Point

8.46 The coast between Cape Melville and Claremont Point, about 50 miles WNW, recedes S to form two bays, Bathurst and Princess Charlotte. Bathurst Bay indents the coast about 5 miles SSE between Cape Melville and Bathurst Head, 17 miles WSW. Princess Charlotte Bay indents the coast 20 miles SSW between Bathurst Head and Claremont Point, 34 miles WNW.

Several detached hills lie close to the coast between Cape Melville and Bathurst Head, and the Bathurst Range rises abruptly from the coast to a height of 329m, extending a short distance S from the latter head. The land in the vicinity of Princess Charlotte Bay is low.

Many of the dangers fringing the coast are contained within the 10m curve, which follows the coastal trend between 0.2 mile and 6.2 miles offshore, except that it lies 13 miles seaward of the head of Princess Charlotte Bay. Several steep-to islands and other dangers lie between the 10m curve and the inner edge of the barrier reef. The depth curves cannot generally be relied upon to give adequate warning of these dangers. The inner edge of the Great Barrier Reef lies from 3.7 to 26 miles offshore.

Tides—Currents.—In general, the N set of the flood current and S set of the ebb current that prevails on this coast is interrupted by the tidal flow in and out of Princess Charlotte Bay, where there is a tidal rise of 3.2m.

Between Cape Melville and Claremont Point, the tidal currents set SW or S into Princess Charlotte Bay on the rising tide and in an opposite direction on the falling tide. The ebb current tends to set in a N direction out of the bay.

In the vicinity of Princess Charlotte Bay, from April to November, the Southeast Trades cause a current that sets N or NW at rates of 0.5 to 1.2 knots. The resultant of this current and the tidal current almost always sets N at a rate of 1.2 to 2 knots during the falling tide and up to 0.5 knot during the rising tide. During the Northwest Monsoon, December to March, the resultant set of the wind and tidal currents is more frequently to the S than N. During this season, the flood current setting into the bay is sometimes overcome by an outset from the bay that is probably caused by fresh water discharged from the rivers which empty into the bay. A drift of 2 knots has been reported after heavy rains.

8.47 Except for the Flinders Group, the dangers inside the 10m curve are described with their related coastal features. The Flinders Group and other islands and dangers between the 10m curve and the inner edge of the Great Barrier Reef are described below.

The **Pipon Islets** (14°07'S., 144°31'E.), four in number, lie on a drying reef, 2.5 miles N of Cape Melville. The S islet is 12m high and tree covered; a light is shown from this islet. The reef is steep-to except for depths of 11m and less which lie 0.4 mile off its NW side.

Oswald Shoal lies 1.5 miles NW of the light on the Pipon Islets. It has a depth of 3.9m.

Pipon Shoals (14°06'S., 144°32'E.), with a least charted depth of 0.9m lie about 0.5 mile NNE of the Pipon Islets. They consist of shoal patches located on an 11m bank.

Aylen Patch, with a depth of 9.1m, lies 2.5 miles NW of Pipon Islets Light. There is a 12.9m patch 3.2 miles WNW of Aylen Patch. Anchorage Area PI is situated 1 mile WNW of Pipon Island, in depths of 10 to 15m.

King Island (14°06'S., 144°20'E.) is a low, wooded, and reef-fringed island that lies 9.7 miles WNW of Cape Melville.

Atkinson Reef, a small coral reef with a depth of 2.7m, lies on the outer end of a spit which extends 3 miles WSW from King Island. The reef is not marked by tide rips.

Flinders Group (14°10'S., 144°15'E.) consists of five, high, rugged islands, partially covered with stunted trees and scrub, which lie between 1.5 and 7.5 miles N of Bathurst Head. Stanley Island is the farthest N of the group.

8.48 Cape Flinders (14°08'S., 144°14'E.), a steep-to point of land, is the N extremity of the island; it lies 3 miles W of Atkinson Reef. Two peaks rise to a height of 205m and 187m, respectively, 1.5 miles SE of Cape Flinders. A knob on the W slope of the peaks is prominent from the NE and S. The W part of the island has a table-topped summit with a height of 123m, and is the only prominent feature on this part of the island. The E and W parts of the island are connected by a low isthmus.

Flinders Rock, a 7.3m pinnacle marked by rips on the ebb, lies 0.5 mile N of Cape Flinders.

Flinders Island (14°11'S., 144°15'E.), the largest island of the group, is separated from the SE side of Stanley Island by Owen Channel, which is about 0.6 mile wide. The island rises to Flinders Peak, 317m high, in the S part of the island. Pirie Head, 85m high, is a precipitous headland located on the SE end of Flinders Island.

A reef fringes Flinders Island to about 0.3 mile offshore, except that it extends about 0.7 mile from the head of a bight on the NW side of the island. A small detached reef that dries 3m, lies 0.3 mile offshore, 0.7 mile SW of Pirie Head.

Owen Channel is only suitable for small vessels, although there are depths of 5.8 to 16.5m; there are a number of 5.5m patches in its NW part.

Fly Channel separates Flinders Island from the islands about 1 mile farther S. Although there are depths of 8.5 to 14.6m in the fairway, the channel is not recommended because of the existence of dangerous rocks.

Sentry Rock, a 3.6m pinnacle, lies in the middle of the channel about 1 mile SSW of Pirie Head.

Stainer Rock, with a depth of 5.5m, lies on the S side of the channel 0.9 mile WNW of Sentry Rock.

Maclear Island (14°13'S., 144°15'E.), on the S side of Fly Channel, lies 2 miles WSW of Pirie Head. The island is 24m high, with a rocky islet 6.1m high WNW of it. Both are fringed with drying coral reefs, with a channel 150m wide between them.

Denham Island, the farthest SE of the Flinders Group, rises to 201m near its SE extremity. Howard Bluff, 49m high, the NE extremity of the island, is a cliff with an overhanging top. The SE coast is bold, precipitous, and steep-to.

Blackwood Island, 1 mile WNW of Denham Island, rises to a rounded summit, 178m high at its NE end. Pullen Point, 6m high, lies at the SW extremity of the island, at the end of a long narrow neck which has several mounds up to 44m high on it.

In 1989, it was reported that the dangerous wreck of a fishing vessel lies 0.5 mile W of the summit of Blackwood Island.

Anchorage.—During SE winds, vessels can take anchorage 0.5 mile offshore in Anchorage Area SB (Stokes Bay) located on the W side of Stanley Island, in a depth of 16m. Anchorage Area WB, situated halfway between Cape Flinders and Nares Point, has depths ranging from 10 to 13m.

Anchorage can be taken, in 11m, mud, off the W side of Blackwood Island, 1 mile N of Pullen Point. This anchorage is not recommended when the wind is N of E.

8.49 Clack Reef (14°04'S., 144°14'E.) lies 3 miles N of Stanley Island, on the N side of the Inner Route.

Clack Islet, 43m high, lies on the SE extremity of the reef. An islet, 15m high, lies on the E end of the reef, just over 1 mile NNE of Clack Islet. A rock, which dries 1m, lies on the W extremity of the reef, 2.5 miles WNW of Clack Islet. A depth of 9.6m is charted 1.2 miles WSW of Clack Islet, close off the reef.

Wharton Reef (14°08'S., 144°00'E.) is a steep-to reef that lies 12 miles WSW of Clack Reef. It is located about 1.5 miles S of the Inner Route, in the middle of the entrance to Princess Charlotte Bay. A light is shown from the E end of the reef; drying rocks are located 0.8 mile WSW of the light on the W extremity of the reef.

Clark Shoal, a steep-to coral patch with a depth of 6.4m, lies 3.2 miles W of Wharton Reef.

Olive Patch, with a depth of 5.5m, lies about 4 miles SW of Wharton Reef. A depth of 9.6m is charted 1.5 miles S of the patch.

Claremont Point (14°00'S., 143°41'E.) is described in paragraph 8.56.

The Great Barrier Reef—Inner Edge—North Warden Reef to Iris Reef

8.50 The inner edge of the Great Barrier Reef trends NW from North Warden Reef to a position 5 miles NE of Cape Melville at Melanie Rock, then about 8.5 miles N to the inner end of North Broken Passage. It then trends about 44 miles W to Fahey Reef and then 5.5 miles NNW to Iris Reef, which lies 9.5 miles ENE of Claremont Point. Vessels should keep W and S of a line connecting the following dangers, which mark the inner edge of the Great Barrier Reef. For more information, see paragraph 7.2 under the heading "Navigation in the Great Barrier Reef."

Melanie Rock (14°06'S., 144°34'E.), with a least depth of 1m, lies about 4.5 miles NW of the N end of North Warden Reef. Foul ground, with 4.9 to 9.1m patches, extends 2.5 miles ESE from the rock. The area E and NE of Melanie Rock is mostly unexamined.

Eves Reef (13°58'S., 144°34'E.) lies 8 miles N of Melanie Rock. The waters E of a line drawn from Melanie Rock to Eves Reef have not been examined sufficiently for safe navigation.

North Broken Pass lies E of Eves Reef and South Broken Pass lies between Eves Reef and Tydeman Reef, 2 miles W. Neither pass is recommended.

The line of reefs that trend W from Eves Reef to Lowry Passage, 11 miles distant, is not more than 2 miles wide and forms both the inner and outer edges of the Great Barrier Reef.

8.51 Tydeman Reef (13°59'S., 144°31'E.), which dries, lies 2 miles WSW of Eves Reef. A shoal, with a depth of 3.9m, lies off the E end of the reef.

Melville Pass lies between the W end of Tydeman Reef and Davie Reef, 1.7 miles W. There are boulders 0.6m high, on the SW end of Davie Reef. Detached shoal patches, with depths of 4.9 to 16.5m, on either side of the channel, reduce the navigable width to 0.7 mile.

Tidal currents set N and S in Melville Pass and attain a rate of 2 knots at springs, when eddies are formed and the water discolored.

Pipon Islet Light bearing 167.5° leads through Melville Pass from seaward, in depths of 22 to 30m.

West Melville Pass lies with its seaward entrance between Davie Reef and Wilson Reef (13°57'S., 144°24'E.), which dries, 1.5 miles W. There is a beacon on the SW extremity of

Wilson Reef.

Several shoal patches on the W side of the channel, with depths of 8.8 to 10m, reduce the navigable width of the pass to 0.4 mile.

Tidal currents in West Melville Pass set NE and SW; they attain a rate of approximately 2 knots at springs.

West Melville Pass is a safe channel which leads directly from seaward to the Inner Route.

Flinders Peak, 17 miles SW of West Melville Pass, bearing 218°, or at night, King Island Light bearing 221°, leads through the pass in depths of 20 to 30m, however, the former leads close to Davie Reef.

Joan Reef (13°57'S., 144°21'E.), which dries, lies 1.2 miles W of Wilson Reef. The reef is steep-to except for depths of 5.8 and 6.1m lying close off its NE and SW ends, respectively.

Lowry Passage lies between Wilson Reef on the E and Joan Reef on the W; it is deep and clear of dangers.

Tidal currents in Lowry Passage are strong and cause eddies and discolored water, especially at springs.

Flinders Peak bearing 203°, or at night, King Island Light bearing 195.5°, lead through Lowry Passage in a least depth of 29m.

Corbett Reef, on the inner edge of the barrier reef, extends 15 miles SW from a position 6.2 miles W of Joan Reef. The SE side of the reef has not yet been clearly defined. The SW end is steep-to and dries in patches, with rocks which dry to 2.2m.

8.52 **Eden Reef** (14°05'S., 143°55'E.), a steep-to reef which dries 1.5m, lies 5 miles W of the W extremity of Corbett Reef. A light is shown from the reef, which is located 1 mile N of the Inner Route.

Taiwan Shoal, Cameron Shoal, and Keast Shoal, with depths of 4.6m, 4.6m, and 7.3m, respectively, lie between Eden Reef and Grub Reef, 2.2 miles NNE.

Fahey Reef (14°04'S., 143°51'E.), 3.2 miles WNW of Eden Reef, dries 0.9 to 1.5m, and is steep-to. A light is shown from the reef. A strong E set on the ebb at springs has been reported in the vicinity of the reef.

Beabey Patches, a group of coral heads with a least depth of 5.5m, lie 3 miles NW of Fahey Reef. The Inner Route lies 1.2 mile SW of the 5.5m patch.

Iris Reef, which is steep-to on its W side, lies 2.5 miles N of Beabey Patches. The reef dries 1.2m, and Stainer Islet, 2m high, lies on its NW side. A lighted buoy is moored 1.8 miles W of Iris Reef.

The Great Barrier Reef—Outer Edge—Waterwitch Passage to Lowry Passage

8.53 From the NW side of Waterwitch Passage, the outer edge of the Great Barrier Reef trends about 21 miles NW in an unbroken line with no apparent openings. It then turns abruptly SW for 2 miles to North Broken Passage, an opening which lies 13 miles NNE of Cape Melville. The passages and reefs W of this passage, to Lowry Passage, 12 miles farther W, have been described with the inner edge of the Great Barrier Reef.

Bathurst Bay is entered between the W extremity of Cape Melville and the E extremity of **Bathurst Head** (14°15'S., 144°15'E.), 17 miles WSW; the 5m curve lies 5.2 miles off the head of the bay.

From the W extremity of Cape Melville to a point 10.5 miles SW, the coast is formed by a sandy beach backed by sparsely-wooded ground.

Islets, with a few bushes on them, lie between 1 and 2.5 miles N of the point mentioned above.

Bathurst Head is a rugged projection which terminates in three points; the central and N point is **Combe Point** (14°15'S., 144°13'E.), with a small bay on each side. Within the three points, the head is formed by a tableland covered with trees, which fall abruptly near the coast.

Rattlesnake Channel lies between Bathurst Head, on one side, and Denham Island and Blackwood Island of the Flinders Group, on the other side. The channel is about 0.8 mile wide between the 10m curve and is clear of dangers.

8.54 Princess Charlotte Bay, an extensive bay that lies between Bathurst Head and Claremont Point, 34 miles NW, has a mud bank which extends 2 miles offshore at its head. The 10m curve lies up to 12.5 miles from the head of the bay.

The E shore of the bay along Bathurst Head for a distance of 2.7 miles is steep and wooded. From this point to the mouth of the North Kennedy River, at the head of the bay, a distance of 19 miles, the shore is fronted by mangroves and backed by tidal flats.

For a distance of 3 miles W of the North Kennedy River, the shore is mangrove fringed; then for a distance of 15.5 miles NW it is formed by swampy ground. From this point to Claremont Point, 13 miles N, the shore of the bay is devoid of any remarkable features, except for a conspicuous clump of trees 6 miles S of Claremont Point.

Jane Table Hill (14°30'S., 144°08'E.), 161m high, and Jeannette Hill, 83m high, 1 mile SSE, are located 16 miles SSE of Bathurst Head. Jane Table Hill is easily identified, owing to its position in the low, flat ground in its vicinity.

June Reef, which dries 0.9m, lies within the 5m curve, 15 miles NW of the North Kennedy River.

The **Cliff Islands** (14°14'S., 143°47'E.) are a group of three islets that lie close together between 3 and 4.5 miles off the W side of Princess Charlotte Bay, in a position 3.2 miles N of June Reef. The E islet is 15m high and the N islet is 23m high. They are located within the 5m curve on the E end.

8.55 **Port Stewart** (14°05'S., 143°41'E.) (World Port Index No. 53310) is a small settlement situated on the Stewart River, 10.5 miles NNW of the Cliff Islands. Claremont Point is located 3.7 miles farther N. Local knowledge is essential.

Anchorage.—Anchorage may be taken anywhere in Princess Charlotte Bay outside the 5m curve, but care must be taken to avoid Olive Patch and the shoal patches in the vicinity. Good anchorage during E winds can be taken, in 9.1m, mud and shells, about 2 miles WSW of the NW extremity of Bathurst Head. When the SE winds are strong off Cape Flinders and Cape Melville, it is invariably light in the bay.

Claremont Point to Cape Direction

8.56 **Claremont Point** (14°00'S., 143°41'E.) is a low wooded projection of the mainland that is relatively inconspicuous. A shore bank, with depths of less than 5.5m, extends

nearly 2.2 miles E from the point. Several detached coral patches, with depths of less than 1.8m, lie 1.2 miles and 1.5 miles ENE of the point.

The coast trends fairly regularly about 71 miles NNW from Claremont Point to Cape Direction and consists mostly of sandy beaches along which numerous small rivers and creeks empty.

Much of the coast is fringed with reefs; there are many detached reefs, shoal patches, and islets between the coast and the inner edge of the barrier reef. These dangers are particularly numerous between Campbell Point and Cape Direction. The inner edge of the Great Barrier Reef lies 4 to 10 miles off this coast.

Between Claremont Point and Campbell Point, 29 miles NNW, the low coast recedes about 5.5 miles W and consists of sandy beaches fringed with sandbanks and coral reefs. It is backed by low land to a position 6 miles SSW of Campbell Point, where the coastal range again begins to closely back the coast.

The Embley Range is the only feature on this coast that is notable.

Round Mountain (13°34'S., 143°31'E.), 320m high and rounded, rises on the N end of the range; Hobbs Hill, 208m high, with a sharp sugar loaf top, rises near the S end of the range.

The coastal dangers on this coast are contained within the 5m curve. Only the more prominent dangers within the 5m line will be described.

Obree Reef (13°59'S., 143°41'E.) lies on the shorebank 2 miles N of Claremont Point.

Rattlesnake Reefs, which consist of a coral reef, awash, and three reefs which dry between 0.6 and 1.2m, lies 4 miles NNW of Obree Reef, close to the E edge of the coastal bank.

Colmer Point, about 17 miles NNW of Claremont Point, is a low point that lies close S of the mouth of the Rocky River.

Holdsworth Rock (13°46'S., 143°36'E.), with a depth of 3.6m, lies outside the 5m curve, 4.2 miles ENE of Colmer Point.

Frenchman Reef, which dries 2.4m, lies 2.2 miles NNE of Colmer Point.

The **Chester River** (13°42'S., 143°33'E.) enters the sea 4 miles N of Colmer Point. This is the most important river in this area. A ledge of coral rocks, which dry, lie on the edge of the drying sand bank, which extends 0.4 mile from the entrance. Small vessels with a draft of 1.5m can enter the river at HW.

8.57 **Campbell Point** (13°32'S., 143°35'E.) lies on the N side of the Nesbit River, 10 miles NNE of the Chester River. A hill rises to a height of 59m, 1.5 miles NW of the point.

Cape Direction bearing 182°, distant 8 miles

Cape Direction bearing 333°, distant 5 miles

From Campbell Point, the coast trends N 1.7 miles to a red sandstone cliff 18m high. Between the red cliff and Cape Sidmouth, 6 miles farther N, the coast is low and consists of a sand beach. Several hills and a coastal range back this coast from 1 to 5 miles inland.

Whale Hill (13°29'S., 143°32'E.), 306m high, is a table-topped hill that lies 4.7 miles NNW of Campbell Point; it lies at the SE end of the Macrossan Range, which extends 7 miles N.

This section of the coast continues to be fronted by a shore bank, with the 5m curve lying 3 miles offshore.

Bell Bank (13°27'S., 143°37'E.), which dries 1.5m, is about 1 mile long and lies 2 miles offshore in a position 5 miles NNE of Campbell Point. The E edge of this bank is coral.

Cape Sidmouth (13°25'S., 143°36'E.), a bare, rocky point with a sandy beach, rises abruptly to two hummocks which have a height of 62m. From a distance S or N, the cape appears as an island.

Roskruge Reef, awash, lies 1.7 miles N of Bell Bank and 1.7 miles E of Cape Sidmouth.

8.58 Between Cape Sidmouth and Friendly Point, a low sandy point 2.2 miles N, the coast is low and fronted by a sandy beach.

A dangerous shorebank, with depths of less than 2m, extends 4 miles NE of Friendly Point. It shoals abruptly from the 10m curve. Treat Reef, which dries 1.2m, lies on the N edge of the shorebank, 2.7 miles NNE of Friendly Point.

From Friendly Point, the coast trends 4.5 miles NNW, then 8.5 miles N to **Bobardt Point** (13°11'S., 143°31'E.), a low sandy point, with wooded land between it and the coastal range 2 miles W. The coast here is backed by a continuous line of ranges between 274 and 458m high.

Voaden Point, 6.5 miles NNW of Friendly Point, is low and tree covered. A reef, which dries 0.6m, lies on the outer end of a spit of foul ground which extends 1 mile from the point.

Hangklip Peak, 412m high, lies 2.5 miles inland, 3 miles SW of Voaden Point.

An extensive area of foul ground lies within the 5m curve, NE, E, and SE of Bobardt Point.

Between Bobardt Point and Cape Direction, 20 miles N, the coast continues to be primarily sandy beaches separated by several rocky points. This part of the coast is backed by a line of coastal ranges. Chester Peak, 329m high, lies 3.5 miles NNW of Bobardt Point.

The 10m curve follows the coastal trend up to 3 miles offshore between Bobardt Point and **First Red Rocky Point** (13°04'S., 143°31'E.), 7.2 miles N; the water shoals quickly inside the 10m curve.

First Red Rocky Point is 23m high and has red cliffs. High Peak, 491m high, is a conical summit located 3 miles WNW of the point.

A dangerous shore bank, with depths of less than 1.8m, extends up to 3.2 miles offshore between First Red Rocky Point and Cape Direction. It lies just within the 5m curve, but the water shoals quickly within the 10m curve.

Wasp Reef (13°02'S., 143°33'E.), which dries 0.6m, lies on the edge of the coastal bank, 2.2 miles NNE of First Red Rocky Point.

Round Point, 47m high, lies 3 miles N of First Red Rocky Point and Second Red Rocky Point lies 3 miles farther N. Bare Hill, 82m high, lies 0.3 mile W of Second Red Rocky point. The shore bank extends 2.2 miles E of Second Red Rocky Point; the 10m curve lies 0.2 mile farther E.

From Second Red Rocky Point to Cape Direction, 7 miles N, the dangerous shore bank is encumbered with reefs and dangers.

8.59 Hammond Reef (12°56'S., 143°33'E.) lies on the coastal bank 2.2 miles NE of Second Red Rocky Point. Numerous reefs lie NW of Hammond Reef.

Rocky Islet, 39m high, lies 2.5 miles SSE of Cape Direction. Large boulders extend 0.1 mile E from the islet; the outer boulder is 6m high.

Cape Direction (12°51'S., 143°32'E.) is a remarkable head and terminating in a rocky point. There are several well-defined round, bare hills, covered with boulders on the cape.

Direction Hill, 146m high, the farthest S of these hills, appears as a sharp peak when seen from the N or S.

Off-lying Islands

8.60 There are numerous steep-to rocks, shoal patches, reefs, and islets between this part of the coast and the inner edge of the barrier reef. The 10m curve is so irregular off the coast between Claremont Point and Cape Sidmouth that it cannot be depended on to give adequate warning of impending danger. North of Cape Sidmouth to Cape Direction, most of the dangers are contained within the 20m curve which follows the coastal trend.

There are general depths of 12.8 to 27m in the fairway of the recommended track through this part of the Inner Route.

The Claremont Islands is a group of three islets, consisting of Burkitt Island, Hannah Island, and Wilkie Island, which lies near the Inner Route between 5.7 miles NE and 14 miles NNW, respectively, of Claremont Point.

Burkitt Islet (13°56'S., 143°45'E.), the farthest S of the group, is 17m high; it lies on the N end of a steep-to reef which dries. A dangerous wreck, best seen on the chart, lies 2 miles NW.

Simpson Rock, with a depth of 10m, lies 2 miles NNE of Burkitt Islet; Yule Rock, with a depth of 9.1m, lies 1 mile NW of Simpson Rock. Olver Rock, with a depth of 7.3m, lies 0.7 mile NW of Yule Rock.

8.61 Hannah Islet (13°52'S., 143°43'E.), 20m high, is fringed by a steep-to reef. It lies 8.5 miles NNE of Claremont Point, 0.6 mile E of the Inner Route. A light is situated on the NW extremity of the islet. The light is obscured SSE of Burkitt Island by trees between the bearings of 328° and 332°.

Sullivan Shoal, a number of coral heads with a least depth of 3.6m, lies on the W side of the Inner Route, 1.7 miles NW of the light on Hannah Islet.

Helby Rock, a 6.8m coral pinnacle, lies 2.2 miles N of Sullivan Shoal.

Wilkie Islet, 14m high, is located on a drying reef, 6.7 miles NNW of Hannah Islet. Poulsen Rock, with a least depth of 7.3m, lies just inside the 10m curve, 2 miles NNW of Wilkie Islet.

8.62 Hay Island (13°40'S., 143°41'E.), 15m high, is a conspicuous wooded island lying 6 miles NNE of Wilkie Islet. A current rip sometimes extends from Hay Island to Fife Island, 1.5 miles NE. The Inner Route passes about midway between these two islands, or to the W of Hay Island.

Fife Island (13°39'S., 143°43'E.) lies on the W end of a steep-to reef, which dries 1.8m. A light is shown from the W end of the island.

Macdonald Reef (13°33'S., 143°39'E.), which dries 0.9m and is steep-to, lies 4 miles E of Campbell Point, and 7.2 miles NNW of Fife Island.

Heath Reef (13°29'S., 143°41'E.), a steep-to dangerous reef, is located on the E side of the Inner Route, 4.5 miles NNE Macdonald Reef. A light is situated on the reef.

Quake Reef, which dries 1.2m, lies 2 miles NW of Heath Reef.

South Khandalla Shoal, with a least depth of 5.2m, and North Khandalla Shoal, with a least depth of 3.6m, lie 2.2 and 2.7 miles NNE, respectively, of Heath Reef.

Bow Reef (13°18'S., 143°40'E.), marked by a light, dries 0.9m; it lies on the E side of the Inner Route, 7 miles NNW of North Khandalla Shoal.

Howard Rock, with a least depth of 8.2m, lies 2.5 miles NW of Bow Reef. Chilcott Rock, Lowrie Islet, and Norman Rock lie 0.7 mile NW, 1.7 miles WNW, and 2.2 miles WNW, respectively, of Howard Rock.

Parry Rock (13°15'S., 143°38'E.), a coral rock with a depth of 10.3m, lies 2 miles N of Howard Rock.

Binstead Islet, 6m high, lies 3.7 miles NW of Parry Rock.

Night Island (13°10'S., 143°34'E.), about 14m high, lies 1.5 miles N of Binstead Islet and 3 miles E of Bobardt Point. The island is fringed with a coral reef, which dries; the reef is steep-to on its E and W sides, but depths of less than 9.1m extend 0.3 mile from the S extremity and 0.4 mile from the N extremity, respectively. Tide rips occur over the latter depths, and also N of them. A small coral reef, awash, lies 0.4 mile NW of the N end of the island.

There is a clear passage, with depths of 7.3 to 11m, mud and shell, between Night Island and the outer reefs off Bobardt Point. There are no good marks and the passage should not be used without local knowledge except at LW, when the edges of

the channel on both sides can be plainly seen.

Anchorage.—Anchorage may be obtained, in a depth of 11m, clay, in the N entrance to the channel. Tidal currents in the channel are not strong. Anchorage Area NI lies 0.5 miles W of the N most tip of Night Island.

Caution.—The shore bank extends about 2 to 3.5 miles offshore between Night Island and Cape Direction. Because of a strong W set of the current that may occur with strong E or SE winds, vessels must guard against drifting W of the recommended track in this vicinity.

8.63 Waterwitch Reef (13°09'S., 143°37'E.) dries 1.2m; it lies 2.5 miles NE of Night Island, and about 0.5 mile E of the recommended track. A light is shown from the reef.

Sykes Reef, 4 miles NW of Waterwitch Reef, dries 0.3m.

Stork Reef, which dries 1.8m, lies 2 miles N of Sykes Reef. The water is fouled by rocks 0.6 mile N of the reef and 0.4 mile S., respectively.

Dugdale Rock, a coral pinnacle which dries at LW, lies on the 20m curve, 2.2 miles NE of Stork Reef. This steep-to danger is located 0.9 mile W of the track through the Inner Route.

Chapman Islet (12°53'S., 143°36'E.), a sandy islet covered with bushes and trees, lies on the NE end of a reef, 8.5 miles NNE of Dugdale Rock. A light stands on the reef, 0.5 mile NW of the islet. Current rips occur N of the light when the wind is strong.

Ashton Rock, with a depth of 1.5m, lies 2 miles SW of Chapman Islet.

The Great Barrier Reef—Inner Edge—Iris Reef to Wye Reef

8.64 The inner edge of the Great Barrier Reef trends about 70 miles NNW from Iris Reef to Wye Reef, about 4.2 miles NE of Cape Direction. Vessels should keep W of a line connecting the reefs and dangers described below, which mark the inner edge of the Great Barrier Reef. Most of these dangers are steep-to on their W sides and have depths of 14.9m or more close off them.

Pelican Island (13°55'S., 143°50'E.) lies on the NW side of a steep-to reef, which dries 0.9 to 1.2m, 2.5 miles N of Iris Reef. Rocks, awash at HW, lie on the W side of the reef, S of the island.

Magpie Reef, an extensive shoal, lies with its W extremity 8 miles NNW of Pelican Island. A light is situated on a sand cay, on the W extremity of the reef.

Ballerina Shoal, with a depth of 9.5m, lies 3 miles SSE of Magpie Reef Light. Dayman Rock, steep-to, with a depth of 9.9m, lies 1.5 miles SW of Ballerina Shoal. Olver Rock, with a depth of 7.1m, lies 1 mile SW of Dayman Rock. Yule Rock, with a depth of 8.1m, lies 1 mile SE of Olver Rock.

Noddy Reef lies with its S extremity 4 miles NNE of the light on Magpie Reef. Foul ground extends W from the SW extremity of the reef to the 10m line, 0.5 mile W. Fife Island, previously described in paragraph 8.62, lies 5.5 miles NNW of Noddy Reef.

Ogilvie Reef lies with its W end 6 miles NNE of Fife Island Light. The W part of the reef, which dries 0.6 to 0.9m, is the only part which has been surveyed. A sand cay near the W end of the reef dries 1.8m.

8.65 Morris Island (13°30'S., 143°43'E.) lies near the middle of the W side of a reef which dries 1.8m, 3.7 miles N of the W end of Ogilvie Reef. Claremont Rock, with a depth of 7.6m, lies 1 mile SW of Morris Island.

Anchorage.—Anchorage can be taken, in 12.8 to 16.5m, mud and sand, about 0.5 mile NNW of Morris Island, but care must be taken to avoid Claremont Rock.

Blanchard Reef, which dries in patches, lies 3 miles NNE of Morris Island. Shoal patches and foul ground, with depths of less than 5m, lie within 0.5 mile of the W side of the island, and dangers with depths of 1.2 to 8.2m lie within 1 mile of the SW extremity of the same reef.

Drake Shoals (13°26'S., 143°42'E.) consists of a number of coral heads, with depths of 6.4m, lying 1 mile W of the W extremity of Blanchard Reef.

Ellis Reef dries 1.5 to 2.4m; it lies 1.7 miles W of the N extremity of Blanchard Reef. The reef is steep-to on its W side. A shoal, with a least depth of 7m, is charted 1.5 miles N of Ellis Reef.

Celebration Reef (13°17'S., 143°42'E.), which dries 1.2m, lies 4 miles N of Ellis Reef. The SW side of the reef is steep-to, but foul ground extends 0.5 mile off the N side. The Inner Route lies 1.6 miles W of the reef.

Throne Shoals, a mass of detached reefs, lies between 1.5 and 4 miles N of Celebration Reef, on the S side of the SW end of Second Three Mile Opening.

Gertrude Reef (13°10'S., 143°40'E.), which dries 0.6m, lies on the N side of the SW entrance to Second Three Mile Opening, 2.7 miles N of Throne Shoals. Foul ground extends 0.4 mile NE and WSW, respectively, from the reef.

Glennie Reef, which dries 1.3m, lies 1.2 miles WNW of Gertrude Reef. Foul ground, with a depth of 6.4m, extends 0.3 mile SW from the reef; depths of 10m extends 0.7 mile NW of the same reef.

8.66 New Reef (13°06'S., 143°39'E.), which is about 2 miles long on its W side, lies 1.5 miles N of Glennie Reef. A boulder, which dries 1.8m, lies at the S end of the reef. The W side of the reef is encumbered with several small drying reefs. A shoal patch, with a depth of 2.4m, is charted about 0.3 mile off the NW end of the reef.

Morris Rock is a steep-to knoll with a depth of 10.6m, and lies 1.2 miles NW of New Reef.

Osborne Reef (13°03'S., 143°38'E.), which dries 2.1m, lies 1.5 miles N of Morris Rock. A beacon stands on the S end of the reef.

The **Sherrard Islets** (12°59'S., 143°37'E.) lie on the N end of a reef, 3 miles N of the NW extremity of Osborne Reef. The Inner Route passes about 1 mile W of the W islet. A 4.3m coral patch lies 2 miles ESE of the E of the Sherrard Islets. A small drying reef and an 8.2m patch lie 0.5 mile N of the 4.3m patch.

Anchorage.—Vessels can anchor, in 24 to 26m, mud, 0.4 mile NW of the W Sherrard Islet.

Frederick Patches, a number of shoal heads with a least charted depth of 2.4m, lie 6 miles N of the Sherrard Islets. Chapman Islet, previously described in paragraph 8.63, lies 1 mile W of the patches.

Sunk Reef lies 1 mile N of Frederick Patches; only its W side has been surveyed. The W side of the reef is fringed by a narrow strip of drying sand. A depth of 4.2m is charted close off

the NW extremity of the reef.

Wye Reef (12°49'S., 143°37'E.) dries 1.5m. A lighted beacon is situated on the N end of the reef. Shoals, with depths of less than 11m, extend 0.5 mile SE and 0.7 mile E, respectively, from Wye Reef.

The Great Barrier Reef—Outer Edge—Lowry Passage to Quoin Island Entrance

8.67 The outer edge of the Great Barrier Reef between **Rodda Reef** (13°55'S., 144°21'E.), on the NW side of Lowry Passage, and the entrance to First Three Mile Opening, 34 miles NW, is formed by a chain of drying reefs through which there are a number of small openings.

A rock, which dries 2m, lies on a small reef 10 miles NNW of Rodda Reef, and another rock, which dries 2.6m, lies on the SW side of a reef 6.7 miles farther NW.

Creech Reef (13°38'S., 144°06'E.), 6.2 miles NW of the rock above, which dries 2.6m, has a rock on its W extremity which dries 3m. Anchorage Area CR is situated just W of the westernmost tip of Creech Reef, in a depth of 23m.

First Three Mile Opening (13°28'S., 144°01'E.) is entered between a reef located 10 miles N of Creech Reef and a drying reef, which has an above-water sand cay on its NW end, 4 miles WNW. Below-water rocks lie in the opening 1.7 miles WNW of the reef on the S side of the opening. Depths of 9.1m lie 0.4 mile SSE and 0.3 mile NNW, respectively, of the below-water rocks. A charted depth of 7.2m lies on the N side of the channel.

Fairway Channel, which has not been fully examined, extends SSE along the W side of the outer edge of the Great Barrier Reef, from First Three Mile Opening to the W extremity of Rodda Reef, about 32 miles distant.

Tijou Reef (13°10'S., 143°57'E.), a long narrow drying reef, lies with its S end 8 miles NNW of First Three Mile Opening; its N end is 12 miles N and forms the E entrance point of Second Three Mile Opening. The outer side of Tijou Reef is dangerous to approach as the swell generally rolls in and breaks heavily on it.

Black Rock, which is always above water, lies 1.5 miles SW of the N extremity of Tijou Reef.

Second Three Mile Opening is entered at its NE end between the N end of Tijou Reef and **Ham Reef** (13°02'S., 143°52'E.), 4.7 miles WNW. Franklin Reef, which dries 1.2m, lies in the middle of the entrance.

Between Black Rock and Franklin Reef there is a small drying reef, and several shoals with depths of less than 5.5m.

Wilson Shoal, with a depth of 2.3m, lies 0.5 mile S of Ham Reef; a depth of 10.2m lies 0.5 mile SE of Wilson Reef.

8.68 **Jubilee Reef** (13°10'S., 143°46'E.), which dries 0.3m, lies on the S side of Second Three Mile Opening, 9 miles WSW of Franklin Reef.

Dart Shoal, with a depth of 1.9m, lies in the middle of the opening 2 miles NW of Jubilee Reef.

Diamond Reign Reefs are a continuation NE of Throne Shoals. They consist of numerous detached reefs which have some patches that dry 0.9m, and are joined to Jubilee Reef ENE.

Colclough Reef (13°05'S., 143°44'E.), which dries 1.2m, lies on the N side of Second Three Mile Opening, 7 miles WSW of Ham Reef.

Gertrude Reef, previously described in paragraph 8.65, lies on the N side of the opening, 5 miles SW of Colclough Reef.

The seaward entrance to Second Three Mile Opening, from the N, is easily made out as Cape Direction is readily identified from 5 miles outside the Great Barrier Reef. Hangklip Peak, bearing 237°, is an excellent steering mark for clearing the reefs in the entrance in a least depth of 10.2m, but Dart Shoal lies on this same bearing farther SW.

Between Second Three Mile Opening and Quoin Island Entrance, 40 miles N, the outer edge of the Great Barrier Reef is formed by a chain of narrow, drying reefs.

Derry Reef (13°01'S., 143°51'E.), separated from Ham Reef by a deep channel 0.5 mile wide, dries 1.2m. A sand cay lies on its NW side. A sandbank lies at the NW extremity of the reef that forms the S side of Bligh Boat Entrance, 10.5 miles N of Derry Reef.

Bligh Boat Entrance lies between the sandbank and Bligh Reef 0.2 mile N.

Hibernia Entrance is about 0.2 mile wide and lies 7.2 miles N of Bligh Boat Entrance. Its seaward entrance lies 17 miles ENE of Cape Direction.

8.69 **Providential Channel** (12°36'S., 143°49'E.) lies 7.2 miles N of Hibernia Entrance. A below-water rock lies nearly in the middle of the entrance.

Southern Small Detached Reef, which breaks heavily, lies 2.5 miles NE of the entrance to Providential Channel.

Northern Small Detached Reef (12°25'S., 143°49'E.), which also breaks heavily, lies 9 miles N of Southern Small Detached Reef. The reef dries in patches.

Quoin Island Entrance lies 4 miles W of Northern Small Detached Reef and is entered between a drying reef on the S side and Lagoon Reef on the N side; it is 0.4 mile wide, with depths of 56 to 79m.

When approaching from seaward, it is best to identify Northern Small Detached Reef and pass N of it; the entrance will be seen bearing 277° and vessels should steer a mid-channel course to the clear water W of the reefs.

Vessels having cleared the entrance may proceed SW and pass S of the small detached reef that lies 4 miles E of Eel Reef, then WSW to pass midway between Eel Reef and Dolphin Reef, 1.7 miles S. When clear of Dolphin Reef, steer as required to the Inner Route.

Caution.—The areas to the N and S of the line of soundings from Quoin Island Entrance to Dolphin Reef have not been thoroughly examined.

Cape Direction to Cape Grenville

8.70 The coast between Cape Direction and Cape Grenville, about 55 miles NNW, is indented by three bays which are separated by prominent capes. Much of this coast consists of sandy beaches and low mangrove shores, with an occasional small river or creek flowing through them.

Tides—Currents.—The current has been found to set N along the E side of Lansdown Reef during SE gales at a rate of 2 to 3 knots, but its normal rate during the Southeast Trades is 0.5 to 1.2 knots. North of Lansdown Reef, the current sets

more into Lloyd Bay.

In the vicinity of the Piper Islands, the surface current always sets NW during the Southeast Trades when the wind is strong. When the wind is light during the falling tide, the current may sometimes cease or even flow SE.

During the Northwest Monsoon, the wind-driven current in the vicinity of the Piper Islands sets mostly SE or with the varying direction of wind. At springs, the flood current setting NW usually predominates over the wind-driven current. At neaps, the SE set of the wind-driven current prevails and attains a maximum rate of about 0.5 knot about the time of LW; the minimum rate occurs about the time of HW.

Lloyd Bay is a deep indentation in the coast between Cape Direction and Cape Weymouth, 15 miles NNW. Except for Edwards Shoals, all dangers in the bay are contained within to 10m line.

The S side of Lloyd Bay trends 11 miles W from Cape Direction to the head of the bay and consists mostly of a low mangroved shore.

Orchid Point (12°51'S., 143°27'E.), which is bold, lies on the S side of the bay, 5.5 miles W of Cape Direction. Orchid Hill rises to a 123m summit about 0.7 miles S of the point.

The W side of Lloyd Bay trends about 15 miles NNE from its head to Cape Weymouth and consists mostly of sandy beaches. Several scattered hills, nearly 123m high, lie 0.5 to 2 miles inland in the S part of the W side. The N half of the W shore is closely backed by sandhills and ridges, and attains a height of 121m at Red Hill, 0.4 mile SW of Cape Griffith.

8.71 Cape Griffith (12°41'S., 143°25'E.), a bold rocky headland, lies on the W side of Lloyd Bay, 12.5 miles NW of Cape Direction; a rock, 2m high, lies less than 0.2 mile SE of the cape.

Albatross Cove lies on the N side of Cape Griffith; a drying sandbank, fringed with coral, extends nearly 0.5 mile from the W side of the cove and continues NNE nearly to Cape Weymouth, 3.7 miles N of Cape Griffith.

Caution.—The dangers in the SE part of Lloyd Bay consist of a number of steep-to reefs, which partly dry, and several banks and rocks, whose positions may be seen on the chart.

Lansdown Reef (12°49'S., 143°33'E.), with a charted depth of 1.8m, lies on the edge of the 10m curve, 2 miles NNW of Cape Direction. A depth of 2.7m lies 1 mile NNW of Lansdown Reef; it is steep-to on its N and E sides. A 1.8m shoal lies charted near the 10m curve, 1.5 miles NE of Cape Direction. Tide rips occur close N of the 2.7m depth, N of Lansdown Reef.

Hazelgrove Reefs, three detached reefs which dry 0.9m, lie on the 10m curve, 5.5 miles NNW of Cape Direction.

Edwards Shoals consists of two patches 2 miles NE of Cape Griffith. There is a depth of 1.5m over the S patch; the N patch is awash.

8.72 Restoration Rock (12°37'S., 143°28'E.) lies 1.5 miles E of Cape Weymouth and is 33m high. The rock is steep-to except on its N and NE sides, where foul ground extends a short distance offshore. A light is shown from the summit of the rock. Tide rips occur between 0.2 and 0.5 mile N of the rock.

Cape Weymouth (12°37'S., 143°26'E.) is a prominent headland, with a double summit, 55m high. The land W of the cape is low.

Weymouth Bay lies between Cape Weymouth and Fair Cape, 15.5 miles NW. Its S part is fringed by drying reefs for a distance of 9 miles NW of Cape Weymouth, then by a narrow drying sand bank about 2.7 miles N. The dangers fringing this part of the coast are contained within the 5m curve which follows the coastal trend from 0.2 to 1 mile offshore.

Aylen Hills, 119m high, rise 1.7 miles NW of Cape Weymouth. These hills appear as an island when seen from N or S.

Rocky Islet (12°35'S., 143°25'E.), 33m high, lies 2 miles NW of Cape Weymouth. It is steep-to, but foul ground lies off the SE side. There are tide rips N of the islet.

Anchorage.—Portland Road lies in a small bight that indents the coast 0.5 mile W of Rocky Islet. During SE winds, small vessels can take anchorage in the road 0.6 mile W of Rocky Islet, in 8m, mud.

The flood current sets SW across the E end of Portland Road at a rate of less than 1 knot, and the ebb, which is weak, sets in the opposite direction.

Round Back Hills rise from the coast, 2.5 miles W of Portland Road, to a height of 350m; when seen from a distance, they appear as an island.

Kennedy Hill, 10 miles NNW of Round Back Hills, rises abruptly from the coast to a height of 439m. Stanley Hill, 354m high, rises 0.5 mile inland, 1.5 miles NNE of Kennedy Hill.

A shore bank, with depths of less than 0.3m, extends 1 mile offshore, E of Stanley Hill.

Fair Cape (12°24'S., 143°16'E.), a rocky point, rises abruptly to a height of 148m and is closely backed by hills, 305m high, that are a continuation N of the hills backing the W side of Weymouth Bay.

Caution.—Most of the dangers between this part of the coast and the inner edge of the barrier reef lie on the W side of the Inner Route.

Middle Reef (12°31'S., 143°23'E.) is a narrow, coral ridge, which dries 1.8m, lying 6 miles NNW of Cape Weymouth. A depth of 4.9m is lies off the N end of the reef; the Inner Route lies 1.2 miles E of the light on the S end of the reef.

Blue Bell Rocks consist of two pinnacles which lie 1 mile W of Middle Reef. The N rock dries and the S has a depth of 2.1m.

Kemp Rocks (12°26'S., 143°22'E.) are two steep-to pinnacle rocks, with a depth of 6.1m, that lie close inside the 20m curve, 4.5 miles NNW of Middle Reef.

8.73 From Fair Cape, the coast trends WNW about 11 miles, then 5 miles N to Bolt Head. Cape Grenville lies 19 miles NNE of Bolt Head. Temple Bay occupies the bight formed between Fair Cape and Cape Grenville.

The dangers contained within the 10m curve, which lies up to 5 miles off the SW extremity of Temple Bay, are charted and are not discussed here.

Kangaroo Shoals extends 1 mile E of Fair Cape and terminates in a spit 2 miles N of the cape. There are patches on the outer edge of the shoals with depths of 0.4 to 1.2m; the edge of the bank is steep-to.

First Stony Point (12°23'S., 143°15'E.), with rocks which dry 2.4m close off it, lies 2 miles NW of Fair Cape. Second

Stony Point and Mosquito Point lie 2.2 and 4.5 miles NW, respectively, of First Stony Point. Drying coral reefs and mud flats fringe most of this section of coast to 0.5 mile offshore.

From Mosquito Point to the head of Temple Bay, 6 miles W, the coast is low, with mangroves extending 3.5 miles inland, and fronted by a mud bank 0.5 mile offshore.

From the head of Temple Bay, a sandy beach backed by low land extends 5 miles N to **Bolt Head** (12°15'S., 143°06'E.), an inconspicuous cliffy head that has a hill, 70m high, 0.8 mile W of it.

A red cliff lies 2 miles N of Bolt Head; from the cliff the coast trends about 16 miles NNE to Cape Grenville. A ridge of low hills backs this shore to a position about 5 miles S of Cape Grenville. From this position to the cape the shore is low and swampy.

Caution.—Piper Reef (12°15'S., 143°14'E.) consists of two reefs. The largest and farthest E of the two reefs lies 9.5 miles NNW of Fair Cape; it dries 1.8m. A light is shown from the E reef and the Inner Route passes 0.5 mile E of the light.

The Piper Islands are four small islets located on Piper Reef. Fisher Islet, the largest of the islets, is 14m high. It lies on the reef, 0.7 mile SW of the light. Anchorage Area PIN is situated just S of a line drawn between Baird and Farmer Islands. Anchorage Area PIS is situated 0.25 miles N of Farmer Island.

Young Reef (12°08'S., 143°13'E.), which dries and is steep-to, lies 8 miles NNW of the light on Piper Reef, and 1.2 miles W of the recommended Inner Route. A beacon is situated on the N extremity of the reef.

Cape Grenville (11°58'S., 143°14'E.) is described in paragraph 8.78.

The Great Barrier Reef—Inner Edge—Wye Reef to Queue Reef

8.74 The inner edge of the Great Barrier Reef trends about 40 miles NNW from Wye Reef to the N end of Inset Reef. It then trends N about 9 miles to Moody Reef, and then about 11 miles NE to Queue Reef, 7.5 miles NE of Cape Grenville. Vessels should keep W of a line connecting the following reefs, which are the dangers on the inner edge of the Great Barrier Reef.

Zenith Reef (12°46'S., 143°36'E.) dries 0.9m. A sand cay, which dries 2.4m, lies on the N end of the reef. The reef lies 5.7 miles NE of Cape Direction. Halloran Rock, with a depth of 14m, lies about 1.2 miles SSW of Zenith Reef and 1 mile NNW of Wye Reef.

Ape Reef, parts of which dry 1.5m, lies 3.5 mile NNW of Zenith Reef. Boulders, which dry, lie on the S end of the reef and a sand cay, which dries, lies on the NW end.

Tannadice Rock (12°40'S., 143°31'E.), with a depth of 1.8m, and Tannadice Shoal, with a depth of 7.3m, lie 3.7 and 3.2 miles NW, respectively, of Ape Reef.

Burke Reef, an elongated U-shaped series of reefs, drying between 0.6m and 0.9m, with many large drying boulders, lies 1.5 miles NE of Tannadice Rock. The shallow bay formed by the E and W extremities of the reef has not been examined but contains numerous isolated coral heads. Foul ground extends nearly 0.5 mile N of the line joining the N ends of the reef. There is a clear passage, about 1.2 miles wide, with depths of 33 to 38m, between Burke Reef and Curd Reef, allowing access to Quoin Island Entrance or Black Rock Entrance.

Caroline Rock (12°39'S., 143°32'E.), which dries 0.3m, is the outermost of the foul ground which extends 0.5 mile W of Burke Reef.

Curd Reef lies 2.2 miles NNW of Burke Reef, about 3.2 miles ENE of the light on Restoration Rock; it dries 0.9m. A sand cay on the N extremity of the reef dries 2.7m. Curd Reef, a series of drying reefs, extends 1.7 miles ESE from the sand cay and then 1 mile E. Unexamined foul ground, about 2 miles wide, extends 4.7 miles ENE from the same cay.

8.75 **Dolphin Reef** (12°34'S., 143°31'E.), a group of rocky heads with a least depth of 0.1m, lies 1 mile N of Curd Reef. Isolated shoals lie 4 miles ENE of the W extremity of the reef. The channel between Dolphin Reef and Eel Reef, 2 miles N, appears to be clear over a width of 1.5 miles. This passage is the W entrance of Quoin Island Entrance.

Eel Reef (12°30'S., 143°26'E.) extends 11 miles NNW from a position 2 miles N of Dolphin Reef. A light is situated near the N extremity of the reef, about 5.5 miles ESE of Fair Cape. The S edge of the reef has been examined only for a distance of about 3.5 miles NE and appears to be steep-to. The SW edge of the reef partly dries at springs but the reef is always visible when the light is good.

Quoin Island, 18m high, lies on the unsurveyed part of the barrier reef, 7 miles E of the light on the N end of Eel Reef.

Gallon Reef lies with its SW end 2 miles NE of Eel Reef Light; the W side of the reef extends 9 miles NNW from this position; parts of this reef dry.

The Forbes Islands lie about 3 miles NE of the center of the W side of Gallon Reef. The islands, which are up to 88m high, are prominent from the S and appear as several hummocks.

Hazel Reef (12°16'S., 143°18'E.), a steep-to reef which dries 1.5m, lies 2 miles SW of the NW end of Gallon Reef. The Inner Route lies 1 mile W of Hazel Reef.

Inset Reef (12°15'S., 143°16'E.), which shows a light, lies 0.7 mile NW of Hazel Reef. A group of rocks, which dry 2.4m, lie on the S end of this steep-to reef, and a sand cay, which dries 1.5m, lies on the N end. The Inner Route passes about midway between Piper Reef and Inset Reef.

Kay Reef is a reef, which dries 1 to 2m, whose N extremity lies 1 mile N of Inset Reef. Kay Islet, 1m high, is located on the NW extremity of Kay Reef.

Laurel Reef, which dries and is steep-to, has a sand cay on its NW end which dries 1.2m.

Moody Reef (12°05'S., 143°16'E.) lies about 0.7 mile N of Laurel Reef and about 6 miles SSE of Cape Grenville. A sand cay, which dries 1.7m, lies on the NW end of the reef. A light is shown from the sand cay.

Haggerstone Island, 78m high, lies on the S end of a drying reef, 3.2 miles NNE of the light on Moody Reef. Rocks, 2.8m high, lie on the drying reef, about 1 mile N of Haggerstone Island.

Queue Reef (11°56'S., 143°22'E.), which dries 2.4m, lies 7 miles NNE of the N end of the reef on which Haggerstone Reef lies. Foul ground extends 7 miles NE from Queue Reef along the S side of Pollard Channel.

The Great Barrier Reef—Quoin Island Entrance to Raine Island Entrance

8.76 The outer edge of the Great Barrier Reef trends NE for 15 miles from Lagoon Reef, on the N side of Quoin Island Entrance, to Black Rocks, which lie on the N extremity of an extensive reef. Black Rocks marks the S entrance point to Wreck Bay. The Great Barrier Reef, which forms the N entrance point of Wreck Bay, lies 6 miles NNE of Black Rocks. From this point the Great Barrier Reef extends N about 27 miles to Raine Island Entrance.

Yule Detached Reef and Great Detached Reef lie off the barrier reef, which is only about 1 mile wide in places. There are several openings through the reef in this area.

Wreck Bay (12°08'S., 143°52'E.) is formed by a circular bight in the outer edge of the Great Barrier Reef; it is entered between **Black Rocks** (12°12'S., 143°55'E.) and the S extremity of a reef 6 miles NNE and extends 9.5 miles W. A broken line of drying reefs forms the N and W sides of the bay, with the S side consisting of isolated drying reefs and a number of below-water patches There are general depths of 30 to 35m and greater across the S part of the bay and off the reefs bordering its W and N sides.

Black Rock Entrance is the farthest S of three passages through the reef on the W side of Wreck Bay.

Directions for Black Rock Entrance.—Vessels should enter Wreck Bay on a W heading and, when Black Rocks bear 146°, 2 miles distant, steer 224°. When 2 miles NNW of Lagoon Reef, steer a course of 213° and follow the directions for Quoin Island Entrance in paragraph 8.69. Vessels are cautioned to keep a good lookout as there are several reefs and dangers in this area.

Safe Entrance is a passage through the barrier reefs on the W side of Wreck Bay, 8 miles W of Black Rocks. It leads to apparent deep water on the W side of the barrier. It should be noted that the waters between the inner and outer ranges of the Great Barrier Reef have not been adequately surveyed and uncharted dangers may exist.

Nimrod Passage lies in the NW part of Wreck Bay, 10.5 miles NW of Black Rocks. This opening is about 0.3 mile wide.

Off the N entrance of Wreck Bay there is, at times, a heavy confused swell.

From the reef forming the N side of Wreck Bay, the outer edge of the barrier trends 3.5 miles N and then 3 miles NW to Single Rock Entrance.

Single Rock Entrance (12°01'S., 143°56'E.), a safe opening 0.3 mile wide, may be identified by a black rock on its SE side.

From the N side of the entrance to Single Rock Passage, a chain of small reefs trends about 9 miles NW to Stead Passage.

Yule Detached Reef (11°58'S., 143°58'E.), which dries and is steep-to, lies 3 miles NE of Single Rock Entrance.

Stead Passage is 0.3 mile wide and is difficult to make out, as it lies at the head of a bight in the barrier reef.

For a distance of 3 miles N of Stead Passage, the barrier reef is intersected by two or three narrow openings through Five Reefs.

Between Five Reefs and Small Opening, 6 miles NNE, the reefs are narrow and dry, with the sea nearly always breaking over them.

Three Reefs, on the N side of Small Opening, dry, and a spit with depths of less than 5.5m extends 0.2 mile N of them.

8.77 **Great Detached Reef** (11°45'S., 144°00'E.) lies with its SW extremity 4.5 miles SE of Three Reefs. A detached drying reef lies close off its SW extremity. The W side of the reef, for a distance of 6 miles N of the SW extremity, is formed by a below-water reef, with a small drying reef on its N end. Elsewhere, the reef consists of a continuously drying reef. There are several drying rocks on the E side of the reef. There are five openings through the reef; two on the SW side, 2 miles E and 2.2 miles SE, respectively, of the SW extremity, which have not been examined. There are two narrow safe channels on the N side, the widest one being to the NW side of the reef.

Anchorage.—Anchorage may be taken within the NW entrance to Great Detached Reef, in depths of 33 to 37m, in the N part.

Raine Island (11°36'S., 144°01'E.), 3m high, lies in the middle of the opening between Great Detached Reef and the projecting point of the Great Barrier Reef, 8 miles NE. A fringing reef surrounds the island, except at its SE end where it extends 1.2 miles SE. A round stone tower stands on the E end of the island and is a good landmark.

Raine Island Entrance may be entered with local knowledge by passing either N or S of Raine Island, however, the S side is preferred. This entrance and Blackwood Channel, within the barrier, are no longer used and only small vessels with local knowledge should attempt them.

Cape Grenville to Cape York

8.78 **Cape Grenville** (11°58'S., 143°14'E.) is a peninsula connected to the mainland by a low isthmus. The cape rises to a height of 75m at the summit of Highgate Hill.

The **Home Islands** (11°59'S., 143°17'E.) are a group of seven islands which lie within 2.5 miles of Cape Grenville; each island lies on a reef.

Clerke Island, the farthest E of the Home Islands, lies nearest the recommended Inner Route. The island lies 2.5 miles E of Cape Grenville on a drying reef which extends 0.5 mile N of the island. A light is shown close off the SE extremity of the island.

The position of the other islands of the group may best be seen on the chart.

Tidal currents set obliquely across the Inner Route between the Home Islands and Haggerstone Island, 3 miles SSE.

The coast between Cape Grenville and Cape York, about 87 miles NNW, trends fairly regularly in that direction, except that a large bight recedes 15 miles SW between Cape Grenville and False Orford Ness, about 40 miles NNW. Most of the coast consists of sandy beaches separated by rocky points. Except for the SW sides of Shelburne Bay and Newcastle Bay, where low mangrove shores are backed by low land, most of the coast is closely backed by hills, ridges of hills, and sand hills that rise abruptly from the sea to heights of 15 to 152m. A few rivers and numerous small streams empty into the sea from this coast. There are no towns or ports on this part of the coast.

Most of the dangers fringing the coast are contained within the 10m curve, which follows the coastal trend about 0.5 to 2.7 miles offshore, except that it lies about 8 miles offshore at

Shelburne Bay, about 5.5 miles offshore at Bushy Islet, and about 11.5 miles off the head of Newcastle Bay.

Caution.—Shelburne Bay and the waters immediately N of it, as far as the Hannibal Islands, have not been completely surveyed inside a line from Round Point to the Bird Islands and then to the Hannibal Islands. Vessels are advised to keep E of the above limits.

8.79 Margaret Bay lies between a point 2 miles WNW of Cape Grenville and **Thorpe Point** (11°55'S., 143°09'E.), 4.5 miles farther NW.

Sunday Island, 36m high, lies off the entrance off Margaret Bay, 1.5 miles N of the E entrance point, and is reef-fringed on its N and S side.

Anchorage.—Vessels may anchor, in 12m, 1 mile W of Sunday Island.

Round Point, 3 miles NW of Thorpe Point, is the SE entrance point of Shelburne Bay. The 10m curve lies 1 mile N of the point. A dangerous submerged rock lies about 0.7 mile NE of the point.

Conical Hill, 69m high, rises 2 miles SE of Round Point.

Shelburne Bay indents the coast about 6 miles SW between Round Point and the coast at Messum Hill, 86m high, about 17 miles NW.

The bay is only partly surveyed and vessels are advised to keep outside the 20m curve.

Hunter Point (11°30'S., 142°50'E.), 14 miles N of Messum Hill, rises to a height of 88m at the summit of Hunter Hill, 0.8 mile NW.

False Orford Ness, 13m high, is a hilly point 7 miles NNE of Hunter Point. A reef extends about 0.3 mile E off the point.

Hunter Reefs lie just inside the 15m curve, 2.5 miles SE of Hunter Point.

Between False Orford Ness and Sharp Point, about 27 miles NNW, the coast consists of numerous small bights separated by rocky points. This section of the coast is backed by a range of mostly barren hills that rise abruptly from the sea. Much of the N coast is cliffy. The 10m curve lies up to 5 miles offshore.

Orford Ness, a sandy point, lies 6 miles NNW of False Orford Ness. The coast between them is fronted by a shorebank, with depths of less than 5.5m, that extends up to 1 mile offshore.

Orford Bay, a shallow exposed bay, is a small indentation on the N side of Orford Ness.

8.80 **Ussher Point** (11°10'S., 142°48'E.) lies 8 miles N of Orford Ness. Some well-defined red cliffs of moderate height lie 0.5 mile S of the point. Left Hill, 115m high, rise 1.5 miles SW of the same point.

Cliffs, flat-topped and reddish in color, rise abruptly from the sea along most of the coast from Ussher Point to Shadwell Point, 10 miles N.

Sharp Point (10°58'S., 142°43'E.), which rises sharply to the 37m summit of Sharp Peak, lies 2.7 miles NNW of Shadwell Point.

Caution.—The coast from Orford Ness N should be approached with care, especially during the SE trades to which it is exposed.

Turtle Head Island lies 0.7 mile NW of Sharp Point. The Escape River empties into the sea between Sharp Point and Turtle Head Island. The river entrance is fronted by a bar with a least charted depth of 1.8m, and lies up to 1.7 miles offshore

Newcastle Bay indents the coast 8.5 miles SW, between Turtle Head Island and Fly Point, 10 miles NNW. The bay is shallow and encumbered with numerous detached banks and shoals, which may best be seen on the chart. These dangers are contained within the 10m curve, including those extending SE from Fly Point.

8.81 **Fly Point** (10°45'S., 142°36'E.), 6m high, is black and rocky. There are some large anthills composed of red clay and sand on the bare land within the point.

Between Fly Point and Cape York, about 6 miles NW, the coast is indented by numerous small bights.

Albany Island, about 3 miles long, lies parallel to the coast with its SE end 1 mile E of Fly Point. The island rises to a height of 90m at its N end.

Albany Pass lies between the SW side of Albany Island and the coast NW of Fly Point. The pass has depths of 11 to 26m, but there is a shoal with a depth of 9.4m in the middle of the channel, 0.6 mile S of the NW extremity of Albany Island. At its NW end, the pass is obstructed by a bar, with depths of less than 10m, which extends from Frederick Point to **Eborac Island** (10°41'S., 142°32'E.). The significant depth on this bar is a 6.7m patch 0.5 mile NE of Ida Island. Vessels of more than 7m draft should not attempt to use this channel.

Cape York (10°41'S., 142°32'E.), the N extremity of Australia, lies on the W side of the N entrance of Adolphus Channel. Mount Bremer, 113m high, is a prominent peaked summit located 0.7 mile SSE of the extremity of Cape York. Cape York has been reported to give good radar returns up to 18 miles.

Eborac Island, 0.3 mile N of Cape York, is 34m high. A light is shown from the summit of the island. York Island, close W of Eborac Island, rises to a conspicuous peak, 84m high.

Off-lying Islands and Dangers

8.82 **Paluma Shoal** (11°55'S., 143°18'E.), a detached 4m patch, lies 3.2 miles NNE of Clerke Island Light. It is located about 1.5 miles E of the track through the Inner Route.

The Bird Islands lie on two drying reefs, which are always visible, 6 miles N of Round Point. The N reef, which is nearest to the Inner Route, lies on the edge of the 20m curve.

The Macarthur Islands, a number of small islands connected by sand cays, lie 5.5 miles WNW of the Bird Islands.

The **Hannibal Islands** (11°35'S., 142°57'E.), consisting of two low, wooded islands, are located on a steep-to reef, 8.5 miles NNW of the Macarthur Islands. A light is shown from the easternmost of the two islands. The track through the Inner Route leads 0.7 mile NE of the light.

Pirie Islet, 11m high, lies on the E side of a reef, 2.5 miles WNW of the light on the Hannibal Islands.

Pearn Rock (11°25'S., 142°56'E.), 10 miles N of the Hannibal Islands, has a charted depth of 3m. The rock is steep-to and located 1.5 miles E of the Inner Route.

Halfway Islet lies on the NE side of a steep-to reef, 3 miles NNE of Pearn Rock. The coral reef dries and is always visible.

8.83 The **Cairncross Islets** (11°15'S., 142°56'E.) are several wooded islets that lie on a drying reef, 8.5 miles NNW of

Halfway Islet. The W islet is 18m high and shows a light.

Bushy Islet, 5m high, lies 2.7 miles WSW of Cairncross Islets Light. The Inner Route passes about midway between these two points.

Gilmour Bank lies 2 miles ESE of Ussher Point, and about 5.5 miles NNW of Bushy Islet. The reef, which dries 0.6m, is difficult to see when it is covered.

Shortland Reef lies on the edge of the 20m curve, 15 miles NNW of Gilmour Bank. The reef dries and is always visible.

Wyborn Reef (10°49'S., 142°45'E.), 3 miles N of Shortland Reef, dries and is always visible. Shoal ground, with depths of less than 10m, extends 1.5 miles NW from the reef. A 15.5m shoal patch, lies on the recommended track, 2.7 miles NW of the N end of Wyborn Reef. A light is shown on the E side of the reef, 1.5 miles N of its S extremity.

The Great Barrier Reef—Inner Edge—Queue Reef to South Edge

8.84 The inner edge of the Great Barrier Reef trends about 30 miles NW from Queue Reef to Viking Reef and then about 20 miles NNW to the Cairncross Islets. It then trends 26 miles N to an unnamed reef, which lies 8.7 miles E of Wyborn Reef, and then 10 miles NW to South Ledge.

Vessels should keep SW and W of a line connecting the following reefs and islets which are dangers on the inner side of the Great Barrier Reef. The S and W sides of these reefs are steep-to.

Cockburn Reef (11°50'S., 143°19'E.) lies with its SW extremity 3.5 miles NW of Queue Reef. The reef extends 11 miles ENE and 8.5 miles NNW, respectively, from its SW extremity.

The Cockburn Islets are a group of islets that lie near the middle of Cockburn Reef. Pig Islet, the farthest N of the group is, 30m high.

Erlangen Patch, with a depth of 1.8m, and Cockburn Patch, with a depth of 2.2m, lie 1.2 and 1.7 miles NW, respectively, of Queue Reef.

Magra Islet lies on the N end of a reef, close off the W side of Cockburn Reef.

Guthray Reef lies close off the W side of Cockburn Reef, 2.7 miles N of Magra Islet; the reef dries.

Chimmo Shoal (11°48'S., 143°15'E.), with a least depth of 1.4m, lies 1 mile W of Guthray Reef.

Fairway Reef, awash, lies 2.5 miles WNW of the N extremity of Cockburn Reef.

Thrush Reef (11°43'S., 143°11'E.) lies 2.5 miles NW of Fairway Reef. Saunders Islet lies on the N end of this drying reef.

8.85 **Viking Reef** (11°36'S., 143°00'E.), 11 miles NW of Saunders Islet, dries and is always visible.

Wizard Reef, which dries and is always visible, lies 1 mile N of Viking Reef.

Boydong Cays (11°28'S., 143°01'E.) consists of several islets and sand banks which lie between 1.2 and 5.5 miles NNE of Viking Reef. Anchorage Area BC lies 0.5 miles N of Boydong Island.

Pearn Rock, 7.2 miles NNW of Wizard Reef, and Halfway Islet, 3.2 miles NE of Pearn Rock, have previously been described in paragraph 8.82.

The East Islets consists of Jardine Islet, 9 miles N of Wizard Reef and Cholmondley Islet, 1.5 miles ENE of Jardine Islet. Vessels are advised to keep W of Halfway Islet, which lies 3.5 miles E of Jardine Islet.

Douglas Islet lies on the NW end of a drying reef which is usually visible. The islet lies 8.7 miles NNW of Jardine Islet; there is a clump of prominent trees on the islet.

Milman Islet (11°10'S., 143°01'E.) lies on the NW end of a reef which dries, 4.2 miles NNE of Douglas Islet.

A reef which dries 0.3m, lies 2.2 miles NNW of Milman Islet.

Sinclair Islet, 1.2m high, lies on the NW end of a drying reef, 3.5 miles N of Milman Island.

Arnold Islet (11°01'S., 142°59'E.), 4m high and wooded, lies in the middle of a drying reef, which is always visible, 6.2 miles NNW of Sinclair Islet.

A reef (10°49'S., 142°55'E.), which dries 1.2m, lies 12.5 miles NNW of Arnold Islet; about 2.7 miles E of this reef is another reef with a small sand bank on its N end.

South Ledge (10°43'S., 142°44'E.) is an extensive reef that lies with its E end 9.7 miles WNW of the small reef above. Tetley Islet, 2.4m high, lies on the S side of the reef, 3 miles from its E end.

Many reefs lie between South Ledge and the outer edge of the barrier reefs, about 70 miles to the E. The area is unsurveyed and is considered dangerous to navigation.

The Great Barrier Reef—Raine Island Entrance to Anchor Cay

8.86 From Raine Island Entrance, the barrier reef trends in a general N direction about 136 miles to East Cay, then 5 miles WNW to Anchor Cay. The reefs appear to be almost continuous, but they are broken with several passes through the reef.

From the N entrance point of Raine Island Entrance, the outer edge of the barrier reef trends about 7 miles NNW, terminating in a sandbank, 2m high. This sandbank (11°26'S., 144°00'E.) forms the SE side of Pandora Entrance.

Pandora Entrance is about 2.2 miles wide and has depths of 20 to 73m. Several drying reefs extend across the channel from the N side, 2 miles within the entrance. A clear passage, about 1 mile wide, leads through these reefs.

Between Pandora Entrance and Olinda Entrance, 12.5 miles NNE, the outer edge of the barrier reef consists of a number of detached reefs overlapping each other, and from the offing appear as a continuous line of reefs.

Olinda Entrance is 1 mile wide and is well-marked by the continuous reef N of it, but it has not been examined and is not recommended due to the shoals within the entrance.

Triangle Reef (10°45'S., 143°57'E.), so named from its shape, lies 30 miles NNW of Olinda Entrance at the end of the continuous reef.

Yule Entrance (10°23'S., 143°55'E.) lies 21 miles N of Triangle Reef. The intervening barrier reef is formed by a chain of detached reefs, which, from the offing, appear as an unbroken line.

Yule Entrance is about 1 mile wide and has a small reef, which breaks, lying nearly in mid-channel. The entrance is dangerous and is not recommended. The flood current at

springs has been known to attain a rate of 5 knots.

8.87 Flinders Entrance (9°38'S., 144°14'E.) lies between the extremities of the reefs 46 miles NNE of Yule Entrance, and detached drying reefs, 7.5 miles NNW, on the E end of which is Don Cay. Foul ground extends 2.5 miles N from the S entrance point, with depths of 3.7 to 5.5m extending 2.5 miles farther. In 1973, a reef was reported 3.5 miles ENE of Don Cay; there is an extensive shoal, with a depth of 9.1m, between 6 and 8.5 miles ENE of Don Cay. Other dangers may exist in the entrance.

Flinders Entrance does not lead to any direct route through Torres Strait and is only recommended as the best approach to the Murray Islands.

The Murray Islands is a group of three islands located 4 miles within the barrier reef, and about 19 miles SSW of Don Cay.

Maer Island (9°55'S., 144°03'E.), the northernmost of the group, is the largest and rises to a conical hill, 209m high, on its SW side. The N and E sides of the island are fronted by reefs between 0.5 and 0.7 mile wide. Detached below-water patches and reefs lie W of the island.

Range beacons, in line bearing 145°, are situated on the NW side of the island. There is a mission and refuge station situated on the island.

Dowar Islet, 184m high, lies 1.5 miles SSW of Maer Island; Wyer Islet lies 1.5 miles S of the same island. The islands are conspicuous.

When entering Flinders Entrance care must be taken in rounding the spit of foul ground extending N from the S entrance point, which is usually marked by tide rips. After rounding the spit, steer S and bring the summit of Maer Island to bear 223°, avoiding the shoal patch near the middle of the channel.

Close N of Maer Island, the tidal currents set E and W, and attain a rate of 2 knots at springs.

Anchorage.—Anchorage may be obtained, in 46m, sand and shells, 1.5 miles N of Maer Island.

East Cay (9°24'S., 144°13'E.) and Anchor Cay, 3.5 miles WNW, lie at the N extremity of the Great Barrier Reef. They are separated from the detached reefs N of Don Cay by deep channels 7 to 8.5 miles wide. A 3.7m shoal lies in the channel, 6 miles S of East Cay. There is a shoal, with a depth of 9.1m, 9.5 miles SE of East Cay and a 7.7m patch lies 4 miles ENE of the cay. A shoal depth of 9m was reported 2 miles E of the SE extremity of the cay.

Ashmore Reef—Portlock Reefs—Eastern Fields

8.88 Ashmore Reef (10°15'S., 144°25'E.), with its SW extremity located 21 miles E of Yule Entrance, is the farthest S of a chain of reefs which lies nearly parallel with the Great Barrier Reef and extends about 65 miles NNE. A clear channel between 21 and 28 miles wide lies between this chain of reefs and the outer edge of the barrier reef.

Ashmore Reef, an extensive reef which dries, extends 24 miles NNE from its S extremity.

Boot Reef, a drying reef, lies with its S extremity 10 miles E of the N extremity of Ashmore Reef. It extends 8 miles N. A drying reef about 0.7 mile wide lies 3 miles S of the S extremity of Boot Reef. A shoal, with a least depth of 2.4m, lies 5.2 miles S of the same point; in 1989, it was reported that a steep 5m swell ran over this shoal, although the sea at the time was generally calm.

Pandora Passage is a deep clear opening, 13 miles wide between Boot Reef and the S end of Portlock Reefs.

Portlock Reefs (9°35'S., 144°50'E.) form the N part of the chain of reefs extending NNE from Ashmore Reef. Portlock Reefs extend 18 miles N from the N side of Pandora Passage to Lagoon Reef. The sea breaks over all the reefs. The S reef in the group dries and a reef lying 2 miles E of it also dries. Detached reefs lie 4.5 miles W of the N extremity of Portlock Reefs.

Lagoon Reef, which dries, lies off the N end of Portlock Reefs, with a below-water rocky bottom between them. In 1980, there was a stranded wreck on the reef which was radar conspicuous.

Eastern Fields (10°07'S., 145°40'E.) is in extensive reef enclosing a lagoon. The reef lies about 100 miles E of Yule Entrance in the Great Barrier Reef.

Eastern Fields lies in the S approach to the Great Northeast Channel and has an approximate diameter of 15 miles. All sides of the roughly square-shaped reef are composed of drying or below-water reefs.

A drying reef lies 4 miles WNW of the NW extremity of the reef. Below-water reefs, largely unexamined, lie within 3 miles W and SW, and 1.5 miles SSE, respectively, of the drying reef. A drying reef lies 3 miles S of the S extremity of Eastern Fields. Other dangers are charted in the vicinity.

Adolphus Channel

8.89 Adolphus Channel (10°40'S., 142°35'E.) is the principal passage from the Inner Route to Torres Strait, where it joins Great North East Channel from the E and Prince of Wales Channel from the W. The channel is free from dangers within a distance of 0.7 mile on either side of the recommended track. Quetta Rock, and a dangerous wreck and a below-water rock, 0.5 and 1 mile NW, respectively, of Quetta Rock, all lie within 0.7 mile of the track.

Tides—Currents.—In Adolphus Channel, the flood current sets NW and the ebb current sets SE; both attain a rate of 2 to 4 knots at springs. Strong SE winds will increase the strength and duration of the NW current and decrease the strength and duration of SE current.

There are tide rips and eddies in many places in the channel when the currents are at their strength, giving the appearance of foul ground. There is a heavy confused sea off Albany Rock, when the currents are running strongly.

The W current, setting toward Mount Adolphus Island from seaward, meeting the NW current through Adolphus Channel, causes heavy overfalls off the shoals and salient points. The currents attain a considerable rate among the island groups at springs.

8.90 Southwest side.—Albany Rock (10°43'S., 142°38'E.), 0.8 mile NE of Albany Island, is 26m high and shows a light. Mai Islet, 48m high, lies close SW of Albany Rock; Pitt Rock lies close SW of Mai Islet. These three islets are connected by foul ground and are closely fringed with reefs

that extend nearly 0.1 mile from them.

Foul ground, with a least depth of 7m, lies 0.4 mile to 1.2 miles SSE of Albany Rock.

A 6.1 to 11m shoal, with heavy tide rips over it, extends about 1 mile NW from a position 0.3 mile N of Albany Rock.

Brush Islet, 21m high, lies 2 miles WNW of the light on Albany Rock. Tree Islet lies 0.1 mile N and Sana Rock, with a depth of 0.9m, lies 0.3 mile NNE, respectively, from Brush Islet. A shore bank, with a least depth of 0.3m, extends 0.4 mile E from Tree Islet. Heavy tide rips occur in the vicinity of Sana Rock.

8.91 Northeast side.—Middle Brother (10°43'S., 142°41'E.), 5.7m high, lies on the NW end of a drying reef, which is always visible. South Brother, a rock which dries 2.4m, lies on the SE side of the same reef.

A narrow steep-to shoal, with a depth of 5.7m on its S extremity, extends 1.5 miles S from South Brother. The Inner Route lies 0.6 mile SW of the above depth.

North Brother, 12m high, is a detached steep-to rock that lies 0.8 mile NW of Middle Brother. Although the rock is visible at a distance of 6 to 8 miles, it is not always conspicuous.

The Mount Adolphus Islands are a group of high rugged islands, partially covered with stunted trees and scrub, which extend from Pinnacle Peak, 3 miles NNW of North Brother, to Little Adolphus Island, 3.5 miles NNW.

Mount Adolphus Island (10°38'S., 142°39'E.), the largest and farthest SE of the group, rises to a height of 150m at flat-topped Mount Adolphus.

Blackwood Bay indents the W side of Mount Adolphus Island; there are depths of 5.5 to 9.1m in the central part of the bay. Blackwood Bank, with a least depth of 2.1m, extends about 1.5 miles NW across the entrance of the bay from a position 0.3 mile NW of the S entrance point. The entrance channels at each end have depths of 7.3 to 10.9m.

Anchorage.—Good anchorage can be taken in the central part of Blackwood Bay, in 7.3 to 9.1m, mud.

Little Adolphus Island (10°36'S., 142°37'E.), 1.2 miles NW of the N extremity of Mount Adolphus Island, is the farthest N of the island group. A shore bank, with depths of less than 10.9m, extends about 1.2 miles SW from the island.

Anchorage.—Anchorage may be taken between the above-mentioned bank and Lacey Island, which lies 0.2 mile S of Little Adolphus Island, in 9.1 to 10.9m, about 0.3 mile off Lacey Island.

Bungaree Shoals, three patches with depths of 9.1, 5.5, and 9.4m, lie 3.5 miles NNW, and 3.5 and 4.2 miles N, respectively, of Little Adolphus Island. These small patches are steep-to.

There are other islands and rocks in the Mount Adolphus Islands, which may best be seen on the chart.

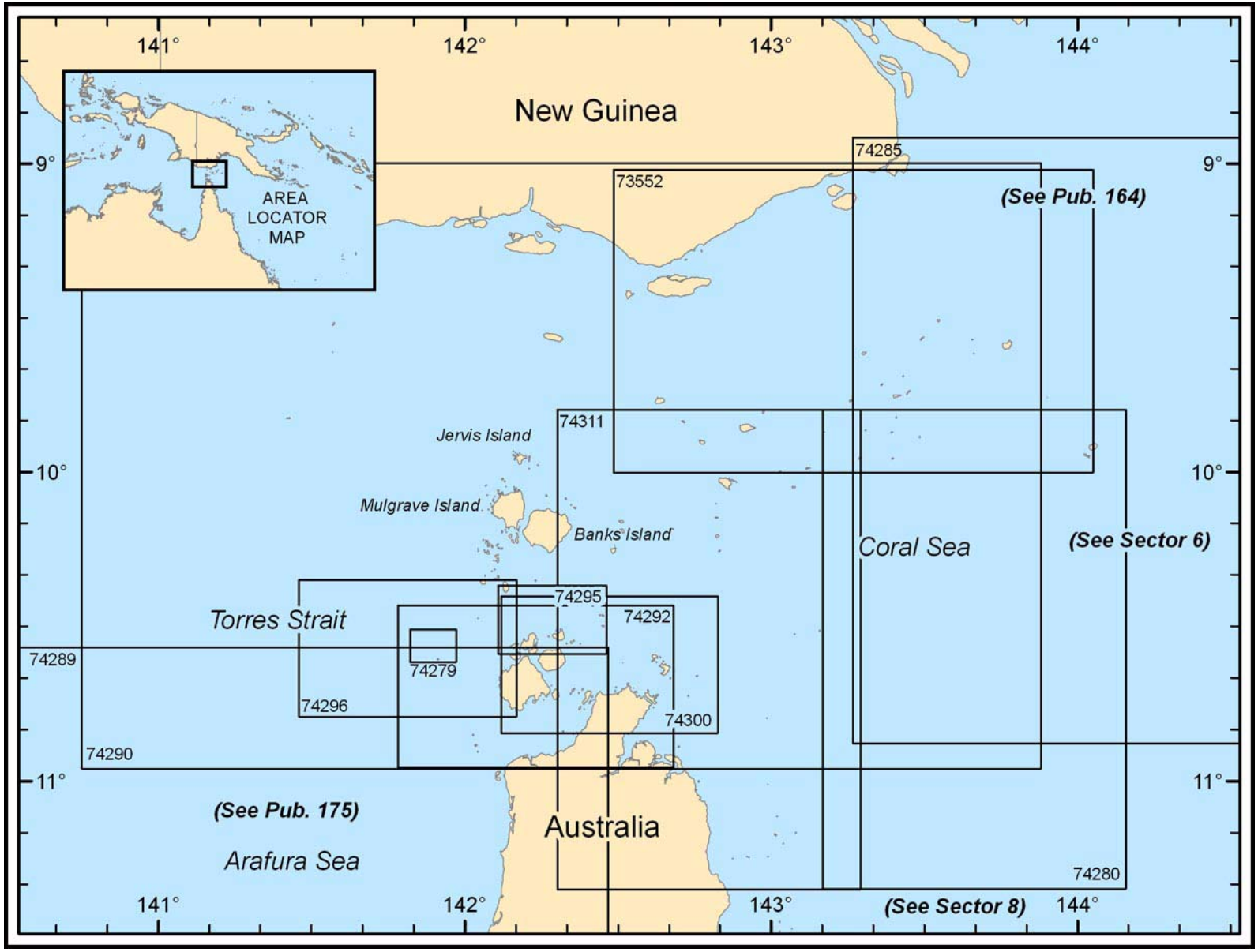
8.92 Dangers in Adolphus Channel and the N approach.—Quetta Rock (10°40'S., 142°38'E.), a small dangerous patch with a depth of 3.2m, lies 1.2 miles SW of the S extremity of Mount Adolphus Island. It is marked by tide rips; tide rips also occur across the Inner Route between 0.7 and 1.5 miles S of Quetta Rock.

A dangerous wreck lies 0.4 mile NNW of Quetta Rock. A below-water rock, with a depth of 7.2m, lies 1 mile NNW of Quetta Rock.

Mid Rock (10°41'S., 142°36'E.), a shoal patch with a least depth of 1.8m, lies on the W side of the Inner Route, 2 miles WSW of Quetta Rock. Its position is usually marked by heavy tide rips.

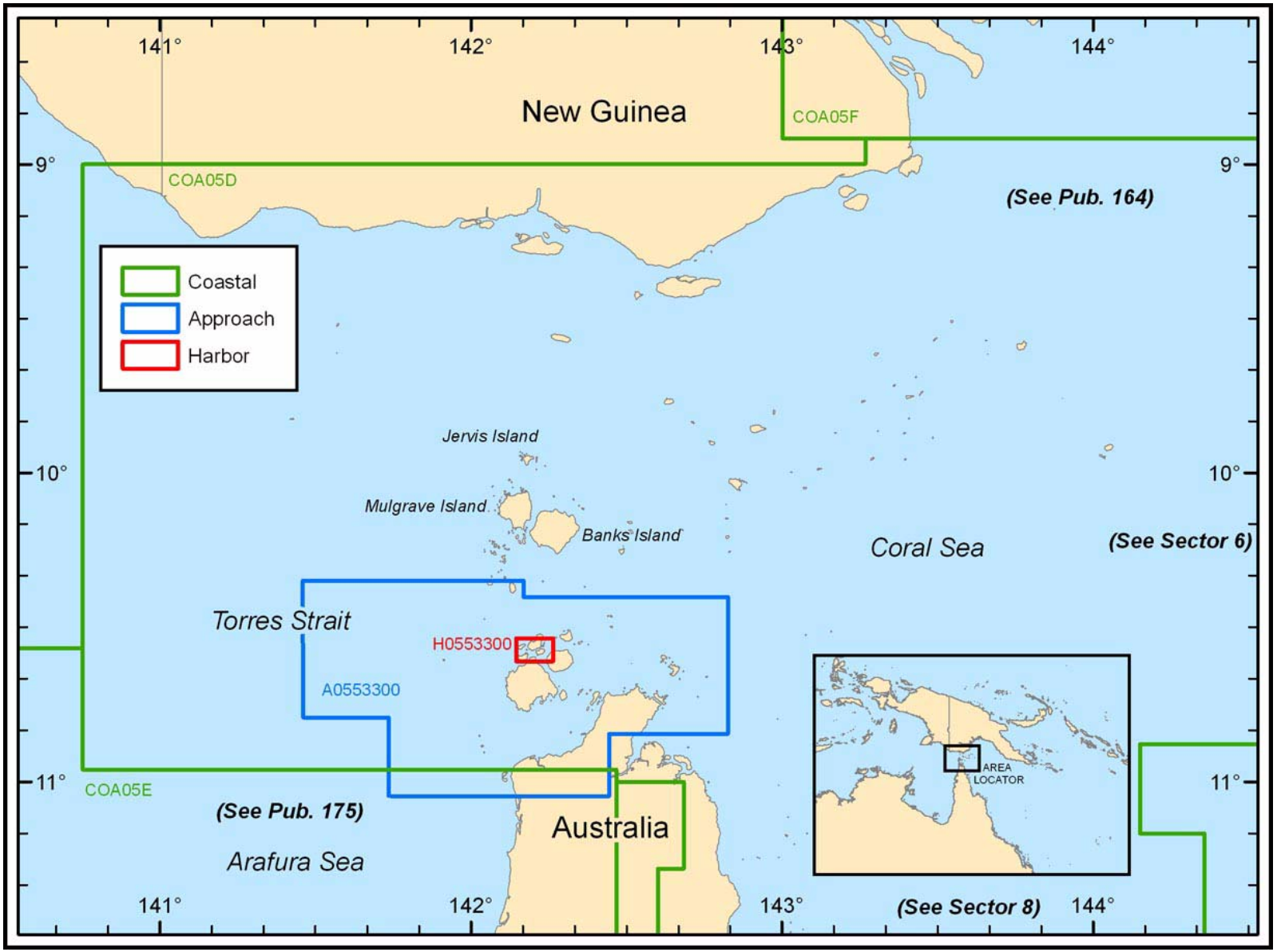
Alpha Rock (10°37'S., 142°31'E.), 18.3m high, lies 4.5 miles N of Cape York. It may be passed at a distance of 0.5 mile on either side and is a good mark when approaching Adolphus Channel.

Vessels proceeding through Adolphus Channel should follow the recommended track.



Additional chart coverage may be found in NGA/DLIS Catalog of Maps, Charts, and Related Products (Unlimited Distribution).

SECTOR **9** — CHART INFORMATION



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SECTOR 9 — DNC LIBRARY INFORMATION

SECTOR 9

AUSTRALIA—TORRES STRAIT AND GREAT NORTH EAST CHANNEL

Plan.—This sector describes Great North East Channel from NE to SW. The various channels leading through Torres Strait are then described from S to N. This is followed by a description of the islands and dangers in the N part of Torres Strait and by a description of the dangers in the W approach to Torres Strait.

General Remarks

9.1 Torres Strait lies between the N coast of the Cape York Peninsula and the S coast of Papua New Guinea; it connects the Coral Sea with the Arafura Sea. The E limit of the strait is approximately a line joining Cape York and Dauan Island, about 75 miles N. Dauan Island lies about 5 miles off the coast of Papua New Guinea. The W limit of the strait may be considered to lie between a point on the coast of Australia, about 30 miles SW of Cape York, and the mouth of the Bensbach River (9°07'S., 141°02'E.), about 127 miles NNW. The coast and dangers between the Bensbach River and Dauan Island are described in Pub. 164, Sailing Directions (Enroute) New Guinea.

The best and most commonly-used route through Torres Strait is through Prince of Wales Channel.

To the N of Jervis Island, 49 miles NNW of Cape York, Torres Strait is shallow and reef-strewn. There is no known route through this area for other than small craft with local knowledge.

Great Northeast Channel extends about 100 miles SW from **Bramble Cay** (9°09'S., 143°53'E.), its NE entrance, to **Harvey Rocks** (10°19'S., 142°41'E.). This channel connects the Gulf of Papua and the Coral Sea with the various channels leading through Torres Strait and is comparatively free of dangers.

Winds—Weather

9.2 In the E approach to Torres Strait, the Southeast Trades begin in April, with squalls and rainy weather at first, but in a week or 10 days the weather becomes more settled. These trades are strongest from May until August, with steady winds from the SSE to ESE. The wind is generally fresh and steady when the moon quarters and unsettled at the time of full and change. These trades continue until the first or second week in November, when the wind becomes more regular, stronger, and from the E, after which there are variable winds and calms until the latter part of November, and sometimes the beginning of December.

In Torres Strait, the Southeast Trades have been observed to generally be lighter at night than by day. These trades have been observed to be stronger with a high barometer than on other occasions, being then accompanied by a thick haze. Little rain is experienced, and the sky is rarely overcast during this period.

The Northwest Monsoon, which commences in December, may be expected to have strength and some regularity toward the end of that month. During the months of January and February, the winds are strongest, but decline in strength toward the end of February until the beginning of March, when they become variable with cloudy and unsettled weather. The Northwest Monsoon season is the rainy season; violent thunder and lightning storms sometimes occur.

Apart from brief squalls, gales do not occur on an average of more than 1 day a year in this area and are generally associated with tropical storms.

On the S coast of New Guinea, both land and sea breezes are often the only winds during the transitional periods between the season of the Southeast Trades and that of the Northwest Monsoon.

Tides—Currents

9.3 The restricted channels of Torres Strait connect two areas in which the tides differ greatly. Marked contrast occurs between the semidiurnal components of the tide in either entrance. During some phases of the moon, it is HW in one entrance at the same time that it is LW in the other entrance. In consequence, great differences in the levels of the two entrances occur, and the tidal currents through the channels flow from the high level to the low level.

The tides at either end of the strait do not differ greatly in their diurnal component, therefore there are no marked differences in the water levels at either entrance, and high water due to this component is more or less uniform.

The tidal rise at **Booby Island** (10°36'S., 141°55'E.), just S of Gannet Passage, is as follows: HWS 4m; HWN 3m; LWN 2.1m; LLWS -0.2m. The HHW and the LLW only occur during certain times of the year so that for the most part, the tides range between 0.9 and 3.4m above datum.

High water springs at Twin Island is 2.7m; LWS is 0.4m.

Automatic telemetric tide gauges have been established at Booby Island, Goods Island, Turtle Head and Ince Point. Automatic tide gauges broadcast on VHF channel 68 from a station on Hammond Island. Tidal heights are also available from a telephone answering service 7-4069-2821.

The tidal currents, in contrast with the tides, which have a relatively large diurnal component, are predominantly semi-diurnal. East of and in the channels in the S part of Torres Strait, the tidal currents are mainly semidiurnal, but with appreciable diurnal inequality; diurnal inequality increases from E to W. West of the channels, diurnal inequality continues to increase, and at **Proudfoot Shoal** (10°32'S., 141°28'E.) the tidal currents are mainly diurnal and rotary.

The tidal currents in the channels through the S part of Torres Strait do not depend on, and cannot be referred to, the local tide. They may, however, be referred very approximately to the tide at Brisbane Bar. As a rule, the tidal currents set E while the tide is rising at Brisbane Bar, and W while the tide is falling.

The tidal currents turn almost simultaneously in all the chan-

nels and in the vicinity E of the channels. West of the channels, the times become progressively earlier; near Proudfoot Shoal tides are about 4 hours earlier.

The direction of the tidal currents in the channels conform to the direction of the channels. Thus, the tidal currents which flow E and W in Prince of Wales Channel and in the W entrance of Endeavour Strait, flow N and S, respectively, in the E entrance of Endeavour Strait between Entrance Island and Woody Island.

The rates of the tidal currents are greatest in the most restricted channels and in the narrowest part of these channels. The rates predicted for Prince of Wales Channel can be regarded as about the greatest likely to be experienced in any channel normally used for navigation. The rates vary greatly with astronomical conditions.

Diurnal inequality is great. The weak E tidal current runs while the tide at Brisbane Bar is rising to LHW, and the strong W current runs while the tide at Brisbane Bar is falling from LHW. The strong E current runs during the rise to HHW at Brisbane Bar, and the weak W current runs during the fall from HHW at Brisbane Bar.

When the moon is in high declination near springs, the strong E and W tidal currents may run at a considerable rate. When the moon is near the Equator at neaps, the rate is inappreciable.

The horizontal movement of the water in the channel of Torres Strait is the combined effect of the current and the tidal current. When both are strong and setting in the same direction, their combined rate may be great. Under such conditions, a resultant current of 8 knots has been reported in Normanby Sound. Under similar conditions, but with the current setting against the tidal current, there would be little or no horizontal movement of the water. When the tidal current is weak, but the current strong, movement may be in one direction continuously for several days. When the current is weak and the tidal current strong, regular alternating W and E horizontal movements of the water may be experienced.

The currents in the various channels of Torres Strait depend to a great extent on the direction and strength of the wind. During the period of the Southeast Trades, from March to November, the current sets continuously W. In January and February, during the period of the Northwest Monsoon, the set through the strait is E. December may be considered as a transition month, but E sets can usually be expected during the latter part of the month. During and after long continuous, high velocity winds in an almost constant direction, the rate of the current may be considerable.

The currents off the SE side of Papua are irregular and little is known about them, except that they are greatly influenced by the direction and force of the wind.

The currents found in Great North East Channel are described with that channel.

Pilotage

9.4 Pilotage is compulsory for vessels 70m in length or longer and for all laden oil tankers, chemical carriers, and LNG carriers when navigating through the Inner Route of the Great Barrier Reef between Cape York (latitude 10°41'S.) and Cairns Roads (latitude 16°40'S.), or when passing through Hydrographer's Passage. For more information, see paragraph 7.2 under the heading "Navigation in the Great Barrier Reef."

Vessels with a maximum draft of 12.2m can obtain pilotage through Gannett Passage, Varzin Passage, and Prince of Wales Channel.

Vessels 100m in length or larger and all laden oil tankers, chemical carriers, and LNG carriers are advised to carry a pilot when navigating in Torres Strait and the Great North East Channel between **Booby Island** (10°36'S., 141°55'E.) and **Bramble Cay** (9°09'S., 143°53'E.).

Pilots are available from Australian Reef Pilots Limited (call sign Reef Pilots) and Torres Pilots (call sign Torres Pilots). Both companies maintain comprehensive websites with boarding ground locations.

Australian Reef Pilots

http://www.reefpilots.com.au

Torres Pilots

http://www.torrespilots.com.au

Pilots board in the following positions:

1. Eastbound vessels with a draft of 8m or greater board off Booby Island (10°36.3'S., 141°49.8'E.).
2. Eastbound vessels with a draft of less than 8m board off Goods Island (10°33.9'S., 142°04.4'E.).
3. Westbound vessels board off Dalrymple Island (9°34'S., 143°24.5'E.).

E bound vessels with a draft less than 8m can also request a pilot at the Booby Island station if so desired.

Southbound and Eastbound Vessels.—Vessels requiring pilotage should give 4 to 5 days notice advising the ETA at the pilot boarding place, maximum draft, and destination.

Confirmation or adjustment of the ETA should be sent 24 hours and 6 hours prior to arrival. Contact the respective pilot station 2 hours before arrival, as follows:

1. Torres Pilots—VHF channel 79.
2. Reef Pilots—VHF channel 20.

Northbound and Westbound Vessels.—If in an Australian port, advise pilots of pilotage requirements, giving as much notice as possible.

If coming from an overseas port, advise pilots 4 to 5 days in advance of pilotage requirements, stating ETA (name of boarding place), maximum draft, and destination. For more information, see paragraph 7.2 under the heading "Navigation in the Great Barrier Reef."

Hydrographer's Passage.—Requests for pilotage should be sent 4 to 5 days in advance stating ETA at Blossom Bank and a confirmation of suitability for land-on helicopter transfer. Vessels must confirm or amend the ETA to the pilotage association at Mackay 48 hours, 24 hours, and 6 hours before arrival at Blossom Bank.

Grafton Passage and Palm Passage.—Requests for pilotage should be sent 4 to 5 days in advance stating ETA at Euston or Pith Reefs and with a confirmation of suitability for land-on helicopter transfer at Pith Reef.

Great North East Channel.—Requests for pilotage should be sent 4 to 5 days in advance stating ETA and pilot boarding

position, maximum draft, and destination. For more information, see paragraph 7.2 under the heading "Navigation in the Great Barrier Reef."

Note.—Boardings and landings are by launch with the exception of Hydrographer's Passage and Edward Island Palm Passage, where only a land-on helicopter can be utilized. Land-on helicopters are available at other boarding places by arrangement, depending on aircraft availability and suitability of the vessel to accept a land-on helicopter. Vessels requiring pilot boarding by helicopter should request this service when ordering a pilot. Winch-down operations will be introduced when suitable aircraft are available. As a guide, a clear space of 21m is the minimum required for land-on helicopter operations. Some helicopters, however, require larger areas.

The maximum draft of a vessel transiting the Inner Route and Torres Strait, taking advantage of the tidal rise, is 12.2m. The pilotage service requires that vessels maintain an underkeel clearance of 1m in Gannet Passage and Varzin Passage. In Prince of Wales Channel, vessels with a draft of 11.9m or less must maintain an underkeel clearance of 1m, while vessels over 11.9m in draft must maintain an underkeel clearance equal to 10 per cent of the vessel's draft at all times.

Vessels entering or leaving the Inner Route by way of Grafton Passage, Palm Passage, and Hydrographer's Passage are restricted only by any draft limitation at the Australian port of arrival or departure.

Vessels are requested to maintain an International Radio Watch, as well as a watch on VHF channel 16, while in any of the pilotage waters mentioned above.

Regulations.—A protective zone had been established in the Torres Strait to protect the traditional activities of the inhabitants. Fishing by vessels of all nationalities in the zone is regulated by Australia and Papua New Guinea in accordance with an agreement between them.

For information regarding the mandatory ship reporting systems and vessel traffic service which cover the Torres Strait region and the Inner Route of the Great Barrier Reef, see paragraph 7.2.

The Inner Route

9.5 The Inner Route is an intricate well-surveyed channel inside the Great Barrier Reef that may be termed one of the great trade highways of the world. The channel extends from Gannet Passage in Torres Strait, E of Cape York via Adolphus Channel, and along the Queensland coast to Capricorn Channel. The Inner Route is also accessible from the Coral Sea via the several passes and openings through the Great Barrier Reef.

This channel, which is charted as a Two-Way Route, has been established by local authority, and is not mandatory. It is meant to indicate the best routes for moderate draft vessels (up to 9m). Traffic is free to move in both directions along its length. Caution should be taken while navigating along the route, taking into account the nature of the waterway, and the fact that vessels constrained by draft may be met in certain areas. Vessels should also note that the International Regulations for Preventing Collisions at Sea, 1972 (72 COLREGS) apply equally to vessels sailing within or outside of the charted route.

In accordance with the International Convention for the Safety of Life at Sea, 1974 (SOLAS, 1974) all vessels should maintain a watch on VHF channel 16 while sailing along or near the route.

Pilotage for the fairway is available from the Queensland Coast and Torres Strait Pilotage Service (Torres Sydney) by prior arrangement. Detailed information on pilotage, physical features, navigational hazards, etc. can be had in the sector pertaining to that area, and on the appropriate chart.

Great North East Channel

9.6 Great North East Channel, which is deep and comparatively free of sunken dangers in the fairway, is the most widely-used channel in approaching Torres Strait from the E.

There are two entrances leading into Great North East Channel, namely, Bligh Entrance and an entrance N and W of Bramble Cay. Bligh Entrance is the better of the two and lies between Bramble Cay and Anchor Cay, 19 miles SE. A new Two-Way Route for medium-draft vessels, which is not mandatory but indicates the best and safest route, has been established (2004) in Great North East Channel and can best be seen on the chart.

Tides—Currents.—A W set has been experienced in Great North East Channel from **Bramble Cay** (9°09'S., 143°53'E.) to **Coconut Island** (10°03'S., 143°04'E.), with a rate of about 3 knots. A similar set at the same rate has been experienced N of the **Three Sisters Islets** (10°12'S., 142°49'E.). It is reported that during the period of the Southeast Trades, an abnormal current sets NW across the channel at a rate of about 5 knots.

The tidal currents in Great North East Channel are governed by the direction, and their rate by the narrowness of the passages through which they set.

In the vicinity of Bramble Cay and in the S part of Bligh Entrance, the tidal currents set E and W. However, because of the proximity of the mouth of the Fly River, about 25 miles NW, the tidal currents in this area are strong and irregular, especially during the season of the Northwest Monsoon (rainy season) and at the change of seasons.

During the season of the Southeast Trades, the W tidal current is accelerated by the current and is reported to then set toward Bramble Cay. Because of this, several vessels have shipwrecked on Bramble Cay.

In the fairway of Great North East Channel, between **Stephens Islet** (9°30'S., 143°33'E.) and Dungeness Reef, about 40 miles SW, the tidal currents are diverted into NE and SW sets by the extensive Warrior Reefs which form the NW side of the channel. The SW tidal current runs about 2 hours after HW. In this part of the channel a rate of 1.5 to 2 knots is experienced at springs.

Between **Saddle Island** (10°10'S., 142°41'E.) and Mount Adolphus, about 28 miles S, the tidal currents attain a rate of 1.5 knots.

Bligh Entrance (9°15'S., 143°55'E.) lies between Anchor Cay, the N extremity of the Great Barrier Reef, and Bramble Cay. The entrance is clear of dangers and has depths of 35 to 66m, sand and shells, and 4 miles S of Bramble Cay there is yellow clay.

9.7 Dangers on the S side of Bligh Entrance.—Anchor Cay (9°22'S., 144°07'E.) lies on the NW side of a small reef which forms the N termination of the Great Barrier Reef. The

N side of this reef forms the S side of the outer part of Bligh Entrance.

Vessels using this entrance should keep N of a line joining the below described dangers.

Laxton Reef (9°24'S., 143°49'E.) is a drying reef. Drying reefs lie about 2 miles NE and 6 miles NW of Laxton Reef, a dangerous rock lies about 3.5 miles NNE of Laxton Reef.

Darnley Island (9°35'S., 143°46'E.) lies 7.5 miles S of Brown Reef. The island rises to a height of 181m and, in clear weather, may be seen from a distance of 25 to 30 miles from seaward. A coral reef, approximately 0.5 mile in diameter, lies 3.2 miles W of Darnley Island.

Anchorage.—Anchorage may be taken in Treacherous Bay, on the N side of the island, in 26 to 27m, about 0.5 mile offshore. The anchorage is protected from SE winds.

Nepean Islet, 19m high, lies near the center of a reef, 6 miles WNW of Darnley Island. A depth of 6.7m lies 3.7 miles NNE of the islet.

9.8 Dangers on the N side of Bligh Entrance.—Bramble Cay (9°09'S., 143°53'E.), 3m high, serves as a good mark for vessels making Bligh Entrance from the E. The cay is surrounded by a reef which partly dries. Black Rocks, 1m high, lie 3 miles SW of Bramble Cay Light; a racon transmits from the tower.

Anchorage.—Temporary anchorage, in 37m, may be taken in the lee of Bramble Cay.

A shoal, with a depth of 7.3m, was reported to lie in position 9°00'S., 145°10'E, 77 miles ENE of Bramble Cay.

The entrance to Great North East Channel, N and W of Bramble Cay, lies between Bramble Cay and Parama Island and Bristow Island off the coast of Papua New Guinea. It should be borne in mind that the coast of Papua is low and is not visible more than 10 miles offshore, except for the trees on the islands.

The entrance is nearly 14 miles wide NW and SE between Bramble Cay and the shoals off the coast of Papua. When using this entrance, keep as near Bramble Cay as convenient. This entrance connects with Bligh Entrance SW of Bramble Cay.

9.9 Great North East Channel—Stephens Islet to Coconut Island.—From a position 3.2 miles S of Bramble Cay, the track extends about 42 miles SW to Dalrymple Islet. From this position the fairway trends SSW for 30 miles to a position 1.2 miles WNW of Coconut Island. The extensive Warrior Reefs and Dungeness Reef form the NW side of the channel.

Tides—Currents.—A W set, with a rate of 3 knots, has been experienced in Great North East Channel between Bramble Cay and Coconut Island, and Bet Island, the N of the Three Sisters.

In approximately mid-channel between Stephens Islet and Dungeness Reef, Warrior Reefs divert the tidal currents into NE and SW. The latter current runs for approximately 2 hours after HW. In this part of the channel, a rate of 1.5 to 2 knots may be allowed for at springs.

Stephens Islet (9°30'S., 143°33'E.) lies on the S side of the recommended track, about 7 miles NW of Nepean Islet. The islet is 38m high and lies on the N side of a drying reef. A village and mission are situated on the NE side of the islet.

A conspicuous church, which can only be seen from N, stands on the N side of the inlet. In 1981, a depth of 6m, with a shoal area extending 0.5 mile NE from it, was reported to lie 4.5 miles ENE of Stephens Islet.

Anchorage.—Anchorage may be obtained during SE winds off the NW side of the reef on which Stephens Islet lies.

Campbell Islet, 15m high, lies 4.5 miles SW of Stephens Islet, in the middle of a drying reef. A spit, with depths of less than 5.5m, extends 0.7 mile N from the reef. A depth of 15m was reported 4 miles E of Campbell Islet.

A sand cay, 1.2m high, lies on a drying reef on the N side of the channel, 14 miles NW of Stephens Islet. A similar cay and reef lie 1.5 miles farther NW.

9.10 Pearce Cay (9°31'S., 143°17'E.), 0.3m high, lies on the NW side of Great North East Channel, 15 miles W of Stephens Islet. The channel between the cay and Warrior Reefs is 3 miles wide.

Dalrymple Islet (9°37'S., 143°18'E.) lies on the W end of a drying reef, 5.5 miles S of Pearce Cay.

A 14.3m patch lies 2 miles WSW of Dalrymple Islet Light, on the W side of the recommended track.

Marsden Islet, 15m high, lies on the W side of a drying reef, 6.7 miles SSE of Dalrymple Islet. Keats Islet lies on a reef 4 miles ENE of Marsden Islet.

The Yorke Islands, 4 miles S of Keats Islet, is comprised of two islands. Massig Island, the largest of the two, lies on the W end of a reef; Kodall Island lies on the NE end of the reef, 1.2 miles E of Massig.

A village, with a flagstaff, lies on the N side of Massig; a radio mast, 100m high, stands near the center; and an airfield is situated at the W end of the island. A shoal, with a depth of 1m, was reported to extend 2 miles NE from a position 1 mile NE of the NW extremity of Massig Island.

Smith Cay, 0.3m high, lies on a small drying reef, 4.5 miles WSW of Massig Island.

Rennel Island (9°46'S., 143°16'E.), 22m high, lies on a drying reef 6 miles SW of Marsden Islet.

9.11 Warrior Reefs (9°14'S., 143°12'E.) lie with their N extremity about 26 miles NW of Stephens Islet. Warrior Reefs are formed by three large reefs that extend 38 miles SSW from their N extremity and form the NW side of this part of Great North East Channel. During the Southeast Trades, the E side of the reefs break heavily. The area N and NW of the reefs to the Papua coast is unsurveyed.

Tudu Island (9°48'S., 142°58'E.) lies close off the SW extremity of Warrior Reefs. It is located near the center of a reef which is 3 miles long in a NNW and SSE direction.

Dungeness Reef, which dries in places, lies with its N edge 3.2 miles S of Tudu Island, and extends 8.5 miles S. The SE side of the reef is generally well-defined.

Basilisk Passage, between the S end of Warrior Reefs and Dungeness Reef, is 1.5 miles wide. The passage is deep and clear of dangers, except for a reef which dries 2.7m, which lies in the fairway of the W entrance, 2.5 miles W of Tudu Island.

Tides—Currents.—The tidal E current through Basilisk Passage attains a rate of 5 knots at springs. The Southeast Trade winds against this current raise a confused sea. The NW current does not run so strongly.

Zagai Island, 3.2 miles SW of Tudu Island, forms part of the

S side of Basilisk Passage.

Jacobus West Shoal (9°53'S., 143°04'E.) lies in the E entrance to Basilisk Passage, with a least depth of 2.8m lying about 3.4 miles ESE of the N extremity of Dungeness Reef. A 3.3m patch lies 1 mile WSW of Jacobus West Shoal.

Dove Islet (10°00'S., 143°02'E.) lies on the NW end of a drying reef, 6.5 miles SSW of Jacobus West Shoal. An area of bright green water, which should be avoided, lies 2 miles NE of the islet. A light stands on the E end of the reef extending from the islet. The recommended track passes about 1.2 miles E of the light.

Arden Islet (9°52'S., 143°10'E.) lies on the E side of the Great North East Channel, about 8 miles SW of Rennel Island. A depth of 14.3m is charted on the W side of the channel, 2.7 miles WNW of Arden Islet. A light is shown from the W extremity of Arden Islet.

A sand cay, which dries 1.5m, is located on the NW side of a small reef, 2.7 miles SE of Arden Islet.

Roberts Islet (9°59'S., 143°07'E.), 15m high and wooded, lies on the NW side of a drying reef, 7.2 miles SSW of Arden Islet. The recommended track passes about 2 miles NW of the islet.

Coconut Island (10°03'S., 143°04'E.) lies on the NW side of a reef, 4.2 miles SW of Roberts Islet. The reef extends 0.6 mile W of the island. The recommended track passes 0.8 mile W of the reef.

9.12 Coconut Island to East Strait Island.—From a position 1.2 miles NW of Coconut Island, the fairway of this part of the Great North East Channel trends in a general SW direction for about 12 miles to a position about 2 miles SSE of Bet Reef Light. The fairway then trends in a general WNW direction for 10 miles to a position about 3.2 miles SW of Bet Islet. From this position the channel trends in a SSW direction for about 10 miles to a position 2 miles SE of Harvey Rocks, then WSW 17.5 miles to East Strait Island.

An alternative preferred route, best seen on the chart, continues SW, beyond Vigilant Channel, for about 8 miles, then heads more WSW between **Ackers Shoal** (10°18.5'S., 142°48.8'E.) and **Kirkcaldie Reef** (10°20'S., 142°50'E.), which is marked with a racon. The route continues 22 miles towards East Strait Island.

Richardson Reef (10°07'S., 143°03'E.), with a sand cay 1.8m high on its NW side, lies 4.2 miles SSW of Coconut Island.

Walker Shoal has a depth of 5.2m. The shoal lies on the W side of the recommended track, 4 miles WSW of Coconut Island.

The water between Walker Shoal and the NE extremity of Bet Reef, 6 miles SSW has not been completely examined.

Bet Reef, 7 miles long from E to W, forms the N side of Vigilant Channel. A light, which is partially obscured by a stranded wreck between the bearings of 054° and 070°, is shown from the SE side of the reef. Bet Islet, 18m high, is located on the NW extremity of the reef.

Panther Shoal, with depths of 10.3 to 15m, extends 2 miles NW from the W end of Bet Reef.

Sue Islet (10°13'S., 142°49'E.), 26m high, lies near the NW extremity of a reef, 3.5 miles S of Bet Islet; the reef extends 2.5 miles ESE from Sue Islet. A shoal, with a depth of 3.6m, extends 0.6 mile NE from the E end of the above reef, and a shoal, with a least depth of 4.9m, extends 1.2 miles NW from the NW extremity of the reef.

Vigilant Channel is about 2.5 miles wide between the S side of Bet Reef and the N side of the reef surrounding Sue Islet. Depths of 10.9 to 20.1m are found in the fairway, which is clear of dangers. The recommended channel favors the Bet Reef side of the fairway.

Poll Islet (10°15'S., 142°50'E.), 14m high, lies on the E side of the recommended track, 2.7 miles S of Sue Islet.

Ackers Shoal, with a least depth of 0.7m, lies 3.7 miles SSW of Poll Islet. Depths of 2.2 and 5.2m lie 0.5 mile ENE and WSW, respectively, of the shoal.

9.13 Moresby Rock (10°11'S., 142°43'E.), small and steep-to, with a depth of 1.8m, lies on the W side of the recommended track, 6.7 miles WNW of Sue Islet.

Saddle Island, 48m high, is located 1.5 miles WNW of Moresby Rock; the island is fringed by a drying reef.

Between Saddle Island and the Mount Adolphus Islands, 28 miles SSW, the flood tidal current sets WSW, and the ebb ENE. Both attain a rate of 1.5 knots at springs.

Ninepin Rock (10°14'S., 142°41'E.), a steep-to rock, 6m high, lies 3.5 miles S of Saddle Island. The rock is square in shape and conspicuous.

Ibis Reefs, two reefs which dry 1.5 and 0.9m, lie 3.7 miles SSE and 3.5 miles S, respectively, of Ninepin Rock.

Harvey Rocks (10°19'S., 142°41'E.) is a group of black rocks, 6m high, which lie on a drying reef. A light is shown from the reef on which the rocks lie.

Beagle Rocks, two below-water patches, lie 1.2 miles W of Harvey Rocks.

Campbell Reef (10°20'S., 142°29'E.) is a below-water reef which lies 11.5 miles W of Harvey Rocks Light. A shoal, with a depth of 8.8m, lies 2.5 miles ENE of the shoal.

East Strait Island (10°30'S., 142°27'E.), 14m high, lies near the E end of a reef which extends 0.3 mile W from it. The island lies on the S side of the recommended track, 18 miles SW of Harvey Rocks. A rear range light is situated on the island, with the forward light situated approximately 545m E of the front range, on a reef surrounding the island.

The Twin Islands, 1.7 miles N of East Strait Island, consists of two islands which lie on the E and W ends of a reef which dries 2.1m in places. The E island is 61m high and is a prominent mark when approaching Prince of Wales Channel from the E.

Endeavour Strait

9.14 Endeavour Strait, the farthest S and most extensive of the W channels through Torres Strait, lies between and the NW side of the Cape York Peninsula.

Endeavour Strait is entered from the E between Peak Point and the E extremity of Horn Island, 8.7 mile NW, and from the W between Cape Cornwall and a position on the mainland 9 miles S.

Vessels of light draft, with local knowledge, bound for the Gulf of Carpentaria, use Endeavour Strait in preference to Prince of Wales, as the saving in distance is about 12 miles.

Tides—Currents.—At Possession Island, the mean rise at

springs is 2.7m. The flood current sets SSW for 7 hours; the ebb current sets NNE for 5 hours.

Tidal currents in Endeavour Strait commence and reach their maximum rates about 40 minutes later than off Hammond Rock, in Prince of Wales Channel, and except in the more restricted parts of the strait, their rates are not more than about 30 per cent of those N of Hammond Rock.

The tidal currents over Wallisp Bank and Inskip Bank are irregular, but in the W entrance of Endeavour Strait their main trend is E and W, the rising tide setting to the W and the falling tide to the E. At springs, the maximum velocity is 2 knots. At neaps, and during the strength of the Southeast Trades, the tidal current is likely to run to the W all day.

9.15 East approach to Endeavour Strait.—Peak Point (10°43'S., 142°26'E.), the NW extremity of the Cape York Peninsula, lies 5.5 miles WSW of Cape York. The point is cliff-faced and rises to Carubaura, 149m high, 0.5 mile S.

A flat, with least charted depths of 0.3m, extends 1.7 miles offshore between Cape York and Peak Point. York Island, 84m high, lies on the E side of the flat, 0.2 mile N of Cape York.

Horn Island (10°37'S., 142°17'E.), 115m high, lies with its E extremity 8.7 miles NW of Peak Point. Horned Peak, 115m high, lies in the NE part of the island and is conspicuous.

Asp Shoals (10°38'S., 142°22'E.), which break, have a least depth of 1.2m. They extend 2.5 miles WSW from a position 3 miles ESE of the E extremity of Horn Island.

Prince of Wales Island (10°41'S., 142°11'E.) lies 1 mile SW of Horn Island. The island rises to a height of 232m in its W part. Rattlesnake Point is the SE extremity of the island, and Cape Cornwall, 6 miles WSW, is the S extremity.

The boat channel which separates Horn Island from Prince of Wales Island affords a good passage for small vessels between Endeavour Strait and Port Kennedy. There is a least depth of 0.9m in the fairway over the bar at the SE end of the channel. A rock, which dries 3.4m, lies on the bar across the SE entrance, 0.5 mile S of the S extremity of Horn Island.

9.16 Islands in the E entrance to Endeavour Strait.—Possession Island (10°44'S., 142°24'E.) lies on the E side of the strait, with its N extremity 2 miles W of Peak Point. It rises to a height of 76m near its S end, and is conspicuous because of the number of hummocks on it.

A spit, with depths of less than 1.2m, extends 0.7 mile ENE from Possession Island. A patch, with a least depth of 4.8m, lies in about mid-channel between Peak Point and the E extremity of Possession Island.

Dayman Island, 87m high, lies 0.7 mile SSW of Possession Island, and is reef-fringed. A spit, with depths less than 4.9m, extends 0.3 mile N from the island. A 4.2m patch was reported to lie 0.3 mile S of the S end of Dayman Island.

Meddler Island (10°42'S., 142°23'E.), a reef-fringed island 39m high, lies 0.8 mile WNW of Possession Island.

Shoals, with depths of 8.5m, lie 1 mile NE and 0.9 mile N, respectively, of Meddler Island. They are marked by overfalls. A depth of 10m was reported to lie 1.5 miles NNW of Meddler Island. A 4.6m patch was reported to lie 0.7 mile NNE of Meddler Island.

Quoin Island, 42m high, lies 0.7 mile SW of Meddler Island. A spit extends 0.4 mile NNE from the island.

The channel between the NW coast of Possession Island, and Meddler Island and Quoin Island, is 0.7 mile wide, with a least charted depth of 6.7m in the fairway. Tidal currents set through in the direction of the channel, and attain a rate of 5 knots at springs and 3.5 knots at neaps.

Great Woody Island (Kai-Yelubi Island) (10°42'S., 142°21'E.), 64m high, lies with its N extremity 1.5 miles WNW of Meddler Island. The island, which is 64m high, is fringed by a narrow drying reef. A drying reef extends 0.4 mile SSW from its S extremity. A shoal, with a depth of 3.6m, lies 1 mile W from the N extremity of the island.

Little Woody Island (Meggi-Yelubi Island), 47m high, lies close SW of Great Woody Island. An 8.5m shoal lies 0.4 mile NW of the island.

The channel between Great Woody Island and Little Woody Island is 1 mile wide, with a least depth of 10.7m in the fairway. Tidal currents set through the channel at a considerable rate.

Entrance Island (Zuna Island) (10°43'S., 142°18'E.) lies with its E extremity 2.2 miles W of Little Woody Island, and is separated from Prince of Wales Island by a channel 0.5 mile wide. There is a least depth of 10.4m in the channel.

Entrance Island is reef-fringed; the reef extends 0.8 mile SW from the island. An islet and two above-water rocks lie on the reef near its center.

An 8.2m shoal lies 0.5 mile NE, and a small patch, which dries 0.3m, lies 0.7 mile SW, respectively, of the N extremity of Entrance Island.

Chiropo Island, 10.7m high, lies near the N end of a drying reef, just over 1 mile NW of Entrance Island.

Gibson Rock (10°44'S., 142°18'E.) has a depth of 0.6m, and is marked by tide rips. An 6.9m patch lies 0.7 mile S of Gibson Rock.

Heroine Rock (10°46'S., 142°19'E.), a coral patch with a depth of 0.9m, lies 2 miles SSE of Gibson Rock and is marked by tide rips.

9.17 South side of Endeavour Strait.—From Peak Point the coast trends in a SSW direction about 14 miles, then W 8 miles to the W limits of Endeavour Strait. In general, the coast is low and sandy, with several streams flowing into the sea.

High Island (10°44'S., 142°25'E.), 79m high, is the largest and highest of several islands and islets that lie on the shore bank between Possession Island and the mainland.

Generally speaking, the entire area from High Island to Red Island, 7.5 miles SSW, is foul and should only be navigated by small craft with local knowledge.

Red Island (10°51'S., 142°21'E.) lies on the shore bank, 0.2 mile offshore.

There is a T-headed wharf, of concrete and wood construction, on the point close E of Red Island. The head of the wharf is 37m long and has a depth of 4.4m alongside.

Tidal currents have been reported to attain a rate of 6 knots in the channel between the point and Red Island.

Beacons situated on shore about 0.9 mile NE of Red Island lead from seaward to the wharf. When a vessel is about 0.5 mile from the front beacon, steer SSW to the wharf. Only vessels with local knowledge should approach this area.

Brady Bank lies with its S extremity 1.2 miles NNW of Red Island. A shoal patch with a depth of 4.6m, lies close off its S

extremity.

Anchorage.—Anchorage, in 7 to 9m, may be obtained E of the S end of the bank.

Barn Island (Parau Island) (10°51'S., 142°19'E.), 43m high, lies 2 miles W of Red Island; the island is reef-fringed. A patch, with a depth of 4.9m, lies 0.8 mile NNE of Barn Island. A group of coral heads, with a least depth of 1m, lie almost 0.2 mile NE of the N extremity of Barn Island.

Mutee Head (10°55'S., 142°15'E.), 61m high, lies 8 miles SW of Red Island; it is a prominent headland.

The Jardine River flows into the strait 2.5 miles W of Mutee Head, and the W limit of Endeavour Strait lies about 1 mile farther W.

9.18 North side of Endeavour Strait.—The N side of Endeavour Strait is formed by the SE coast of Horn Island, Entrance Island, and the SE coast of Prince of Wales Island between Rattlesnake Point and **Cape Cornwall** (10°46'S., 142°11'E.), about 6 miles SW.

A bight on the SE coast of Prince of Wales Island is divided into two parts by a peninsula which lies 2.2 miles WSW of Rattlesnake Point. The bight is filled with drying mud flats and foul ground.

An islet lies on the NE end of a bank, with depths of less than 4.8m, 0.2 mile SSE of Rattlesnake Point.

Turtle Island, 23m high and reef-fringed, lies on the coastal bank 0.8 mile SW of Rattlesnake Point. A small islet, 0.9m high, lies on the E end of a spit, 0.4 mile S of Turtle Island.

Packe Island (10°45'S., 142°13'E.) is 81m high and is reef-fringed except on its E side, where there is a sandy beach. The island lies close W of the S extremity of the peninsula which divides the bight.

Port Lihou, the bight on the W side of the dividing peninsula, is mangrove fringed except for a distance of 1 mile NE of Cape Cornwall, where it is cliff-faced.

Dumaralug, an islet 15m high, lies on a bank 1.2 miles SSW of Packe Island. Below-water rocks and numerous shoal depths lie within the 10m curve in the vicinity of Dumaralug islet. The position of these dangers may best be seen on the chart.

Eagle Rock (10°47'S., 142°14'E.), 1.5 miles SE of Dumaralug Islet, is below-water. Peebles Shoals, with depths of 4.9m, lie 1.5 miles SW of Eagle Rock. An isolated reef, with a depth of 3m, lies 0.8 mile NE of Eagle Rock.

An 8.2m patch lies 2 miles SE of Eagle Rock, and there are other patches with depths of 10.4 to 11m in this vicinity.

9.19 West approach to Endeavour Strait.—The W approach to Endeavour Strait is encumbered by a bar, which has several long, narrow, and shallow ridges. Depths of 5.8 to 10.1m are found in the fairway, and a least depth of 7.3m is found on the approach line.

9.20 South Side of W entrance to Endeavour Strait.—Between the Jardine River and Slade Point, 13 miles SSW, the coast consists of low sand hills covered with scrub. Slade Point is the E entrance point to the Gulf of Carpentaria. For information regarding the Gulf of Carpentaria, see Pub. 175, Sailing Directions (Enroute) North, West, and South Coasts of Australia.

Crab Island (10°59'S., 142°06'E.) lies on a drying bank 1 mile W of Slade Point. The coastal bank, which dries in places, extends 4.7 miles SW from Crab Island.

9.21 North side of W entrance to Endeavour Strait.—The SW coast of Prince of Wales Island, from Cape Cornwall to Bampfield Head (10°43'S., 142°07'E.), consists of steep, rugged bluffs.

Yule Point (10°46'S., 142°09'E.), 1.7 miles W of Cape Cornwall, rises to a height of 119m, 0.7 mile N of its extremity. Bampfield Head lies 3.5 miles NNW of Yule Point.

Rothsay Banks, with depths of less than 5.5m, consists of extensive shoals and sandbanks which extend 14 miles W from Cape Cornwall. They form the N side of the W approach to Endeavour Strait.

9.22 Islands and dangers in the W approach to Endeavour Strait.—Red Wallis Island (10°51'S., 142°01'E.), 22m high, lies on a drying coral reef, 10 miles SW of Cape Cornwall. A 6.1m patch lies 1 mile NNE of the island.

Red Banks, consisting of narrow ridges of sand with depths of 0.5 to 6.7m, extend about 6 miles W from the W side of Red Wallis Island.

Woody Wallis Island (10°53'S., 142°02'E.), partially wooded and 13m high, lies on a drying coral reef about 2 miles SSE of Red Wallis Island.

Wallis Banks consists of several banks, with least depths of 0.4m, which extend 7.5 miles W from Woody Wallis Island.

Inskip Banks, consisting of extensive shallow sand ridges, which dry in places, occupy the entire area between Wallis Banks and the coastal bank fronting the mainland of Australia. A rocky islet, 1.8m high, lies on the N part of these banks in a position 1 mile SSE of Woody Wallis Island.

There is a channel, with a least depth of 7m, between the coastal bank extending from Slade Point and the SE side of Inskip Banks. Another channel between the N and S banks of Inskip Banks has a least depth of 5.8m. Extensive sandy shoals, which can best be seen on the chart, are located at the SW and W ends of the two channels. A 1.5m shoal lies 8 miles WSW of Woody Wallis Island.

9.23 Channels in the W approach to Endeavour Strait.—The main channel lies between the N side of Red Banks and the S side of Rothsay Banks. The general depths are 11 to 15.5m; however, in the W entrance, depths of 5.5 to 10.1m are found in the channel.

The channel between the S side of Red Banks and the N side of Wallis Banks should only be attempted by small vessels with local knowledge. A rock, which dries 2m, lies near mid-channel, 0.8 mile SSW of Red Wallis Island. There are several other patches in the channel which may best be seen on the chart.

Directions for Endeavour Strait.—Vessels approaching Endeavour Strait from the E should steer to a position about 1.2 miles N of Great Woody Island. When the summit of Great Woody Island bears 175°, steer course 220°, passing between Entrance Island and Gibson Rock.

When the N summit of Barn Island bears 093°, vessel should steer 273°, with the summit of the island astern, passing not less than 1.7 miles N of Red Wallis Island. When Red Wallis Island bears 111°, vessels should alter course to 291°. With the islet astern, continue this course for a distance of 10 miles from

the islet, when the bar will have been cleared.

Vessels approaching Endeavour Strait from W may use the reverse of the directions.

Prince of Wales Channel and Approaches

9.24 Prince of Wales Channel affords the best passage through Torres Strait and is recommended for vessels passing through from either the E or W. The channel lies between North West Reef and Sunk Reefs, on the N, and Wednesday Island, Hammond Island, and Goods Island, on the S.

Prince of Wales Channel may be approached from the NE, SE, or W. The approach from the NE, which is made via Great North East Channel, and the approach from the SE, which is made via the Inner Route and Adolphus Channel, can be safely navigated in daylight and under favorable tidal conditions. The area between Ince Point, the N extremity of Wednesday Island, and the SW end of Great North East Channel, may be considered as the critical part of the approach, as shoals of less than 9.1m exist close SE and NW of the recommended track. The approach from the W is via Gannet Passage, which can be dangerous under poor conditions of sea and tide, as the depths in the fairway are constantly changing and may be less than charted.

Tides—Currents.—Throughout Prince of Wales Channel and its approaches, from the Twin Islands on the E, to a few miles W of Goods Island on the W, the tidal currents flow at the times predicted for those of Hammond Rock Light. The rates diminish as the channel becomes less restricted. The rates in its E and W entrances are only about 30 per cent of those predicted in the channel N of the above light.

When Gannet Passage, N of Booby Island, is reached, the rates are comparatively weak and the character of the tidal current is quite different from that of Prince of Wales Channel. In the vicinity of Harvey Rocks and Saddle Island, the currents in the E approach to the channel reach their maximum rates about 30 minutes earlier than those of Hammond Rock, and in these more open waters, the rates are comparatively weak.

9.25 East approach to Prince of Wales Channel.— Twin Island (10°28'S., 142°27'E.) is a prominent mark when approaching Prince of Wales Channel from the E.

Marina Rock (10°28'S., 142°23'E.), 3.7 miles W of the light on Twin Island, is a pinnacle rock with a depth of 2.1m.

Beresford Shoal, a narrow coral ledge, extends 3.2 miles W from a position 1 mile NNW of Marina Rock.

Edwards Rock (10°31'S., 142°26'E.), about 1 mile SSW of East Strait Island, has a least depth of 2.1m; the rock breaks occasionally. Reeves Shoal, with a least depth of 8.2m, lies 0.7 miles SSE of Edwards Rock.

Alert Rock (10°30'S., 142°21'E.) lies on a patch 5.5 miles WNW of East Strait Island; the rock has a depth of 5.5m. The patch extends 1.5 miles ENE, about 0.5 mile S, and 1.2 miles WNW, respectively, from Alert Rock. In 1986, it was reported that there was less water than charted 0.4 mile S of Alert Rock. A 10.7m patch lies 0.5 mile SW of Alert Rock and is marked by a buoy. A rock with a depth of 12.2m, lies 0.8 mile SW of Alert Rock. The dangers listed, including Marina Rock, are covered by a red sector of Tuesday Islet No. 4 Light.

Herald Patches, sand wave formations with depths of 7.6 to 11m, lie with their center about 1.5 miles E of Ince Point.

Caution.—Herald Patches and Alert Rock lie in sandwave formations which cause depths to vary from those charted. The sandwaves trend SE form Herald Patches and NE from Alert Rock. In addition, rocky outcrops occur in the channel between them.

A rock, with a depth of 10.4m, lies close S of the recommended track, 2 miles ENE of Ince Point.

Wednesday Island (10°31'S., 142°18'E.) forms part of the S side of Prince of Wales Channel. The island rises to a height of 91m in its S central part, and there is a height of 84m close S of Ince Point, the N extremity. A transmitting tide gauge has been established. Tide gauges transmit on VHF channel 68. Tidal heights are also available from a telephone answering service (7-4069-2821). A light is shown from Ince Point.

Hood Bank extends 2.5 miles WSW from a position 0.3 mile W of Ince Point. It consists of hard sand pinnacles, which dry in patches, and lies parallel with and about 0.3 mile off the mud bank which fronts the NW coast of Wednesday Island.

9.26 North West Reef (10°30'S., 142°11'E.), which dries 1.2 to 1.8m, forms the major part of the N side of Prince of Wales Channel. It extends 9 miles WSW from a position 3.2 miles NW of Ince Point. A bank, with a least charted depth of 4m, extends 1.7 miles E from the E end of the reef. Overfalls occur between this bank and Ince Point.

Pilot Knoll, 1 mile SW of the E end of Northwest Reef, has a depth of 0.5m; the sea breaks over it in a moderate SE wind.

Duff Rock, with a depth of 1.8m, lies 1 mile WSW of Pilot Knoll.

Nardana Patches (10°30'S., 142°15'E.), close N of the recommended track, lies 0.7 mile SSE of Duff Rock. They are two rocks, with depths of 7.6m, marked by overfalls.

Pullar Patches (10°31'S., 142°15'E.) lies on the S side of the recommended track, 0.9 mile SSW of Nardana Patches. There is a least charted depth of 6.7m.

Marie Rock, with depths of less than 2m, lies 0.5 mile SW of Pullar Patches; it is marked by overfalls.

Hammond Island (10°31'S., 142°12'E.) rises to a height of 152m, 1 mile SSE of Turtle Head, its N extremity. Turtle Head is cliff-faced and 28m high. A tide gauge is situated close NW of Turtle Head, and a radio mast, which is the telemeter link with Booby Island, stands on Turtle Head. Tidal heights for Turtle Head are broadcast on VHF channel 68 and also available from a telephone answering service (7-4069-2821).

Race Rock, which dries 0.6m, lies 0.2 mile ENE of Turtle Head.

Hammond Rock (10°31'S., 142°13'E.), 9m high, lies on the S side of the recommended track and about 0.3 mile N of Turtle Head. A light is shown from the rock.

Caution.—Turtle Head appears as an island from a distance of 10 miles, and should not be mistaken for Hammond Rock.

Round Island, 60m high, lies on the coastal reef, 1.5 miles SW of Turtle Head.

9.27 Goods Island (10°34'S., 142°09'E.) lies 0.6 mile W of Hammond Island. Tessy Head, the NE extremity of the island, rises to Hester Hill, 67m high, close SE. The NW side of Goods Island is fringed by a steep-to coral reef. A transmitting tide gauge has been established on Goods Island. Tide gauges

transmit on VHF channel 68. Tidal heights are also available from a telephone answering service (7-4069-2821).

Ipili Reef, with some boulders on it, lies 0.5 mile N of Tessy Head, and Mecca Reef, which dries 0.6m, lies 0.2 mile farther N on a bank with less than 10m over it. The recommended track lies about 0.2 mile NW of the bank.

Sunk Reefs (10°32'S., 142°08'E.), with depths of less than 10m, extend 3 miles W from a position 2.2 miles ESE of the W end of North West Reef. There are several small drying reefs located on Sunk Reefs.

Harrison Rock, with a depth of 3.9m, lies 2 miles S of the W end of North West Reef. The rock is marked on its E side by overfalls.

Booby Island and Booby Island Light

9.28 West approach to Prince to Wales Channel.—Booby Island (10°36'S., 141°55'E.), 19m high, lies on the S side of the W approach to Prince of Wales Channel, about 14 miles WSW of the W extremity of Goods Island. A light is shown from the summit of the island.

Banda Rock, with a depth of 1.8m, lies 0.6 mile ENE of Booby Island.

A bank, with depths of less than 11m, extends 4.5 miles SW from Booby Island, with a 9.7m patch near its outer end.

Gannet Passage, 1.7 miles NW of Booby Island, leads across a ridge, with general depths of 9.4m, which connects with the bank on which Banda Rock lies.

Caution.—Owing to the unstable bottom in Gannet Passage, caused by moving sandwaves, the recommended track is amended from time to time to meet the variations in depths to those charted. A least depth of 9.8m was obtained in 2002. The lighted buoys are moved as necessary to meet the changes in the recommended track.

Varzin Shoal (10°33'S., 141°55'E.), 3.5 miles N of Booby Island, has a least depth of 2.7m, rock. It lies on the bank on the N side of Gannet Passage.

Varzin Passage lies 4.2 miles N of Booby Island and N of Varzin Shoal, and is marked by buoys. This passage, established in 1989, is the preferred W approach to Torres Strait.

Larpent Bank (10°35'S., 142°01'E.), with a least charted depth of 0.6m, hard sand, extends 4.7 miles E from a position 4.2 miles E of Booby Island.

Gerard Bank extends ENE 7.5 miles to Friday Island, from a position 7.2 miles ESE of Booby Island. The bank dries for a distance of 4 miles W of Friday Island.

9.29 Off-lying dangers in the W approach.—Carpentaria Shoal (10°45'S., 141°03'E.), with a depth of 12.8m, lies about 51 miles WSW of Booby Island and is marked by a lighted buoy.

Merkara Shoal, with a least charted depth of 6.4m, lies 16.5 miles NNE of Carpentaria Shoal.

Glamis Castle Shoal, with a depth of 10.1m, was reported to lie 31 miles N of Carpentaria Shoal. Careful, but unsuccessful searches have been made for this shoal.

Turu Cay (9°49'S., 141°25'E.) is the farthest NE of these dangers. The cay, about 0.9m high, lies on the NW side of a reef.

Deedler Reef, which dries 0.9m, is located 21 miles NNW of Glamis Castle Shoal.

Cook Shoal (10°04'S., 141°22'E.), awash, lies 23 miles ENE of Glamis Castle Shoal.

Sketty Belle Shoal, below-water, was reported to lie 13 miles SSE of Cook Shoal.

Swan Shoal, with a depth of 3.3m, lies 4.7 miles SE of Sketty Belle Shoal.

Cook Reef, crescent-shaped and awash, is about 4 miles in extent. The reef lies 4.5 miles S of Swan Shoal. A shoal patch, with a least depth of 3m was reported to lie about 2 miles S of the S edge of Cook Reef.

9.30 Proudfoot Shoal (10°32'S., 141°28'E.), a coral reef with drying rocks, lies 26 miles WNW of Booby Island Light.

Hockings Patches, 8 miles SE of Proudfoot Shoal, has a least depth of 8.8m. A depth of 10m lies 5.2 miles S of them.

Several shoal patches, with depths of 10 to 11m, exist within a 2.5 mile radius centered 6.5 miles S of Hockings Patches. The farthest S of these shoal patches lies 2.7 miles N of the W approach to Torres Strait.

Bramble Patches (10°30'S., 141°35'E.), a shoal area with a least depth of 3.4m, lie 6.5 miles E of Proudfoot Shoals.

Anchorage.—Anchorage can be taken, in 12m, sand and shells, about 4.5 miles W of Goods Island.

Directions.—Vessels bound for Prince of Wales Channel from the E should follow the recommended track leading through Great North East Channel. Those coming from the Inner Route via Adolphus Channel should follow the charted recommended track. Vessels approaching Prince of Wales Channel from the W should proceed via Gannet Passage and then follow the charted recommended track.

Caution.—Navigators are warned that the color of water in Prince of Wales Channel varies during different tidal and weather conditions. During strong winds, with the tidal current setting W, much sand is carried in the waters of the channel. At this time, the channel appears streaky and shoal-encumbered. In good weather, with the current setting E through the channel, the water is generally clear and the shoal areas can be readily ascertained.

Normanby Sound

9.31 Normanby Sound, the W and main approach to Thursday Island Harbor, lies between Friday Island and the N end of Prince of Wales Island on the S, and Goods Island, Hammond Island, and Thursday Island on the N. It is entered between **Pott Point** (10°36'S., 142°09'E.), the W extremity of Friday Island, and Tucker Point, the W extremity of Goods Island, 1.7 miles N. From the W, the sound is easily distinguished by Goods Island Light. In 1983, there was a least depth of 5m in Normanby Sound.

Tides—Currents.—In Bertie Bay, the mean range of the tide is 3m at springs and is 1.8m at neaps. The times of HW

and LW are irregular and the duration of the currents is influenced by the prevailing winds.

Tidal currents have been known to reach 8 knots.

9.32 Friday Island (10°36'S., 142°10'E.) is about 2.2 miles long and rises to a height of 112m, close to its SE extremity. The N side of the island is formed by sand beaches fronted by drying sand banks, except near its middle where it is reef-fringed.

Black Rock, 23m high, lies on a bank 0.2 mile NW of the N extremity of Friday Island. The bank, with depths of less than 5.5m, extends 0.7 mile WSW from the rock. A 6.4m patch lies 0.3 mile NNW of Black Rock.

Kunai Island, 3m high, lies 0.2 mile E of Black Rock.

Ghibber Rock (10°35'S., 142°10'E.) lies in the fairway of Normanby Sound, 0.2 mile NNE of Black Rock. There is a clear passage on either side of Ghibber Rock, but the N passage is preferred. When the rock is covered there are strong tide rips which extend across the S passage to Black Rock.

Goods Island, on the N side of Normanby Sound, between Tucker Point and Quoin Point, is fronted by a drying reef.

A spit, with depths of less than 11m, hard sand and coral, extends 1 mile SW from the SW side of Goods Island.

Goods Island rises to a hill, 97m high, 0.3 mile NE of Quoin Point. From Quoin Point to Tessy Head, the SE coast of the island is formed by a sandy beach, fronted by a drying reef.

Anchorage.—Bertie Bay or Goods Island anchorage lies between the SE side of Goods Island and **Wai Weer Islet** (10°34'S., 142°10'E.), 0.8 mile SW. Peile Reef and Brewster Reef lie on the N side of the bay. The area N of these reefs, between Goods Island and the W end of Hammond Island, is foul with reefs and sunken dangers.

Cardale Patch, with a depth of 3.9m, lies 0.6 mile W of Wai Weer Islet, and may be passed on either side.

West Wai Weer Reef, which dries 0.3m, extends about 0.4 mile W from the reef which fringes Wai Weer Islet. A reef, which dries on its inner part, extends 0.4 mile ESE from Wai Weer.

Anchorage may be obtained in the Southeast Trades, 0.7 mile W of Black Rock, in the quarantine anchorage, in 10m, with the N extremity of Black Rock bearing 098°, and the beacons E of Quoin Point in range.

Anchorage may be taken in Bertie Bay, in a depth of 8.2m, by vessels with local knowledge.

9.33 Brisbane Rock (10°35'S., 142°12'E.), with a depth of 3.1m, lies 0.3 mile NNW of Heath Point, the NE extremity of Prince of Wales Island.

Devonshire Rock, with a depth of 5.8m, lies 0.1 mile NE of Heath Point.

Tidal currents between Heath Point and Vivien Point, the SW extremity of Thursday Island, attain rates of 6 to 7 knots, and at times, 9 knots. When the current is setting against a strong Southeast Trade, there are tide rips across the channel which are dangerous to boats.

Thursday Island Harbor (10°36'S., 142°13'E.) is formed between Horn Island, Prince of Wales Island, and Thursday Island. The N and S parts of the W coast of Horn Island, which forms the SE side of the harbor, are mangrove-fringed, with a sandy beach between, backed by scrub-covered land. Double Hill, 94m high, rises 0.7 mile inland of the beach.

Madge Reefs, which dry, consists of several reefs lying roughly parallel with the W side of Horn Island and extend up to 0.7 mile offshore. There are passages between the reefs, but none are navigable.

Normanby Sound Ledge, with a depth of 5m, lies 0.3 mile ESE of Vivien Point.

Hovell Rock (10°36'S., 142°13'E.), a narrow shoal with a least depth of 3.4m, extends 0.3 mile E from a position 0.6 mile ESE of Vivien Point.

Thursday Island (10°35'S., 142°13'E.), on the N side of the harbor, rises to Milman Hill, 104m high, 0.5 mile WSW of the E extremity of the island. A prominent radio tower stands on Milman Hill.

The E and W ends of Thursday Island are reef-fringed; between which is a sandy beach, fronted by a mud bank covered with kelp. The coastal bank, with less than 5.5m, extends up to 0.2 mile offshore.

Thursday Island Harbor (10°35'S., 142°13'E.)

World Port Index No. 53300

9.34 Thursday Island Harbor (Port Kennedy) is located between the S side of Thursday Island and the N side of Madge Reef. The harbor is practically landlocked.

The port is under the jurisdiction of the Department of Transport Queensland. The local representative is the harbormaster at Thursday Island Harbor.

Queensland Ports Corporation

http://www.pcq.com.au/html/02_ports.htm

Winds—Weather.—The prevailing winds are SE from February to November and NW from November to February.

Tides—Currents.—The spring rise of the tide is 3m and the neap rise is 0.6m. It has been reported that there is a great irregularity both at the time of HW and at the height of the tide.

The flood current on the S side of the harbor attains a rate of 2 to 4 knots, and the ebb off Madge Reefs attain a rate of 4 to 5 knots.

The currents set strongly over Hovell Rock.

Depths—Limitations.—There are three channels to the port. Normanby Sound has a depth of 6.3m; Flinders Passage has a depth of 3m; and the Boat Channel, available only to vessels of light draft, has a depth of 2.7m.

There are three piers in Port Kennedy. The Main Jetty, for general cargo, is the middle jetty, and has an L-shaped head 30m long, with dolphins off each end, and a depth of 3.1m alongside. A barge ramp is situated inshore of the head.

The Caltex Jetty, the farthest E, is 23m long at its head and has a depth of 3.0m alongside. This is a T-shaped pier and oil terminal. A tank farm is situated at the root of the jetty.

Engineers Jetty, situated W of the Main Jetty is 28m long at its head and has a depth of 4.3m alongside. This berth is utilized primarily by passenger vessels.

Horn Island Jetty, across the harbor, has a berth 40m in length, with two dolphins situated just SW. The depth alongside is 4m. Passenger ferries dock here.

The maximum allowable draft at the port is 5.4m.

Thursday Island Anchorage

Thursday Island from SE

Aspect.—The Grand Hotel, with its name in white letters on the roof, is situated about 0.2 mile NNW of the main jetty, and the church about 0.3 mile WNW of the hotel, is conspicuous from the harbor. The hospital buildings on Vivien Point are conspicuous.

Pilotage.—Pilotage is compulsory for all vessels 50m long and over, except vessels exempted by law, and additionally for foreign vessels 35m long or more crossing Hovell Bar. Pilotage is available 24 hours a day for vessels les than 85m and during daylight hours only for vessels greater than 85m. Pilots come from Cairns and must be requested at least 72 hours in advance. Pilots will contact the ship on VHF channel 16 about 45 minutes prior to boarding time.

Pilots board, as follows:

1. From the E—South of Chapman Reef.
2. From the W—South of Tucker Point on Goods Island.
3. From the S—West of Boat Channel Lighted Buoy.

Regulations.—The port is a first port of entry. Customs officers board the vessel at the wharf.

An underkeel clearance of 1m in draft is required.

Vessels should maintain a continuous listening watch on VHF channel 16 when transiting the area

Signals.—A red pennant displayed at the Post Office flagstaff, at the meteorological station on Green Hill, or from Goods Island Light Station, indicates that a storm warning has been received. The radio station near Vivien Point transmits weather bulletins, navigational warnings, and storm warnings.

Anchorage.—The most convenient anchorage during the SE

Trades is 0.1 mile N of the E end of Hovell Rock in sand and mud, over a little clay and granite.

Vessels of more than 6.7m draft should leave the harbor before LW near spring tides and anchor between Hovell Rock and Heath Point, in 8 to 9m.

Vessels are prohibited from anchoring within 0.3 mile E or W of the Main Jetty, or within 0.1 mile S of it.

Shallow draft vessels often swing in an opposite direction to deep-draft vessels, and those in one part of the harbor in an opposite direction to those in another.

Directions.—Vessels should approach Thursday Island Harbor from the W through Normanby Sound.

Channels North of Prince of Wales Channel

9.35 A number of islands and reefs, with channels between them lie between Prince of Wales Channel and Jervis Island, 32 miles N.

Dayman Channel, Simpson Channel, Yule Channel, Bramble Channel, and Napoleon Passage, which lie parallel to Prince of Wales Channel, are unsuitable for deep-draft vessels. Banks Channel (Moa Channel) and Bligh Channel are known to be shallow and intricate. A light-draft vessel wishing to attempt any of these channels from either direction, should first send boats to mark the below-water dangers in the entrances. Even with this precaution, a vigilant lookout from aloft must be kept, and in no case should the attempt be made except in good light.

There is no route for deep-draft vessels N of **Jervis Island** (9°57'S., 142°11'E.).

In all of the above channels, the tidal currents are strong and uncertain, and there are few marks for fixing a vessel's position.

During the period of the Northwest Monsoon, the water in these channels is frequently so discolored that it is almost impossible to detect the positions of the various reefs and shoals.

9.36 **Dayman Channel** (10°28'S., 142°12'E.) lies between North West Reef and South Torres Reef, and is 1 to 2 miles wide.

Patches, with depths of 2.7 to 5.5m, lie in the W entrance of the channel.

The tidal currents are strong and set in the general direction of the channel.

South Torres Reef, which dries 3m, is about 8 miles long and has a greatest width of about 0.8 mile. Depths of less than 5.5m extend a short distance W from the reef.

Simpson Channel lies between South Torres Reef and North Torres Reef. This channel should only be navigated by vessels with local knowledge.

North Torres Reef, which dries 3m, lies 1.2 miles N of South Torres, and foul ground extend 1.5 miles E from North Torres Reef. The S side of the reef is well defined and steep-to.

Caution.—White Rocks (10°28'S., 142°02'E.), 7.6m high, is a group of bare rocks which lies on a drying reef, 5.5 miles W of South Torres Reef.

Fantome Reef, with a depth of 4m, lies 6 miles W of White Rocks. Both Fantome Reef and White Rocks lie on the extensive bank which extends N from Gannet Passage.

9.37 Yule Channel lies between North Torres Reef and Hawkesbury Island. The W part of the channel is foul with reefs and sunken dangers. The channel has not been adequately surveyed, and except in a case of necessity, should not be attempted.

Hawkesbury Island (10°22'S., 142°08'E.) rises to a ridge of craggy peaks, 146m high, near the S end.

Hawkesbury Reefs extend 2 miles N and 8.5 miles E, respectively, from Hawkesbury Island.

Channel Islet, 27m high, lies on the N edge of the E part of Hawkesbury Reefs.

West Island (10°21'S., 142°03'E.) rises to a height of 85m in its E part. The island lies 3.2 miles W of the N end of Hawkesbury Island.

West Shoal extends 2.5 miles W from a position close W of West Island.

Several dangerous coral patches lie within 3 miles SW and 1.2 miles S of Hawkesbury Island, partly blocking the W entrance of Yule Channel.

Bramble Channel is bound on the S by the N side of the shoal enclosing **Stonehenge** (10°19'S., 142°06'E.) and Tuft Rock, and by the N edge of Hawkesbury Reef, and on the N by Long Reef and the bank on which the Duncan Islands lie, at the W end of Long Reef.

Long Reef dries and extends 12 miles W from its E extremity. A drying coral reef lies 2 miles SSE of the E extremity of Long Reef.

Travers Island, 34m high, lies on a drying reef, 5 miles SE of Long Reef.

The Duncan Islands, consisting of five rocky islands, together with numerous islets and rocks, extend 4.7 miles NW from **Spencer Island** (10°17'S., 142°06'E.). Spencer Island is moderately high and lies on the S edge of the bank on which the other Duncan Islands lie.

Spencer Rock, with a least depth of 1.8m, lies about 0.5 mile WSW of Spencer Island.

There are numerous dangers charted in the vicinity of the Duncan Islands and the W end of Long Reef.

9.38 Banks Channel (Moa Channel) lies between Long Reef and the Duncan Islands on the S, and the SW side of Banks Island and Mulgrave Island (Badu Island). South Bank extends 10 miles W from Mulgrave Island on the N side of Banks Channel.

The E part of Banks Channel is wide, well-defined, and, with one exception, clear of dangers, but rocks, islets, and shoals render the W entrance intricate and dangerous.

The tidal currents in Banks Channel set through in the direction of the channel and sometimes attain a rate of 5 knots.

Banks Island is low on the W and hilly on the E side. **Mount Augustus** (10°09'S., 142°19'E.), 380m high, is located on the NE extremity of the island.

Mulgrave Island (Badu Island) rises to a height of 200m, 2.7 miles N of **Rugged Point** (10°11'S., 142°08'E.), its S extremity.

There are a number of islets and dangers charted 2 miles S and 4 miles SSE, respectively, from Rugged Point.

9.39 **Bligh Channel.—**Bligh Channel, known locally as Alligator Passage, lies between the islets and reefs off the N side of Mulgrave Island, and the bank that lies 2.7 miles W of

the NW extremity of Mulgrave Island on the S side, and by **Jervis Reef** (Mabuiag Reef) (10°00'S., 142°08'E.) and the numerous shoals and coral reefs which extend S from that reef, on the N side. The navigable part of the channel is barely 0.2 mile wide at its W entrance.

As the tidal currents set through the channel at a great rate, Bligh Channel may not only be considered intricate, but dangerous for those without local knowledge.

The dangers in the E approach to Bligh Channel are best seen on the chart.

Napoleon Passage lies between Jervis Reef on the S side, and Basilisk Bank (10°00'S., 142°18'E.), Passage Island, Jervis Island, and the foul ground extending W from the latter island, on the N side.

Napoleon Passage is the N passage through the Torres Strait. The passage has a least width of 0.4 mile, but it has not been closely examined and numerous dangers lie in it. The tidal currents set strongly through it.

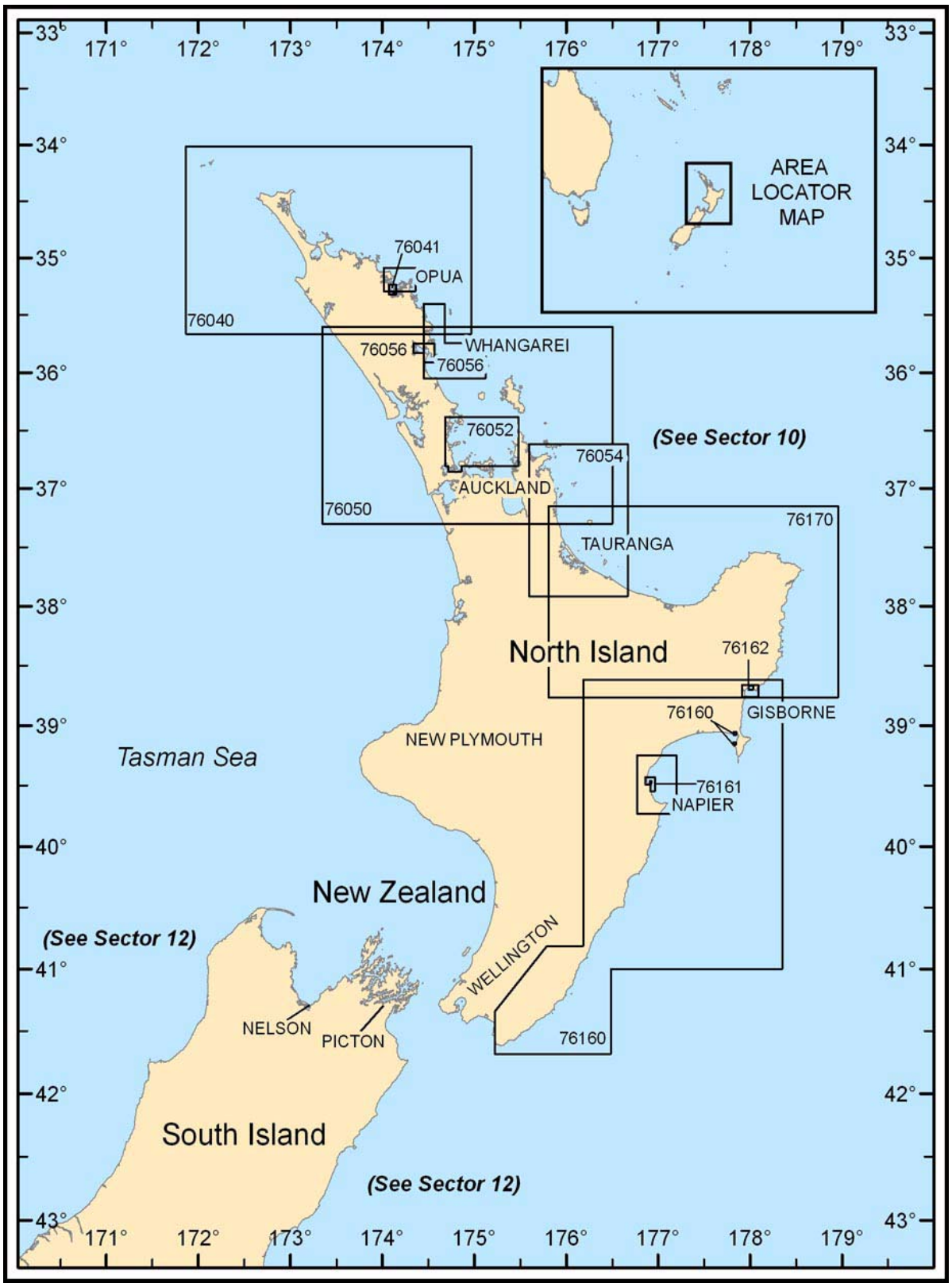
Napoleon Passage should be attempted only by vessels with local knowledge and then under the most favorable of conditions.

Jervis Island (Mabuiag Island) (9°57'S., 142°11'E.) rises to a height of 160m, 0.9 mile N of its S extremity. Shoal water extends about 13 miles W from Jervis Island.

Orman Reef (9°54'S., 142°15'E.), which has been partially examined, forms the SE side of the area of unexamined coral reefs which lie in the N part of Torres Strait, between Jervis Island and the coast of Papua.

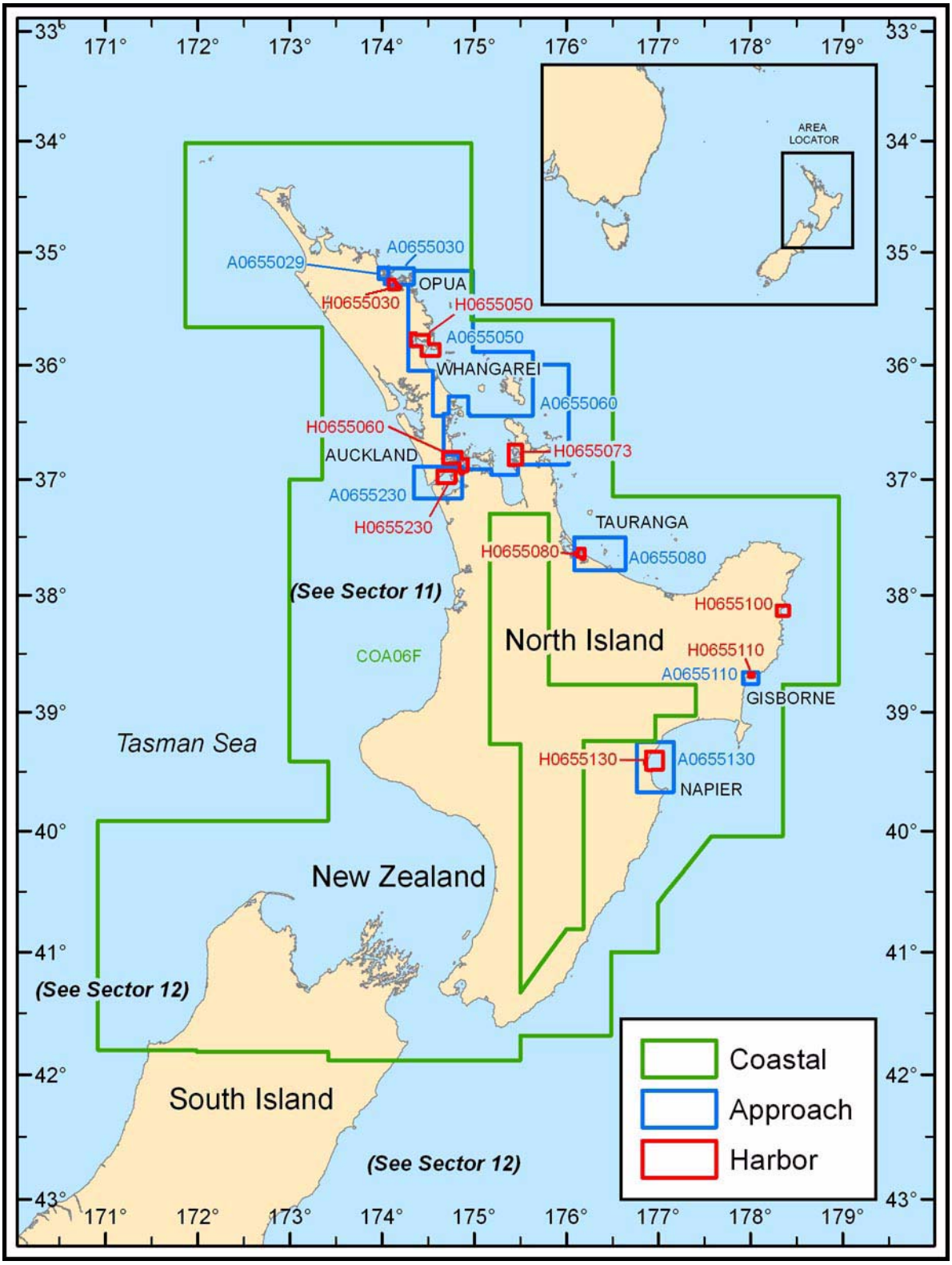
From a position 2 miles N of the E extremity of Jervis Island, the outer edge of Orman Reef has been traced as extending 4 miles SE, then about 18 miles NE. The reef then turns WNW for about 13 miles.

For the coast of Papua, see Pub. 164, Sailing Directions (Enroute) New Guinea.



Additional chart coverage may be found in NGA/DLIS Catalog of Maps, Charts, and Related Products (Unlimited Distribution).

SECTOR **10** — CHART INFORMATION



Additional DNC library coverage may be found in NGA DNC 6 (Limited Distribution) disc within the README\GRAPHICS folder.

SECTOR 10 — DNC LIBRARY INFORMATION

SECTOR 10

NEW ZEALAND—NORTH AND EAST COASTS OF NORTH ISLAND

Plan.—The descriptive sequence of this sector is from N to S. The narrative begins with a description of Three Kings Islands, a group lying about 30 miles WNW of Cape Maria Van Diemen, the NW tip of North Island. The account then continues from this NW extremity with a coastal description to East Cape. Lastly, the description continues SW from East Cape to Cape Palliser, the S tip of North Island. The W shore of North Island, from Cape Maria Van Diemen S to Cape Palliser, is described in Sector 11.

General Remarks

10.1 The Dominion of New Zealand is comprised of three main islands, North Island, South Island, and Stewart Island. Additionally, the Chatham Islands, the Kermadec Islands, the Bounty Islands, the Antipodes Islands, Campbell Island, and the Auckland Islands are also part of New Zealand.

North Island is hilly and mountainous. Also, there are large areas of plains. Although North Island was formerly heavily forested, the density is being reduced.

Very few rivers in North Island are navigable due to their speed and the high relief of the country; mostly all are obstructed by bars at their entrances.

In North Island, mountains occupy 10 per cent of the total surface. Four volcanic peaks rise to heights greater than 2,000m, as follows:

1. Egmont—2,517m high.
2. Ruapehu—3,056m high.
3. Ngauruhoe—2,290m high.
4. Tongariro—1,968m high.

Winds—Weather.—On rare occasions, at about 30-year intervals, a tropical storm may cross the N end of New Zealand. More frequently, a heavy swell is encountered off the N coast produced by storms at some distance to the N. Local tornadoes occur occasionally over land, later appearing as waterspouts as they lead E over the sea.

Winds are variable in speed and direction over the whole of New Zealand. Periods of strong winds occur during all seasons. Sea breezes develop during clear summer days in the vicinity of North Island.

Rough seas are common at all times of the year, especially S of 40°. Swell is also a feature of the waters around New Zealand, with heavy swells occurring throughout the year on 10 to 15 per cent of occasions, and during the S winter, this figure increases to 30 to 40 per cent, especially over the ocean to the E.

Ice.—Both pack ice and icebergs may be found in the vicinity of New Zealand, although occurrences will be rare.

Tides—Currents.—On the coasts of New Zealand, the tides are semi-diurnal, with the greatest range occurring when the moon is at perigee. On the E side of North Island, tidal currents set N with a rising tide and S with a falling tide, except in Hauraki Gulf, where the directions are reversed.

The primary current in that section of the South Pacific Ocean that affects New Zealand is the East Southern Ocean Current, between the parallels of 40°S and 60°S. North of 40°S, currents are light and variable.

The main currents in the vicinity of New Zealand are influenced by the winds and are therefore variable. There is some predominance of current in a NE direction off the W coasts of North Island and South Island; this current continues in a clockwise direction rounding North Cape of North Island, setting SE to **East Cape** (37°41'S., 178°33'E.). This flow continues as a S set along the E coast, about 55 miles, to the vicinity of Gable End Foreland. This circulation is reported to be more apparent in summer and in most parts never exceeds 2 knots, except N of North Island.

Seismic Sea Wave Warning System.—The signal to warn vessels in New Zealand harbors of the approach of seismic sea waves or tsunamis resulting from earthquakes in any part of the Pacific is a series of long blasts on sirens. In some harbors, vessels will be warned by the harbormaster. See Pub. 120, Sailing Directions (Planning Guide) Pacific Ocean and Southeast Asia for further information.

Caution.—Volcanic activity was reported (1992) centered in position 36°22'S, 177°57'E.

A voluntary code of shipping routes around the New Zealand coast, to reduce the potential for pollution of the marine environment, has been introduced. For further information, see Pub. 120, Sailing Directions (Planning Guide) Pacific Ocean and Southeast Asia.

Regulations.—Any vessel over 100 gross tons should contact the Regional Harbormaster before anchoring on the coast or entering any harbors.

The Three Kings Islands

10.2 The **Three Kings Islands** (34°09'S., 172°06'E.), a wildlife sanctuary, is a cluster of uninhabited islands that lie about 31 miles NW of Cape Reinga, the NW tip of North Island. It has been reported that Three Kings Islands are radar conspicuous at a distance of 28 miles.

Great Island, the largest of the group, is 294m high, and is indented on its NW and SE sides, respectively, by Northwest Bay and Southeast Bay.

Tides—Currents.—The tidal currents between these islands attain rates of up to 3 knots and the races frequently give the appearance of shoal depths.

Aspect.—King Bank lies about 14 miles NE of Great Island and has a least depth of 28m. Tide rips show up on the NE side of the bank. King Bank is located at the SE termination of North Maria Ridge, which projects about 35 miles NW of Great Island and ends in Gobey Bank, with a depth of 244m.

Middlesex Bank, with a least depth of 90m, lies 21 miles NW of Great Island. Tide rips occur on the NE side of the bank, which is very steep. Middlesex Bank lies on the South Maria Ridge, which extends about 35 miles NW of from West Island. Three Kings Trough is located between North Maria

Ridge and the South Maria Ridge.

Anchorage.—Vessels with local knowledge can obtain anchorage in either bay, in depths of 30 to 50m, sand and gravel, in fair weather. Additionally, there is an anchorage, with smooth water during strong NE weather, on the SW side of Great Island, in depths of 30 to 50m, rock. The bottom between the different islands, and for a distance of 1 mile off them, is rock, coral, and patches of coral sand.

Farmer Rocks, 5m high, lie 0.5 mile E of the NE side of Great Island. A rocky patch, with a least depth of 2.4m, lies up to 0.2 mile E of the outer above-water rock off the SE tip of Great Island. A rock, with a depth of 6.9m, lies 0.2 mile WNW of Crater head, the NW tip of Great Island.

South West Island lies about 2.5 miles WSW of Great Island. Princes Islands extend about 2 miles W of South West Island to West Island, which is 176m high.

Directions.—Vessels from the W, bound for Auckland Harbor or a port on the E side of North Island, should identify Three Kings Islands, which may be passed on either side.

Cape Maria Van Diemen to Hauraki Gulf

10.3 Cape Maria Van Diemen (34°29'S., 172°39'E.), the NW tip of North Island, appears as an island, and projects 88m high from a sandy isthmus. This cape has been reported to give good radar returns at up to 18 miles. Close NW of the cape is a double islet, named Motuopao, with no safe channel between. An abandoned prominent lighthouse stands on the islet.

Tides—Currents.—The tidal currents between Cape Maria Van Diemen and Middlesex Bank, 54 miles NW, attain rates of 1.5 to 4 knots. Races and overfalls are common between Cape Reinga and Pandora Bank. Between Burt Bank, 19 miles NW of Cape Maria Van Diemen and Middlesex Bank, the current sets SW from about 5 hours to 1 hour before HW at Westport, and NE from about 1 hour to 5 hours after HW at Westport. About 2 miles SW of Cape Maria Van Dieman, the current sets SE from about 6 hours to 2 hours before HW at Westport, and NW from about HW to 5 hours after HW at Westport.

Cape Reinga (34°25'S., 172°41'E.) lies 4 miles NNE of Cape Maria Van Dieman; the bight between the two being foul ground. Cape Reinga is reportedly radar conspicuous at 23 miles.

Columbia Bank, over which the sea continually breaks, lies 0.5 to 1.5 miles W of Cape Reinga.

Spirits Bay is entered between Cape Reinga and Hooper Point, and it is backed by a coast that is steep and cliffy with a sandy beach. A sandy islet, 9m high, lies 0.3 mile SSE of the W tip of Hooper Point. This islet is connected to the coast at its S end by a reef that dries.

Pananche Islet, a rock nearly 1m high that is continually breaking, lies 0.3 mile WSW of Hooper Point. Tidal currents set strongly between the rock and Hooper Point, causing eddies and swirls. There is a channel between the rock and the mainland with a depth of 12.8m.

The coast between Hooper Point and North Cape, about 9.5 miles E, is rocky, alternating with sandy bays. Its general aspect is that of steep cliffs undermined by the sea, and topped by scrub-covered tableland.

Tom Bowling Bay lies 6 miles E of Hooper Point, is backed by Waikuku Flat, a low neck of marshland and sand dunes. Waikuku Flat projects across to the E coast and joins the headland of North Cape to the mainland. Surville Cliffs forms the bold tip of North Cape.

Tides—Currents.—The flood current sets W, with the ebb setting E, along the shore between Cape Reinga and North Cape, attaining rates of 3 knots off Cape Reinga and 1 knot off North Cape.

Anchorage.—Spirits Bay affords good anchorage, as charted, with winds from the E to SW to S, in depths of 16.5 to 20.1m, about 1 to 1.5 miles offshore abreast the sandy beach. With like winds, there is good anchorage in Tom Bowling Bay, 0.5 to 0.7 miles offshore, in depths of 15 to 20m, sand.

10.4 North Cape (34°24'S., 173°02'E.), a bold cliffy headland, is the NE tip of North Island. North Cape has a reddish appearance from the offing, and has been reported radar conspicuous at 20 miles. Murimotu, a small peaked islet, 93m high, lies close E of North Cape and is connected to it by a ledge of rocks. Foul ground projects 0.5 mile NE from the islet, and a rock, uncovered at LW, lies at its outer end. The N end of North Island is a peninsula, and from it a sandy neck, 7 miles wide, extends SE 30 miles. A range of white sand hills, 30 to 91m high, extends nearly the whole length of the neck.

The coast from North Cape trends south 6.2 miles to Ohao Point (Coal Point), a black water-worn bluff and the outer N entrance point to Parengarenga Harbor.

Anchorage.—Anchorage may be found, in a depth of 21.9m, about 1 mile offshore off Waikuku Beach. This anchorage is sheltered from winds from the N through W to SSW; a swell setting in gives warning of the approach of E winds.

Caution.—North Cape should not be approached to within a distance of less than 1 mile.

10.5 Parengarenga Harbor (34°32'S., 173°01'E.) is a small harbor that can only be utilized by small vessels with local knowledge.

The inner N entrance point of Parengarenga Harbor is Ngamaru Point, which lies 1.2 miles SW of Ohao Point. Ngamaru Point is low, sandy, and hard to make out from seaward. The S inner entrance point lies about 0.5 mile S of Ngamaru Point and is formed by white sand hills. A shoal, with a depth of 1.2m, lies 1 mile ENE of Ngamaru Point.

Koteonepore Spit, which breaks, projects about 0.8 mile E from the S entrance point. The entrance channel to the harbor lies between this spit and Ngamaru Point; across its outer end is a bar that usually breaks with an E swell.

A shoal, with a depth of 1.2m, lies 1 mile ENE of Ngamaru Point.

The depths in the entrance are subject to unpredictable change and local knowledge is essential for entry.

Anchorage.—Vessels with local knowledge can obtain anchorage, in depths of 12.8 to 14.6m, about 0.3 mile SW of Ngatehe Point.

Great Exhibition Bay lies close S of the entrance to Parengarenga Harbor and is notable for a curving sandy beach that terminates at Paxton Point, about 11.5 miles SSE. Rawawa Beach projects about 1.2 miles SE from Paxton Point, and in Henderson Bay, NW of Grenville Point, 5.5 miles SE of Paxton Point, there is another sandy beach 2 miles long.

Simmonds Islands, comprised of two islets, lie about 0.5

mile N of Grenville Point. An islet lies about 0.2 mile further N. Grenville Point is steep and rises to 61m.

Rangaunu Bay is entered between Grenville Point and Cape Karikari, 12 miles E. General depths of 36.6 to 45.7m lie in the entrance of Rangaunu Bay; depths of 20m lie within 2 miles of the coast. A rocky patch, with a depth of 8.2m, lies 6.5 miles WNW of Cape Karikari.

10.6 Southwest shore of Rangaunu Bay.—The shore between Grenville Point and Perforated Point, 1 mile SSE, recedes to form a small bay with a sandy beach at its head. The cliffy coast then continues from Perforated Point, 1.2 miles SSE, to Farmer Point.

Houhora Bay is entered between Farmer Point and Stanley Point, 1 mile S. Mount Carmel, 235m high and lying 0.6 mile W of Stanley Point, is a prominent peak that is the highest in elevation on this coast.

Houhora Harbor (34°49'S., 173°09'E.) is entered 0.5 mile W of Perpendicular Point, which lies SW of Stanley Point. A sand spit, on which the sea breaks, projects about 0.5 mile ESE from the S entrance point. Tidal currents attain rates of 4 knots. Houhora Harbor should only be entered by vessels with local knowledge.

Within the narrow entrance, the channel winds through drying flats to the head of the harbor 5.5 miles NW. Pukenui is the S of the several towns that front the W shore of the harbor, where there is a wharf. The beaconed channel has a least depth of 1.8m over the bar, and 4.9m above the bar.

Anchorage.—Anchorage may be obtained by vessels with local knowledge in Houhora Bay, sheltered from winds from N through W to S, in depths of 3 to 6m.

Directions.—Recent local knowledge is required for entry to Houhora Harbor. From a position about 0.4 mile S of Perpendicular Point, vessels entering Houhora Harbor head for Tokoroa Islet and Motuotuna Islet, in line bearing 304°. When abeam the mole on the N entrance point, vessels should maintain a mid-channel course passing SW of Tokoroa Islet. After crossing the bar, vessels follow the marked channel on the S and W shore of the harbor to Pukenui.

10.7 Southeast shore of Rangaunu Bay.—Cape Karikari (34°47'S., 173°24'E.) represents the E entrance point of Rangaunu Bay. The coast 1.2 miles SSW leads to Taumatara Point, the S entrance point of Whataru Bay. Above-water and sunken rocks project 0.2 mile N, 0.3 mile W, and 0.3 mile SW of Taumatara Point. Maraewhiti Point, from which drying rocks project 0.3 mile W, lies about 0.7 mile S of Taumatara Point, and is the N entrance point of Karikari Bay.

Blackney Point (34°52'S., 173°17'E.) lies 6 miles SW of Maraewhiti Point, and between them there is a sandy beach backed by sandy ridges covered with scrub and swampy ground.

Puheke is a prominent grass-covered flat-topped hill, 132m high, lying 2.5 miles E of Blackney Point.

The Awanui River from North

10.8 The Moturoa Islands are made up of four primary islands, together with several islets and rocks, all lying within 3 miles WNW of Cape Karikari. There are several deep channels within the group, and between them and Cape Karikari, but local knowledge is required to navigate them.

Staffa Rock, with a depth of 3.4m, lies about 3.5 miles W of Cape Karikari; the sea seldom breaks over this rock.

Rangaunu Harbor (34°52'S., 173°17'E.) is entered via the Awanui River, which flows into the harbor at the head of Rangaunu Bay. This port should not be entered without local knowledge.

The entrance channel to the harbor is between Motutara Rocks, which lie off Blackney Point, and Te Puke te Huri, a sandy spit that usually breaks and has depths of less than 2m. Depths in the channel vary from 6 to 10m, except for a 4.5m patch lying 1 mile SSW of Motutara Rocks.

Sheigis Rock, above-water, lies on a reef, which dries 2m and extends 0.3 mile W from the shore, about midway between Kotiatia Point and Wairakia Point, about 1.5 miles SSE. There is a depth of 4m, 0.2 mile S of the beacon, close SW of the leading line.

Tides—Currents.—The tidal currents set in the direction of the channels and attain rates of up to 3 knots off Kotiatia Point.

Anchorage.—Vessels with local knowledge can obtain anchorage, in a depth of 7m, about 0.3 mile NW of Scheigis Rock Beacon.

Directions.—No vessel should attempt to enter this river without local knowledge. To enter the Rangaunu River, pass approximately 0.8 mile W of Motutara Rocks on a course of about 182°. This course leads midway between the spit that projects about 1.5 miles NW from Kotiatia Point and the E tip of Te Puke te Huri Spit, about 0.2 mile further NW, over a depth of about 6m. Course should be changed when the leading lights come into range bearing 137.7°, keeping them in line, passing between the lighted beacons in the entrance to about 0.2 mile SW of Sheigis Rock. There is a depth of 4.6m, 0.5 mile S of Sheigis Rock, and a depth of 3.3m, 0.5 mile SW of the same rocks on the range line. Lesser depths lie close to the track. When Scheigis Rock Beacon is in line with Kotiatia Point, bearing about 338°, the vessel should steer 186° to pass close E of Tohunga Lighted Beacon. From Tohunga Lighted Beacon, the channel leads generally SSW with a least depth of about 4.9m, decreasing to 1.1m NE of The Junction.

Extensive local knowledge is necessary to proceed past Tohunga Lighted Beacon.

10.9 Cape Karikari (34°47'S., 173°24'E.) is the E entrance point of Rangaunu Bay. Knuckle Point, the NW entrance of Doubtful Bay lies 5.5 miles SE of Cape Karikari.

Matai Bay lies midway between Cape Karikari and Knuckle Point and is bisected by a narrow peninsula into two inner bays, named Ohungahunga and Waikato Bays. Waikato Bay, the SE bay, is foul; the hills on its E side are remarkably red.

A rock, which is steep-to and is covers at HW, lies in the approach to Matai Bay, about 2.5 miles SE of Cape Karikari. A rock, which dries 2.3m, lies in the approaches to Whangatupere Bay, 0.9 mile NNW of Knuckle Point. A 5.6m shoal lies 1.9 miles S of Knuckle Point.

Anchorage.—There is an anchorage in Ohungahunga Bay, in a depth of 9.1m, sand. However, during NE winds this bay is considered to be unsafe as an anchorage.

Doubtless Bay is entered between Knuckle Point and Berghan Point, about 5.7 miles SE. Berghan Point is 170m

high, steep-to on its E side, with a few scattered trees upon it. There is a flat-topped islet close off the point.

The N shore of Doubtless Bay, distinguished by its steep, rocky nature, is backed by the Rangiawhia Range, 61 to 122m high, and covered with scrub, kiwi, and gorse.

Anchorage.—Good anchorage, sheltered from N winds, may be found in Doubtless Bay, about 5 miles SW of Knuckle Point, in a depth of 14m, sand and shell. Vessels approaching this anchorage pass 1.5 miles S of Knuckle Point and 0.7 mile N of the 6m rocky shoal.

Caution.—Albert Reef, which lies 2.2 miles WSW of Berghan Point, is comprised of a rock, 2m high, a rock, which dries 2.6m, and an 8m patch. All of the above dangers are steep-to.

Fair Way Reef, 3.7 miles WSW of Berghan Point, dries 2.6m. A navigable channel, which can be utilized by a vessel with local knowledge, lies between Albert and Fair Way Reefs and the E shore of Doubtless Bay. This channel is about 1 mile wide and has a least depth of about 13.7m. A rocky shoal, with a depth of 6m, lies 3 miles NW of Fair Way Reef. A shoal, with a depth of 9m, lies 1.5 miles WSW of Fair Way Reef.

10.10 Mangonui Harbor (34°59'S., 173°32'E.) (World Port Index No. 55010) is located in the SE part of Doubtless Bay, and is suitable only for small vessels with local knowledge; the port is primarily a fishing port. The town of Mangonui is situated on White Point, 0.7 mile SE of **Rangikapiti Head** (34°59'S., 173°31'E.)

An obstruction was reported (1987) to lie in the entrance, about 0.4 mile ESE of Rangikapiti Head.

Tides—Currents.—Tidal currents attain a rate of 1 knot in the entrance, but are stronger off the pier, where tide rips and overfalls may occur. With strong NW winds, a swell sets into the harbor.

Depths—Limitations.—From the harbor entrance, depths gradually decrease to 4 to 4.9m on the bar.

The wharf at Mangonui is L-shaped, with a berthing face having a length of 35m and depth alongside of 6.1m. General depths of 7.6 to 8.8m exist WNW of White Point, but shoals rapidly.

Anchorage.—Vessels with local knowledge can obtain anchorage in the fairway of the port, in depths of 5.5 to 9.2m, according to draft; it is advisable to moor.

In moderate weather, good anchorage may be found outside the harbor entrance, in 11 to 12.8m.

Vessels are cautioned not to anchor in the vicinity of the submarine cable laid across the entrance NW of White Point.

The coast ESE from Berghan Point to the W entrance of Whangaroa Bay, 7.5 miles ESE, is mostly bold and cliffy. Tekura Rocks lie close off the coast, about 1 mile SE of Berghan Point. Taemaro Bay lies about 0.7 mile S of these high rocks, but affords no shelter. The entrance to Motukahakaha Bay lies between Tutonu Point, located 3.2 miles ESE of Berghan Point, and a point 3.2 miles E of it.

10.11 Whangaroa Bay (34°59'S., 173°45'E.) is entered between Karaui Point, which lies about 1.2 miles E of the E entrance point of Motukahakaha Bay, and a point 6 miles further ESE.

Kawa Rock (34°58'S., 173°43'E.), on the W side of Whangaroa Bay, is flat-topped and 2m high. Several rocks lie 0.2 mile NW of Kawa Rock.

Taupo Bay (34°59'S., 173°43'E.) is entered between a point about 0.5 mile S of Kawa Rock and False Head, about 1.2 miles SE. False Head is a prominent bluff headland.

Anchorage.—Vessels with local knowledge can obtain anchorage in Taupo Bay in W winds, in a depth of 9.1m, 0.3 mile offshore. Closer in the depths shoal rapidly. The bottom at this anchorage is mostly sand and fine gravel.

North Head, the W entrance point of Whangaroa Harbor, lies 1 mile ESE of False Head. South Head, the E entrance point, lies about 0.5 mile ESE of North Head.

Caution.—Frenchman Rock, 44m high, lies 3 miles ENE of South Head. A depth of 11.2m lies 0.3 mile NE of Frenchman Rock. Arrow Rocks, which lie 2 miles ENE of South Head, are surrounded by rocks which should be given a wide berth due to strong tidal currents in this vicinity.

Stephenson Island, 129m high, lies in the entrance to Whangaroa Bay. Cone Island lies off the NW side of Stephenson Island, and the narrow gap between is blocked by a reef that dries 2.5m, Kawhiti Reef, which dries 0.5m, lies 0.2 mile NW of the NW tip of Cone Island. Also, three rocks, 13 to 20m high, lie off the SW side of Stephenson Island. On the W side of the island are two bays blocked by rocks; off the E and NE sides, several rocks lie close offshore.

Huahine Shoal, with a depth of 11.7m, lies 3.5 miles NNE of the NW tip of Stephenson Island.

Tides—Currents.—Within Whangaroa Bay and off this part of the coast, the current sets W with the flood and E with the ebb. A section of this current runs SW through the channel between North Head and South Head into Whangaroa Harbor on the flood and NE on the ebb.

Anchorage.—Vessels with local knowledge can obtain good shelter from S winds anywhere between Stephenson Island and the coast, in depths of 16.5 to 20.1m. The bottom here is usually sand, stones, or broken shells.

Taurarga Bay, E of the entrance to Whangaroa Harbor, offers safe anchorage for small vessels, in depths of 6 to 10m. A reef, which dries 1.5m, lies on the E side of the approach 0.2 mile WNW of Te Arina Point, the E entrance point.

10.12 Whangaroa Harbor (35°02'S., 173°44'E.) (World Port Index No. 55000) is a fishing and small craft harbor available to those vessels with local knowledge. The entrance to the harbor, at the S end of Whangaroa Bay between North Head and South Head, is through a narrow channel, 0.5 mile long, with high and steep-to sides.

Tides—Currents.—Tidal currents attain rates of 1.5 to 2 knots within the entrance and 0.5 knot in the harbor. In the main channel, N and S of Ohauroro Island, eddies and irregular currents are not unusual.

Depths—Limitations.—The least depth in the 0.5-mile long channel is 7.9m; within the entrance, depths are mostly irregular. A least depth of 7.8m can be carried as far as the wharf at Whangaroa, 2.5 miles within the entrance.

Whangaroa Wharf has a depth of 5m alongside its outer end, and has berths for two small vessels. This wharf extends NW from a point abreast the town of Whangaroa.

The shore immediately E of the entrance of Whangaroa Harbor is indented by Tauranga Bay. Tauranga Bay affords anchor-

age, in a depth of 7.5m, to those small vessels with local knowledge.

Aspect.—In the vicinity of the entrance to Whangaroa Harbor, the land is high; the coast is steep and cliffy. Around the harbor, except for the head, the land is high and steep. Deep fissures penetrate the shore and cubical masses of rock are stacked upon each other, particularly at the head of Pekapeka Bay. St. Peters and St. Pauls, two prominent cupola-shaped hills, are located on opposite sides of the harbor, about 2.5 miles within the entrance.

Ohauroro Island, about 108m high, prominent and steep-to, lies 0.7 mile within the entrance.

Regulations.—Entrance into Whangaroa Harbor is limited to vessels under 100m in length and all vessels over 100 gt must file a passage plan with the Regional Harbormaster.

Anchorage.—Pekapeka Bay (35°01'S., 173°45'E.) lies on the W side of the harbor close W of the entrance and affords the best anchorage. Two rocks, which almost cover at HW and are each marked by a beacon, lie in Pekapeka Bay. with deep water between. The E rock lies 0.5 mile W of the harbor entrance and the W rock 0.1 mile further WNW. A shoal bank, with a least depth of 5.9m at its outer end, projects 0.2 mile N from the S entrance of Pekapeka Bay. Between this bank and the above rocks there is a channel 150m wide with depths of at least 10m.

Vessels with local knowledge entering Pekapeka Bay pass about 100m S of the above two rocks and anchor, in a depth of 9.1m, about 0.2 mile W of them. This is a good anchorage out of the tidal currents and free from eddies. Additionally, there is anchorage E of the above two rocks, in depths of 10 to 14.6m, however, this anchorage is barely out of the tidal currents or swell which runs through the entrance with strong E winds.

Vessels with local knowledge can also find anchorage within one of the three bays on the E side of the harbor entrance, almost out of the tidal currents. A bar, with a depth of 6.2m, obstructs the entrance to the N bay N of Ohauroro Island.

Secure anchorage was reported in N to NE gales, and also in SW gales, in a depth of 14.6m, sand and mud, about 0.6 mile SSW of Ohauroro Island.

In summer Pekapeka Bay is frequented by yachts. It is recommended that larger vessels anchor 3 miles SSE of Puketamoi Point in position 35°01.8'S, 173°45.0'E.

Caution.—The head of Whangaroa Harbor, S of Red Islet, is shallow with mud flats that dry about 1.0 mile offshore.

10.13 East Bay lies about 3.2 miles NE of the entrance of Whangaroa Harbor. A rock, with a depth of less than 2m, lies in the center of the entrance of East Bay, 0.7 mile SE of Frenchman Rock.

Flat Island (34°59'S., 173°52'E.), 30m high and bare, lies about 2.5 miles E of Frenchman Rock. Although the N tip of Flat Island has the appearance of a shelving point, there is a depth of 31m about 0.2 mile off it. A depth of 19.3m lies about 0.5 mile N of Flat Island. Motuekaiti Island, 29m high, lies halfway between Flat Island and the shore.

Opounui Point (35°01'S., 173°53'E.), 74m high, is a rocky headland that lies about 2.2 miles SE of Flat Island. A rock, 1m high, lies 0.2 mile N of the point.

The coast SE from Opounui Point, about 1.5 miles to the N entrance of Matauri Bay, is generally bold and cliffy, and indented with some small sandy coves. The W portion of Matauri Bay is a beach on which there is generally surf.

Anchorage.—Vessels with local knowledge can obtain anchorage, in a depth of 4m, in Matauri Bay. Motuiwi Islet, steep, flat-topped, and 51m high, lies 1.5 miles SE of the S end of Matauri Bay.

The Cavalli Islands are a group of islands which lie about 3.5 miles SE of Flat Island. The group is separated from the shore SW by Cavalli Passage, which is about 1 mile wide in places. The largest of the group is Motukawanui Island, which rises to a height of 177m.

Anchorage.—Small vessels with local knowledge can, in good weather, find anchorage in the sandy bay on the SW side of Motukawanui. Taheke Rock, with a depth of 8m, lies about 2 miles NE of the N tip of Motukawanui Island. Additionally, Motukawanui Island is bordered on its N and E sides, within a distance of 1.5 miles, by a group of high islets with several rocks among them. A light is shown from the E end of Nukutaunga Islet. Nukutaunga Islet lies 0.7 mile NE of the N tip of Motukawanui Island.

10.14 Motukawaiti Island (Step Island), which lies about 1 mile S of Motukawanui Island, is steep, rocky, and prominent, its summit rising to about 115m. The islets of Piraunui and Kahangaro lie 0.7 mile and 0.2 mile W, respectively, of Motukawaiti Island. Between Motukawaiti Island and Motukawanui Island lies a group of islets and rocks making it impassable.

Cavalli Passage, which is only usable by small vessels with local knowledge, lies between Motukawanui Island and Motukawaiti Island on the E and the shore to the W. The narrowest section of this passage lies between the N entrance of Matauri Bay and a shoal, with a least depth of 2.3m, that projects W from Piraunui Islet, leaving a channel about 0.1 mile wide, with a depth of 6m. Mapunanui Reef, which dries and breaks in strong NW to NE winds, lies in the center of Cavalli Passage, 0.7 mile N of the N entrance point of Matauri Bay.

Takou Bay (35°05'S., 173°57'E.) is entered between Motuini and Rocky Point, 8 miles SE. This bay affords no shelter. Foul ground projects 0.4 mile offshore in the vicinity of Rocky Point. Lion Rock, which from sea has the appearance of a lion resting, is 50m high and lies near the outer edge of foul ground, 1 mile WNW of Rocky Point. From Rocky Point to Cape Wiwiki, 3.5 miles SE, the shore is cliffy and steep-to with many small foul coves indenting the coast.

The Bay of Islands

10.15 The Bay of Islands is entered between Cape Wiwiki and Cape Brett (35°10'S., 174°20'E.), about 10 miles E. The W part of the Bay of Islands is indented by Te Puna inlet and Kerikeri inlet. A peninsula projects about 3.5 miles NW from the S shore of the bay, on the W side of which is Port Russell, the main anchorage. Vessels with local knowledge and moderate draft can obtain anchorage in the E part of the bay among the many islands, together with the peninsula extending off the SE shore. The Bay of Islands area is frequently used for visits by large cruise vessels during the southern hemisphere summer. These vessels anchor in the shelter of the inner Bay of Islands and run passengers ashore using tenders to Russell

Entrance to
Bay of Islands

Mataka bearing 195°, distant about 5 miles

Wharf, Paihia Wharf, or Waitangi Wharf. There are four anchorages located in the inner Bay of Islands.

Winds—Weather.—The land breeze is reported to be strong at times. Strong E and NE winds in front of a depression are reported to raise a sea which breaks heavily over Brampton Bank, especially during the ebb with heavy freshets from the river.

Tides—Currents.—For the most part, tidal currents within the Bay of Islands are weak, with the exception of the narrow entrances to rivers where their rate is 1 to 2.5 knots. Vessels heading up the coast often experience a set offshore between Cape Brett and North Cape.

Pilotage.—See the port description for Opau in paragraph 10.23 for details on pilotage. Northland Regional Council, the Harbor Authority for the Bay of Islands, provides the pilot service and can be reached, as follows:

1. Telephone: 9-438-4639
2. E-mail: mailroom@nrc.govt.nz

10.16 West side of the Bay of Islands.—Cape Wiwiki (35°09'S., 174°08'E.) is a bold, steep promontory that rises at Mataka, 0.7 mile SW, to a height of 257m. Mataka is a dark-colored hill that rises abruptly on its N and E sides; the S slope being grassy nearly to the summit.

Harakeke Island, 91m high, is high and rugged, being almost connected to the cape W by rocks and islets. Two rocks, 30m and 1m high, respectively, lie 0.2 to 0.3 mile NNE of its E tip.

Tikitiki Islet (Ninepin Islet), 42m high, is a black pinnacle rock which lies about 0.5 mile ENE of the E tip of Harakeke Island. The passage between the rocks off Harakeke Island and Tikitiki Islet is about 0.2 mile wide with depths of 19.4m. A rock, 0.9m high, lies 150m SSW of Tikitiki Islet.

Howe Point lies 1 mile S of Cape Wiwiki; midway between them is a round-topped cliffy peninsula, 55m high, that is connected to the shore by a low neck.

Moturoa Island, 77m high, lies about 2.5 miles SW of Howe Point. The common approach to either Te Puna Inlet or Kerikeri Inlet is between Howe Point and the E tip of Moturoa Island. The W tip of Moturoa Island is separated from the shore, 0.2 mile W, by Kent Passage, with a depth of 2.4m, which is used by small vessels with local knowledge.

Black Rocks, off the eastern end of Moturoa Island, are a group of black, smooth, and flat-topped rocks, and are 7 to 17m high; a rock, which dries 1.5m, lies 0.1 mile E of the group.

A rock, 0.6m high, lies on the N side of the approach, 0.3 mile SW of Howe Point. A shoal, with a depth of about 5.2m, lies between the rock and the point. Onslow Rock, with a depth of 5.2m, lies 0.7 mile S of Howe Point.

Rangihoua Bay (35°11'S., 174°06'E.) is ent1ered about 1.5 miles W of Howe Point.

Anchorage.—Vessels with local knowledge can obtain anchorage between the E entrance point of Rangihoua Bay and the E entrance point of Wairoa Bay, 0.7 mile WSW, in depths of 9 to 11m, sand, open to E winds. A cone-shaped islet, 27m high, lies about 0.7 mile SE of the E entrance point of Wairoa Bay. A rock, which dries, lies halfway between the islet and the point.

10.17 The **Te Pahi Islands** (35°11'S., 174°05'E.) is a group comprised of four islands, ranging from 36 to 47m high. These islands lie on a shallow flat along with several rocks. Poraenui Point (35°11.6'S., 174°04.1'E.), is entered about 1.5 miles W of Howe Point. 0.5 mile S of the W entrance of Wairoa Bay, is the S tip of an isthmus with an isolated hummock on it, 85m high.

The Brothers, two rocks, lie at the inner part of the approach to Te Puna and Kerikeri Inlets. The N rock, marked by a beacon, dries 1.2m, and lies 0.2 mile SSW of Poraenui Point, The S rock, which dries 0.3m, lies 0.1 mile further SSW. A 4.9m rocky patch lies 100m N of the N rock. Slains Castle, a rock, lies 0.2 mile W of The Brothers, and has a depth of 2.1m.

The Bay of Islands—Anchorages

Anchorage	Position	Charted depth	Maximum draft
No. 1	35°15.28'S, 174°06.27'E	11.8m	9.44m
No. 2	35°15.09'S, 174°05.87'E	12.0m	9.60m
No. 3	35°15.76'S, 174°06.62'E	10.0m	8.00m
No. 4	35°16.90'S, 174°06.75'E	12.0m	5.50m

Kerikeri Inlet is entered between Tareha Point and Days Point, about 1.5 miles SE. The entrance to this inlet is encumbered by Motupapa (Cocked Hat) Island, which is low and stony. A rocky shoal, with a least depth of 4.6m, projects 0.1 mile E from the E tip of Motupapa. The entrance to the inlet, which requires local knowledge for use, lies N of Motupapa Island, as the area S of Motupapa is encumbered by extensive flats and stony patches.

Anchorage.—Vessels with local knowledge obtain anchorage, in a depth of 9.1m, mud, about 0.7 mile W of Motupapa Island. Also, anchorage, in a depth of 12.8m, may be found in the bay on the W side of Days Point.

Te Puna Inlet (35°12'S., 174°03'E.) is entered between Poraenui Point and Tareha Point, 1 mile W.

Anchorage.—Vessels with local knowledge will find Te Puna Inlet to be a spacious well-sheltered anchorage, with depths of 9 to 11m for 1 mile within the entrance where it shoals to 7.3m. Additionally, vessels with local knowledge can anchor, in a depth of 3.7m, within one of the two bays lying 1.5 and 2 miles NW, respectively, of Tareha Point.

Caution.—A dangerous submerged rock has been reported (1991) to lie about 0.2 mile S of Tareha Point.

10.18 East side of the Bay of Islands.—Cape Brett (35°10'S., 174°20'E.) is shaped by Otuwhanga Island, 127m high, which is separated from the mainland by a narrow boat passage. From the cape, the land rises in a series of ridges to Cape Brett Mountain, bush-covered and 361m high, which is the highest land in the vicinity. The coast 5 miles SW from Cape Brett is mostly steep, cliffy, and pocked.

Piercy Island (Motukokako Island), lying about 0.4 mile NNE of Cape Brett, is a sheer island, 148m high, which is perforated by a hole that is open on ESE and WNW bearings. Tiheru Island, 42m high, lies close off the S tip of Piercy Island. A rocky shoal, with a depth of 7.9m, lies 0.1 mile WNW of the NW tip of Cape Brett.

Bird Rock (Mahenotapuku) lies about 1.7 miles W of Piercy Island and is generally black, except in summer, when it is colored white by bird guano. This rock is 11m high and mostly steep-to on all sides except the NW, off which is a rocky patch with a depth of 13.1m.

Motutara Rock, a double rock 7m high, lies about 2 miles SW of Cape Brett. A rock, with a depth of less than 1.8m, lies 0.2 mile SSE of Motutara. Between this and Motutara Rock is a channel with a depth of 20m.

Anchorage.—Vessels with local knowledge can find anchorage along the S shore of the inlet within one of the deep bays and creeks. Te Rawhiti Inlet itself affords good sheltered anchorage for vessels with local knowledge, in depths of 11 to 18m, good holding ground; however, the entrances to this inlet have considerably less water.

The Richards Peninsula, 65m high and grassy, is located about 2 miles SW of the entrance of Deep Water Cove. Steep rocky islets lie off each of the Richards Peninsula's three rugged sides. A rock, which dries 1.8m, lies 0.2 mile E of the N islet off the Richards Peninsula. A rock, 1.2m high, lies 0.1 mile N of the W islet off the Richards Peninsula. Foul ground projects about 0.2 mile N and SW of this rock.

10.19 Te Rawhiti Inlet (35°14'S., 174°12'E.) is a body of water which lies about 7 miles SW of Cape Brett and is enclosed and fronted by six islands and the mainland.

Urupukapuka Island, 109m high, is the largest and E of the six islands fronting Te Rawhiti Inlet. Its E tip lies 0.4 mile W of **Te Hue Point** (35°13.5'S., 174°15'E.), from which it is separated by Albert Channel.

Hope Reef lies 0.4 mile N of the E tip of Urupukapuka Island; the sea breaks upon it in moderate weather. A 4.3m shoal patch and a 2.7m shoal patch lie 0.4 mile NE and 40m E, respectively, of the E tip of the island.

Te Ao Island, 18m high, lies 0.2 mile E of the S tip of Urupukapuka Island. A bank, with depths of less than 5.5m, projects 0.5 mile SSW of Te Ao Island.

Paramena Reef, marked by a lighted beacon, lies about 0.7 mile SW of the SW tip of Urupukapuka Island.

Waewaetorea Island (35°12'S., 174°13'E.), 83m high, and Okahu Island, 73m high, both lie within 1 mile NW of the NW tip of Urupukapuka Island.

Red Head (35°12'S., 174°12'E.), surmounted by a beacon, is a conspicuous, steep, red cliff, 77m high, lying on the NW end of Okahu Island. Two rocks, 1m high, lie close together 0.2 mile WNW of Red Head.

Te Nunuhe Rock, awash, lies about 0.6 mile NW of Red Head. All of the rocks and the islets off Red Head are covered by the red sector of Fraser Rock Light.

Motukiekie Island, 81m high, lies about 0.7 mile W of the NW tip of Urupukapuka Island. Moturua Island, 98m high, lies SW of Motukiekie Island, from which it is separated by a shallow flat. Pakatahi Island, 14m high, lies near the tip of a reef that projects 0.3 mile SE from the SE side of Moturua Island.

10.20 Motuarohia Island (35°14'S., 174°10'E.), 81m high, is a wildlife sanctuary that lies with its E tip 1 mile W of the S tip of Moturua Island. A spit, with depths of less than 4.6m, coral and shell, projects 0.3 mile S from the S side of Motuarohia Island.

Oturori Rock (Capstan Rock), a coral pinnacle which dries, lies about 1.7 miles WSW of the E tip of Motuarohia Island.

Anchorage.—Renown Anchorage is situated between Motuarohia Island and **Tapeka Point** (35°15'S., 174°07'E.). This anchorage, which requires local knowledge, has depths of 23.8 to 25.6m, fine sand, gravel, and shell and is sheltered from all but N or NE winds. Additionally, this is the best anchorage for large vessels.

Vessels with local knowledge find anchorage, in a depth of 6.9m, 0.5 mile within the entrance of Parekura Bay. Parekura Bay lies between **Wairiki Point** (35°15'S., 174°14'E.) and a point about 0.4 mile SW. Also, Waipiro Bay, a cove on the W side of Parekura Bay, affords good anchorage, in a depth of 4.6m.

Motukauri, 39m high, lies on a reef projecting 0.3 mile W from the W tip of the Orokawa Peninsula, 2.2 miles W of the W entrance of Parekura Bay.

Manawaora Bay is entered between the W tip of the Orokawa Peninsula and Tarawatangata Point, 1 mile SSW. A bank projects 0.6 mile W from Motukauri Island, which lies in the entrance to Manawaora Bay.

Anchorage.—Orokawa Bay lies between the S tip of the Orokawa Peninsula and a point 0.5 mile ESE. Vessels with local knowledge can obtain good anchorage here, in a depth of 5.8m.

10.21 Te Rawhiti Inlet—Entrance Channels.—Albert Channel is the E entrance into Te Rawhiti Inlet, between Urupukapuka Island and the Richards Peninsula. The channel is mostly used by small vessels with local knowledge, as the ground is foul. There are shoal patches in the entrance and a heavy swell frequently sets in.

Another passage to the inlet leads between Urupukapuka Island and the islands NW, and Motukiekie Island SW. This channel has a navigable width of 0.3 mile over the bar between Poroporo Island and the rocks SE of Motukiekie Island in depths of about 5.2m. Within Te Rawhiti Inlet, close S of the bar, depths increase to 12.8m.

Directions.—Vessels with local knowledge approaching the channel between Urupukapuka and the islands NW from the NW, should proceed in mid-channel between the islands, with the islet close W of Poroporo Island bearing 144°, to pass 0.1 mile NE of the easternmost of the flat rocks off the SE tip of Motukiekie Island. When the SE end of Motukiekie Island bears 285°, steer 195° across the bar. When in depth of 12.8m, vessels should head for the anchorage (see above), avoiding the shoal and Paramena Reef, S of Poroporo Island.

Vessels with local knowledge utilizing the passage between Motuarohia Island and Moturua Island should enter by heading for the left tangent of Tokatokahau Point, bearing 134°, and pass 0.1 mile SW of the drying rock off the SW side of Moturua Island. When the S tip of Moturua Island bears 044°, head for the anchorage.

Vessels with local knowledge entering the W entrance to Te Rawhiti Inlet head for **Te Uwhi** (35°16'S., 174°11'E.), bearing 125°, passing about 0.5 mile NE of Oturori (Capstan Rock). When Tokatokahau Point bears 091°, with Te Korowhiti Rock just open N of it, vessels should alter course E and head for it. This course leads close S of the shore bank that projects from the S side of Motuarohia Island. When the right tangent of the islet close E of Motuarohia Island bears 028°, a vessel should change course ENE and head for the E end of Poroporo Island, bearing 073°, and anchor SE of Moturua Island.

10.22 Port Russell (35°16'S., 174°07'E.) is entered W of Tapeka Point, and leads between it and Brampton Bank. Within the approaches to Port Russell there are depths of 10 to 20m, and of 7 to 11m in the anchorages. The port, which requires local knowledge for entry, projects about 2.5 miles SSE to Veronica Channel, which leads to Opua.

Manawaora, a low, shelving projection of rocky and swampy ground, lies about 2 miles W of Tapeka Point.

Brampton Bank, with depths of less than 5m, projects about 1 mile E of Manawaora. The bank breaks in moderate swells. A prominent flagstaff, 45m high, with a monument 0.1 mile WSW, lies about 1.5 miles S of the N tip of Manawaora.

The Waitangi River is entered between a point about 1.7 miles S of the N tip of Manawaora and **Ti Point** (35°16'S., 174°05'E.), 0.1 mile SW. A directional light leads through the entrance to Port Russell, between Brampton Bank and Fraser Rock.

Kororareka Bay, located on the E shore, is entered between **Kororaeka Point** (35°16'S., 174°07'E.) and a point about 0.6 mile SE. The town of Russell is situated on the E side of this bay. Flagstaff Hill, 98m high, with a prominent flagstaff 0.1 mile NW of the summit, is located 0.4 mile ENE of Kororaeka Point.

Anchorage.—The best anchorage for vessels with local knowledge is in Renown Anchorage. However, with NE winds, vessels may anchor in the quarantine anchorage, about 0.5 mile W of Tapeka Point and Kororaeka Point, and clear of the fairway.

Anchorage is prohibited due to the presence of submarine cables which lie in an area that extends SW from Russell to the opposite shore.

Veronica Channel, which commences about 1.2 miles SW of Russell, leads to Opua through a channel, about 0.1 mile wide, with depths of 10.6 to 22m The least available depth over the extensive bar N of Veronica Channel should be obtained from Northland Port Corporation (NZ) Ltd. The channel through the bar is no longer maintained by dredging. In 2003, the channel had a controlling depth of 5.7m.

Opua (35°19'S., 174°07'E.)

World Port Index No. 55030

10.23 Opua is situated at the SE termination of Veronica Channel. Opua Wharf is primarily used for small charter operations and local fishing vessels.

Tides—Currents

Tidal currents of 2 to 3 knots may be experienced in Veronica Channel and off Opua Wharf. The flood current sets off the wharf; the ebb current sets on the wharf.

Depths—Limitations

Opua Wharf is 214m long and can accommodate vessels, on its E side, up to 198m long and a draft 8.5m; the W side can accommodate vessels up to 76m long and a draft of 2.5m. Docking or undocking at Opua can be carried out at all hours. Vessels that arrive on the flood are generally berthed bow out. Vessels berthed bow in are subject to draft limitations and undocked only on the flood. The maximum permissible draft in the approach to Opua Wharf is 8.5m at HW and 6.4m at LW.

Location	Controlling depth	Nature of bottom
Entrance to port	4.6m	
Shell dredged channel	7.0m	Sand and shell.
Outside anchorage	14.6m	Coral and shell.
Approach to berth	11.3m	Mud and shell.

Pilotage

Pilotage is compulsory for all vessels over 100 gt S of a line from Tapeka Point to Black Rocks.

Opua

The pilot boards 1.7 mile NNE of Fraser Rock Light. In bad weather, the pilot will lead from the pilot boat.

Regulations

Vessels should send their ETA 96 hours in advance. Immediately before arriving at Opua Wharf, vessels should contact Harbor Control on VHF channel 16 or 63 to receive berthing instructions.

Anchorage

Vessels with local knowledge can obtain restricted anchorage off Opua Wharf. However, the bottom is reported rocky and the holding ground poor.

Anchorage is prohibited in the vicinity of the submarine cables that cross the channel about 0.2 mile NW of the head of the wharf.

Directions

The Bay of Islands—Approaches to Opua.—Vessels approaching the Bay of Islands from the S of Cape Brett, with local knowledge, should round Piercy Island at a distance of about 0.5 mile. Course should then be shaped to pass 0.2 mile N of Bird Rock and 1 mile N of Te Nunuhe Rock. When Motukiekie Island is well open W of the 26m high islet, close SW of Okahu Island, Te Nunuhe Rock will be passed.

Vessels entering the Bay of Islands along its W shore should keep in mind that **Howe Point** (35°10'S., 174°07'E.) can be approached fairly closely, but the shoal, 0.3 mile SW, must be avoided. A good mark to remain in mid-channel, between Howe Point and Onslow Rock, is to keep the S islet of the Te Pahi Islands in line with the hummock on Poraenui Point, bearing about 251°, keeping that course until Howe Point is in line with Tikitiki Island astern, when course should be shaped SW.

Te Puna Inlet.—Vessels with local knowledge pass between Poraenui Point and The Brothers, passing about 100m off the point in a depth of 9.1m, and then head to pass 0.1 mile off Tareha Point. Alternately, vessels can proceed via the channel between Slains Castle Rock and Tareha Point, passing about 0.1 mile S to The Brothers and then steering 284° for the high rocky islet (Ti Korangi Islet), 0.3 mile SW of Tareha Point. This course leads midway between the shoal extending from Motupapa and Slains Castles Rock; when Tareha Point bears 334°, course should be changed to 353°.

Port Russell.—Vessels with local knowledge entering Port Russell should, when about 1.5 miles N of Fraser Rock Light, change course to make the Waitangi River directional light, and when about 1 mile SW of Fraser Rock Light, course should be changed to make Veronica Channel, the Waitangi River, or Kororareka Bay anchorage. Vessels heading to Opua should pass between the lighted beacons that mark the dredged channel in the approaches to Veronica Channel, remaining on the 172.5° range line until 0.5 mile NW of **Okiato Point** (35°18.4'S., 174°07'E.).

10.24 Te Roa Bay (35°14'S., 174°19'E.) is entered about 3.5 miles SW of Cape Brett, and the coast between is cliffy, indented, and rises steeply to bush-covered hills.

Motukorari Rock, 6.1m high, lies 0.2 mile SE of the N entrance point of Te Roa Bay. The S entrance of Te Roa Bay is made up by the E tip of a thin, steep isthmus, 113m high, which separates the bay from Whangamumu Harbor. Vessels with local knowledge can find anchorage in the center of Te Roa Bay, during W winds, in depths of 18.3 to 25.6m, fine sand and shell. Motukumara Rock, 65m high, lies close E of the S entrance point of the bay.

Whangamumu Harbor (35°15'S., 174°18'E.) is entered between the S entrance of Te Roa Bay and the NW tip of the Whangamumu Peninsula, which is high and grassy. Flat Rock, 60m high, lies about 0.1 mile SE of the N entrance to Whangamumu Harbor, and between them lie several other islets and dangers. A 12m rocky patch lies about 0.3 mile S of Flat Rock.

Anchorage.—Vessels with local knowledge can find safe anchorage within a small basin whose entrance lies about 0.5 mile SW of Flat Rock. This anchorage, in depths of 5.5 to 9.1m, is sheltered from all but strong NE winds. The shore bank projects about 0.2 mile from the beach at the W end of the basin, and it has depths of less than 5m. Also, there is an abandoned whaling station and ruined pier on the N shore of the basin.

Caution.—An area in which explosives are dumped lies about 40 miles NE of Cape Brett.

Home Point (35°19'S., 174°23'E.), red, steep, and flat-topped, represents the E tip of a peninsula, 140m high, that is connected to the shore by a low neck of marshy ground. Bland Bay lies about 1.2 miles S of Home Point; it is useless as an anchorage and should not be entered.

Danger Rock (35°21'S., 174°24'E.) lies about 1.7 miles SE of Home Point and is a 6.1m high, black, pinnacle rock. This rock is mostly steep-to, but for a rock close SW of it; there are depths of 51m 0.3 mile E of Danger Rock.

10.25 Whangaruru Harbor (35°24'S., 174°22'E.) (World Port Index No. 55040) is well-sheltered, easy of access, and can accommodate vessels of moderate draft. The entrance to this harbor lies between **Cape Home** (35°23'S., 174°23'E.) and

Entrance to Whangaruru Harbor, bearing about 240°

a point 1.2 miles SW.

Pah Hill, 49m high, lies on low land that separates Whangaruru Harbor from Bland Bay, and it is flat-topped and terraced. Vessels will find Pah Hill to be a good mark to steer for when anchoring.

Bland Rocks, 24m high, lie 0.3 mile off the S entrance point of Whangaruru Harbor to which they are connected to by sunken reefs. A bank, with a depth of 4.6m at its E tip, projects 0.1 mile NE from Bland Rocks.

Rugged Point, 18m high and rugged, is located about 0.5 mile NW of Bland Rocks. A rocky islet, 12m high, lies 0.5 mile NW of Rugged Point. This islet is connected to shore by a ledge which dries.

Motukowhai Islet is comprised of two islets, 18 and 15m high, with bushes on its summit, lying 1.2 miles NNW of Rugged Point. This double islet, connected to shore at low water, is a good mark to head for when entering Whangaruru Harbor.

Orapa Rock, with a least depth of 0.6m, lies 0.7 mile N of the Motukowhai Islets. Hongaio Rock, awash, lies about 0.5 mile NE of Orapa Rock.

Motutara Island (Henry Island), 37m high, lies in the entrance to Whangaruru Harbor about 0.6 mile S of Cape Home. This island and the reef projecting S from it provides shelter to the harbor from E winds.

Tides—Currents.—Currents attain rates of 0.5 knot in the narrowest part of the entrance; currents in the anchorage are barely discernible.

Directions.—Vessels possessing local knowledge pass N or S of Motutara Island; the S passage is much preferred by large vessels approaching the outer anchorage. The passage N of Henry Island is about 0.2 mile wide, with a least depth of 8.5m in the fairway; the bottom is rocky and uneven.

To utilize the passage S of Motutara Island, vessels should steer to pass 0.3 mile S of the reefs S of Henry Island, where there is a depth of 13.8m, and head for Motukowhai Islet, bearing 322°, and anchor, in a depth of about 11m, about 0.3 mile E of Rugged Point. A more sheltered anchorage, in a depth of about 6.4m, lies about 1 mile above Rugged Point, E of Motukowhai Island. The channel to this particular anchorage has a depth of 6.1m and is only 0.1 mile wide. Vessel with a draft of more than 4.3 draft are to pass at least 0.2 mile NE of Bland Rocks and steer for the gap on Motukowhai Islet on a 329° bearing until the rocky islet, lying 0.5 mile NW of Rugged Point, bears 182°, when the vessel should keep the islet, astern, on that bearing or steer for Pah Hill, bearing 002°, and anchor E of Motukowhai Islet.

10.26 Mimiwhangata Bay (35°27'S., 174°25'E.), located in the SE part of Whangaruru Harbor, it is entered between Paparahi Point and a point 1 mile E. A spit, with a depth of 6.4m over its outer end, projects about 0.5 mile NW from Paparahi Point. Vessels with local knowledge can obtain anchorage in Mimiwhangata Bay in S winds, in a depth of 11m, about 0.7 mile E of Paparahi Point.

Rimariki Island (Wide Berth Island) (35°26'S., 174°27'E.) lies about 1.2 miles E of the E entrance point of Mimiwhangata Bay and is almost connected to the mainland S by a reef. Foul ground projects 0.5 mile NW and 0.2 mile E and 1.2 miles S from Rimariki Island. Motutara Point, 63m high, is the N entrance of Sandy Bay and is located about 5.5 miles S of Rimariki Island.

Elizabeth Reef, the N of which dries 2.1m, extends 1.2 miles NE of Motutara Point. The outer edge of the reef is steep-to. A rocky 9.1m patch lies about 0.5 mile S of Elizabeth Reef.

Sandy Bay, which only affords temporary anchorage, lies between Motutara Point and Otara Point, about 2.5 miles SSE. This anchorage is only available in smooth water, during offshore winds, in depths of 9 to 18.3m, sand. A reef, which dries 1.8m, lies on the tip of a spit that projects 0.5 mile NE from the head of Sandy Bay. Dowd Rock, with a depth of less than 1.8m, lies 0.6 mile E of Otara Point; it breaks in any swell.

Tutukaka Head (South Gable) (35°37'S., 174°33'E.), 88m high, is the southernmost of three conspicuous gable-shaped promontories. Tutukaka Head lies about 4 miles SE of Dowd Rock. The other two gables, North Gable and Middle Gable, are 59m and 82m high, respectively.

10.27 The **Poor Knights Islands** (35°28'S., 174°44'E.), a wildlife sanctuary, lie about 12.5 miles NE of Tutukaka Head and are comprised of two islands, 203m and 215m high, with several islets and rocks between. These islands are rugged, cliffy, with scrub-covered summits and are very steep-to, being mostly clear of off-lying dangers.

Poor Knights Rocks (High Peak Rocks) are a group of three pinnacle islets that lie about 4 miles S of the Poor Knights Islands. A rock, which breaks, lies 0.1 mile S of the S islet.

Sugarloaf Rock, an islet 87m high, lies about 1.5 miles SW of Poor Knights Rock, with a rock close off its SE side.

Tutukaka Harbor (35°37'S., 174°33'E.) is only usable by small vessels with local knowledge and is entered between Tutukaka Head and Rauhomaumau, a cliffy islet 0.6 mile S. Tutukaka Head is only joined to the shore W by a thin sandy neck over which the sea breaks. Rauhomaumau Islet, 49m high, lies

on a reef that projects 0.6 mile E from the shore. The inner S entrance point lies about 0.6 mile NW of Rauhomaumau Islet. From this position, rocks project 0.2 mile towards the N entrance point, leaving a 0.2-mile wide channel with depths of 5m in the center. Phillips Island, 26m high, lies in the W part of the harbor.

Directions.—Tutukaka harbor is only usable by small vessels with local knowledge. Due to unpredictable tidal currents and a heavy swell that sets onto the rocks on the S side of the entrance, caution must be exercised upon entering the harbor. Vessels approaching from the S pass about 1 mile off Rauhomaumau Islet and enter in mid-channel between Tutukaka Head and the outermost above-water rock projecting NE for the inner S entrance point. The rocks at the entrance shelter the harbor from E winds.

Anchorage.—Small vessels with local knowledge can obtain anchorage, in a depth of 7.3m, about 0.3 mile E of Phillip Island.

10.28 Ngunguru Bay is entered between Motutara Island, 34m high and cone-shaped, and Taiharuru Head, 5 miles SSE. Submerged rocks project 0.2 mile S from Motutara Islet, and a 4.9m patch lies 0.4 mile SW of the same islet.

The entrance to the Ngunguru River lies in the NW part of Ngunguru Bay, however, it can only be utilized by small vessels with local knowledge in good weather.

Kumi, a rocky point, projects from the foot of Whakareora, a cone-shaped hill, about 1.5 mile SW of the N entrance point of Ngunguru Bay. A reef projects 0.3 mile S from the point.

Taiharuru Head (35°43'S., 174°34'E.) is long and grassy, rising to a steep knoll, 63m high, at its tip. A sharp cone-shaped islet, 30m high, lies 0.3 mile SSE of Taiharuru Head, and between them are rocks. A rocky 5.5m patch lies about 1.7 miles WNW of Taiharuru Head with rocky heads within 0.3 mile N and 0.6 mile NE. A rock awash, a 7.9m patch, and a 16.4m rocky shoal lie 0.8 mile NW, 0.6 mile NNW, and 1.5 miles E, respectively, off Taiharuru Head.

Anchorage.—Small vessels with local knowledge can obtain anchorage, during offshore winds, in depths of 5.5 to 7.3m, sand, in a cove close outside the entrance to the Ngunguru River. Additionally, Ngunguru Bay affords anchorage in its central part, during offshore winds, in depths of 9 to 18m, sand.

Kauri Mountain, 245m high, is a round, grassy hill located about 3.5 miles SSW of Taiharuru Head.

Regulations.—In order to avoid risk of pollution and damage to the environment surrounding the Poor Knights Islands wildlife sanctuary, a mandatory Area to be Avoided has been created.

The mandatory Area to be Avoided is bounded to the N by a line drawn from **Cape Brett** (35°10'S., 174°20'E.) to a position 5 miles offshore of the Poor Knights Islands, then running SW and terminating at Bream Head. This area is best seen on the chart.

All vessels greater than 45m in length should avoid this area. Exceptions are made for vessels engaged in fishing and vessels of the Royal New Zealand Navy. Exceptions are also made for barges under tow, provided the cargo is not oil or other harmful liquid substances.

Bream Head (35°51'S., 174°35'E.) is a conspicuous promontory distinguished by its high, rugged, and bush-covered nature. The land rises to 49m about 0.7 mile W of its tip. A prominent twin crag forms the summit.

Caution.—Awarua Rock, awash, lies about 4.5 miles NW of Bream Head. The Bream Islands, 40 and 27m high, lie between 0.7 and 1 mile N of Bream Head. Bream Rock, which breaks, lies 0.4 mile ENE of the N and larger island.

Hen and Chickens Group, a wildlife sanctuary, lie on the E side of Parry Channel, a wide deep fairway, which separates them from Bream Head and Bream Bay. The N group, the Marotiri Islands (Marotere Islands), are made up of four islands and some islets. The highest, Whatupuke, is 241m high, with Lady Alice Island close W and Coppermine Islet close E.

The Pinnacles, 433m high and prominent, lie near the SW tip of Taranga Island, about 4 miles S of the Marotiri Islands.

Sail Rock, a steep, rocky islet, 138m high, lies about 2 miles S of the SW point of Taranga Island.

Bream Bay is entered between Bream Head and Bream Tail, 11.5 miles S.

10.29 North part of Bream Bay—Whangarei Harbor.— The N shore of Bream Bay between Bream Head and Busby Head, the E entrance point of Whangarei Harbor, 3 miles W, is backed by Bream Head Range. Mount Lion, 380m, rises about 2.2 miles W of Bream Head. Smugglers Bay, which lies close E of Busby Head, is not a good anchorage because of its bottom's rocky nature.

Whangarei Harbor (35°48'S., 174°26'E.)

World Port Index No. 55050

10.30 Whangarei Harbor, the primary port serving North Island N of a line connecting Bream Tail and Kaipara Harbor, has the deepest natural entrance in the Dominion. It affords access to four ports:

1. Mardsen Point (35°50.2'S., 174°29.9E)—Tanker berths.
2. Northport (35°49.9'S., 174°29.2E)—Cargo berths.
3. Portland (35°48.1'S., 174°20.8E)—Cement works.
4. Whangarei (35°45.52'S., 174°20.8E)—General cargo.

North Port is a deep water commercial port facility located at Mardsen Point and is situated at the entrance to Whangarei Harbor. The port is owned and operated by NorthPort Limited.

NorthPort Limited

http://www.northport.co.nz

Tides—Currents.—From the Whangarei Harbor entrance to 2.5 miles above Busby Head, the currents attain a rate of 3 knots; in the main and upper parts of the harbor the rate is about 2 knots. Information concerning height of tide can be obtained from the signal station.

Depths—Limitations.—Deep water reaches into a completely-sheltered basin, where there are four separate berthing areas. There is a least charted depth of 13.4m on the range line about 1.5 miles SE of Marsden Point and a depth of 14.6m charted on the range line 1.6 miles further SE.

For vessels proceeding to Marsden Point, the controlling depth is 13m, which includes the swing basin off the berths.

Courtesy of Northland Port Corporation

Marsden Point from NW

For vessels proceeding to Marsden Jetty berth, the controlling depth is 9.3m. From Marsden Point, a draft of 7.1m may be carried to One Tree Point. From One Tree Point, dredged cuts with a depth of 8.1m lead to the Port Whangarei wharves.

Marsden Point (35°50'S., 174°30'E.) has two oil jetties which serve the New Zealand Refining Company, in addition to the three cargo berths owned by Northport Limited at Marsden Point.

Marsden Point No. 1 Jetty is a crude oil berth with the capacity to accommodate vessels of up to 304m in length, with a maximum draft of 15.2m. Petroleum products are handled at Marsden Point No. 2 Jetty; the berth can accommodate vessels having a maximum length of 304m. Tankers of over 125,000 dwt, with maximum drafts of 15.2m at HW, can be accommodated at Marsden Point subject to the harbormaster's approval.

Marsden Point East/West Cargo Wharves handle general and bulk cargo; each has a length of 275m and an alongside depth of 13m. Marsden Jetty Berth handles general cargo and can accommodate vessels up to 110m in length; it has a depth of 13m alongside.

Port Whangarei (35°45'S., 174°21'E.) handles general cargo, including containers and ro-ro vessels. Main Berth 1 and Main Berth 2 can each accommodate a vessel having a maximum length of 190m and a maximum draft of 13m. Main Berth No. 3 handles bulk cargo and has a length of 155m for vessels having a maximum length of 200m and a maximum draft of 14.5m. Main Berth No. 4 is 122m in length and conducts ship repair and maintenance operations for vessels having a maxi-

Courtesy of Northland Port Corporation

Port Whangarei

mum draft of 4.9m. This wharf is home to New Zealand Yachts.

Portland Cement Wharf (35°48'S., 174°20'E.), which serves the Golden Bay Cement Company, is situated about 1.5 miles SW of Limestone Island. The channel from Limestone Island to the Portland Cement Wharf has a depth of 3m. The cement wharf lies at the outer end of a 0.6-mile long causeway. The berth on the E wharf face will accept vessels up to 115m in length and drafts up to 5.6m.

Shoal Bay, on the N side of the harbor, is entered between Darch Point and Reserve Point, 2.5 miles NW. McDonald Bank, a sand bank which dries, lies in the inner part of Shoal Bay. Snake Bank, which dries 1.2m, lies in the entrance of Shoal Bay.

Shell Bank, with depths less than 5.5m, projects W from Snake Bank to the mud flats on the W side of the harbor. Shell Cut Reach, a dredged cut with a depth of 8.1m, leads through Shell Bank. A channel, through which a depth of 5.5m can be carried, lies between McDonald Bank and Snake Bank between Darch Point and Reserve Point.

Aspect.—The S side of Whangarei Harbor is predominantly low and swampy, while the N shore has many hills of a considerable height.

Manaia, a prominent mountain, 419m high, with several prominent pinnacle crags on its summit, lies 1 mile NE of **Lort Point** (35°40'S., 174°31'E.). Frenchman Islet, 12.5m high, is steep, cone-shaped, and almost connected to the SW part of Busby Head.

In the refinery on **Marsden Point** (35°50.5'S., 174°29.6'E.) there is a conspicuous chimney, 104m high, from which red obstruction lights are shown and 0.1 mile N, another chimney, 62m high, from which a flare is shown.

A directional light is shown on Marsden Point for the entrance to Whangarei Harbor.

Sinclair Point is a low, flat, clay point that is located about 1.5 miles W of Marsden Point. One Tree Point, 9.1m high, lies 1 mile further NW, and the coast between forms a line of clay cliffs.

Northwest of One Tree Point, the S shore of the harbor recedes and is low, swampy, and lined by mangroves. A prominent clump of trees is located on a point about 1.5 miles WSW of One Tree Point.

Limestone Island (35°47'S., 174°22'E.) is grassy, 65m high, and has a disused wharf and the conspicuous ruins of a cement works on its SE side. At Limestone Island, the Whangarei harbor separates. Port Whangarei lies at the W entrance of the Hatea River, about 1.7 miles N of the E tip of Limestone Island, and the town of Portland, about 1.5 miles SW of the same point.

A signal tower and mast stand about 0.5 mile W of Marsden Point, but they cannot be seen until the vessel has rounded Marsden Point.

Pilotage.—Pilotage is compulsory for all merchant vessels over 100 gt, with the exception of exempted vessels and bulk

cement vessels trading at Portland. Pilotage and tug services to Port Whangarei and Marsden Point are arranged through Northport Limited.

Vessels arriving or departing after 1700 on a working day should apply for a pilot and berthing or unberthing facilities before 1400, and confirmed before 1530, on that day. On weekends or public holidays, application must be made before 1400 and confirmed before 1530, on the preceding work day.

Pilots board about 2 miles SE of Fairway Lighted Beacon. In bad weather, pilots board near Frenchman Island. In daylight only, if requested, they will lead vessels through the outer channel in the pilot boat or will pilot vessels by signals from the pilot boat. Vessels carrying hazardous cargo are restricted from this service.

The pilot boat is fitted with VHF.

Pilots embark about 1.5 hours before LW and 1.25 hours before HW for slack water berthing.

Regulations.—Vessels should contact the Harbor Superintendent, Whangarei, giving estimated ETA 72 hours in advance, if possible, but not less than 24 hours prior arrival. The time should be confirmed or amended not less than 3 hours prior arrival or original the ETA, whichever is earlier.

Vessels are not permitted to pass each other in the main channels up harbor from No. 3 Lighted Buoy, 0.3 mile SSW of Busby Head, unless special permission has been obtained.

Vessels over 30,000 dwt berth at HW or SW.

Contact Information.—Whangarei Harbor Radio at Marsden Point is no longer manned, but a 24-hour watch on VHF channels 16 and 19 is maintained by the New Zealand Refining Company's gate security personnel.

Anchorage.—The Ruakaka River, whose entrance nearly dries, empties into the sea about 4 miles SSW of Marsden Point. A prominent chimney, 125m high, painted in red and white bands, is situated about 1.5 miles N of the entrance to the Ruakaka River.

Anchorage may be found, in depths of 14.6 to 16.5m, sand, during offshore winds, S of the entrance to the Ruakaka River.

Anchorage may be obtained SE of Fairway Lighted Buoy, in depths of 36 to 45m, sand, good holding ground. Sheltered anchorage may be found, in depths of 9.8 to 12.8m, about 0.3 mile NW of **Passage Island** (35°50'S., 174°30'E.).

Two outer anchorage areas have been established, with depths of 36 to 45m, in the following areas:

Area	Position
A	35°52.4"S, 174°36.1'E
	35°52.4"S, 174°36.1'E
	35°53.4"S, 174°36.1'E
	35°53.4"S, 174°34.5'E
B	35°55.8"S, 174°32.3'E
	35°55.8"S, 174°33.9'E
	35°57.8"S, 174°33.9'E

Several prohibited anchorage areas, which are best shown on the chart, project SE from Marsden Point, and NW and NE and SE from One Tree Point; several prohibited areas are charted E of Limestone Island.

The quarantine anchorage lies in an area bound by an arc of a circle, radius about 3 miles, centered on **Frenchman Island** (35°52'S., 174°32'E.).

A prohibited area, except by the permission of the harbormaster, surrounds the oil refinery berths at Marsden as follows: From a position about 0.3 mile NW of Marsden Point in a N direction to the W dolphin; then 030° for 126m; then 120° for 0.5 mile; then 120° for 126m to the E dolphin, then 240° to the shore.

Directions.—The seaward approach is easily made and the channels through the harbor are well-marked. If proceeding to Portland, round Wellington Rock and proceed as safe navigation permits to the range lights displayed from Portland Wharf.

Caution.—Mariners are warned that under certain conditions large swells may reduce the underkeel clearance of vessels in the approaches to Whangarei Harbor. Mariners should navigate deep draft vessels with caution during high swell conditions.

A prohibited area, with a radius of 100m, surrounds the special light buoy, which lies halfway between Fairway Lighted Buoy and No. 1 Lighted Buoy.

10.31 The **Mokohinau Islands** (35°55'S., 175°08'E.) are a wildlife sanctuary comprised of four islands and several islets and above-water rocks. The entire group lies roughly 30 miles E of Bream Bay and 17 miles E of Taranga Island. Burgess Island, the northernmost island, rises to 110m. A light is shown from the island. Edith Passage, with a depth of 6.1m, separates Burgess Island from the middle island. A rocky islet, 39.6m high, lies 2 miles WNW of the NW end of the westernmost island.

Two dangerous underwater rocks lie 1.7 miles WSW and SW from Burgess Island Light.

Fanal Island, 134m high, cliffy, flat-topped, and bush-covered, lies about 2.2 miles SE of Burgess Island. Sunken rocks, over the outer end of which there is a depth of 1.2m, project 0.3 mile from the SE tip of the island. A rock, 24.4m high, lies 2 miles off the W side of the island. A below-water reef projects from the island to within 90m of the rock.

Simpson Rock, 4.9m high, lies about 4.5 miles SSW of Fanal Island. A shoal, with a depth of 9.8m, lies 0.7 mile N of Simpson Rock.

Tides—Currents.—It has been reported that in the vicinity of the Marotiri Islands and in Cradock Channel, a constant set in a general 140° direction of variable strength is experienced. After a strong N wind, this current occasionally attains a rate of 2.5 to 3 knots, particularly in the vicinity of the Mokohinau Islands and Cradock Channel.

Bream Tail (36°03'S., 174°35'E.) represents the S tip of Bream Bay; the coast SE to Cape Rodney, about 18 miles long, is comprised of long sandy beaches. McGregor Rock, with a swept depth of 5.5m, lies about 1.5 miles E of Bream Tail.

Te Arai Point lies about 7.5 miles SE of Bream Tail and is rocky and backed by Te Arai Hill, 78.3m high.

Cape Rodney (36°17'S., 174°49'E.) is a bold and steep-to promontory, with a cliffy face that is reported radar conspicuous at a distance of 25 miles.

Tamahunga (Mount Hamilton) is a conspicuous wooded peak, with a double summit that rises to 438m, about 5.5 miles

WSW of the Cape.

Anchoring and fishing are prohibited in a marine reserve area 0.7 mile offshore between Cape Rodney and a position 3 miles WNW.

Hauraki Gulf and Off-lying Islands and Dangers

10.32 Jellicoe Channel, the main N entrance to Hauraki Gulf, lies between Cape Rodney and Little Barrier Island; it is deep and clear of dangers. Cradock Channel lies between Little Barrier Island and Great Barrier Island. Horn Rock lies in Cradock Channel between Great Island and Little Barrier Island.

The primary E entrance to Hauraki Gulf is through Colville Channel; it also is mostly clear of dangers. Colville Channel is entered S of the S tip of Great Barrier Island, between it and Cape Colville, the NW tip of the Moehau Peninsula. Cape Colville, because of off-lying dangers, should be given a berth of 1.5 miles.

A submarine exercise area is situated in Hauraki Gulf.

Tides—Currents.—Within Hauraki Gulf, tidal currents set S with the flood and N with the ebb. However, in close proximity to Cape Barrier and Cape Colville, tidal currents set W with the flood and E with the ebb, attaining rates of 2 to 3 knots at springs. North of Channel Island, the currents attain rates of 1 to 2 knots at springs.

Little Barrier Island (36°12'S., 175°05'E.), a wildlife sanctuary, lies with its SW tip about 12 miles ENE of Cape Rodney, being separated from it by Jellicoe Channel. This steep, almost inaccessible island rises to Mount Hauturu, its 722m summit. Horn Rock, awash, lies 4.5 miles SE of the SE tip of Little Barrier Island. The sea breaks over this rock in any sort of a swell.

Great Barrier Island is separated from Little Barrier Island to the W, by Cradock Channel, and affords shelter to Hauraki Gulf from E winds. This mostly thickly-wooded island rises to 620m near the center. The W shore of the island is pocked with several bays and harbors, open to W winds, but otherwise affording shelter.

10.33 West shore of Great Barrier Island.—Aiguilles Island (36°02'S., 175°24'E.), 144m high, lies close off the N end of Great Barrier Island to which it is almost connected to by rocks. The N tip of this island, Needles Point, has off it several pinnacle rocks, the highest of which is 79m.

Miners Head is a prominent cliffy bluff, 286m high, that lies about 4 miles SW of Needles Point. Miners Rocks, with a least depth of 13.4m, lies about 0.6 mile NW of Miners Head and it has a strong ripple over it. Within a cove close S of Miners Head, small craft with local knowledge can obtain anchorage in good weather, in a depth of 11m.

Katherine Bay is entered between Ahuriri Point and Maunganui Point, about 2 miles SW. Katherine Bay is unsuitable as an anchorage except in all but the best circumstances.

Port Abercrombie (36°10'S., 175°19'E.) is entered about 1.7 miles SSW of Maunganui Point. Green Rock, with a depth of 14.3m, lies about 0.5 mile WSW of the N entrance point of Port Abercrombie. Several islands shelter this port from the S, the largest being Kaikoura Island, which rises to 184m at Mitre Peak. Nelson Islet and Motuhaku Islet are both bold and steep-to, lying about 0.1 mile apart, close W of Kaikoura Island.

Wellington Head is the bluff W tip of Motuhaku Islet and the S entrance point of Port Abercrombie. A rock, 1.2m high lies on the outer end of a spit that projects about 0.5 mile N from the E tip of Motuhaku.

Nagle Cove, which lies in the NW part of Port Abercrombie, has an islet, Oyster Islet, 12m high in the center of its entrance.

Karaka Bay lies in the NE part of Port Abercrombie. The Wood Islets, of which there are two, lie in the entrance of Karaka Bay.

Anchorage.—Port Abercrombie is exposed to W winds and, except for Nagle Cove and Karaka Bay, depths are excessive, making anchorage difficult. Small vessels with local knowledge might obtain anchorage in Nagle Cove W of Oyster Islet, in depths of 16 to 18m. An abandoned submarine cable extends from the W entrance point of Nagle Cove to S of Kaikoura Island.

Port Fitzroy (36°11'S., 175°20'E.) is entered via one of two channels; either the channel off the NE side of Kaikoura Island, or off the channel off the SW side. While Port Fitzroy is sheltered from most wind, it is subject to strong gusts and squalls when windy conditions are prevalent.

Anchorage.—Vessels with local knowledge can obtain good anchorage, in depths of 11 to 12.8m, near the SW side of Port Fitzroy, about 0.5 mile S of the SE tip of Kaikoura Island.

10.34 South Channel—Man of War Passage.—The **Grey Group Islands** (36°11'S., 175°18'E.) are a group of islets ranging from 18 to 46m high that front the shore between Wellington Head and False Head, 3.2 miles S. Moturako, 34m high, the N islet, lies about 1 mile SSE of Motuhaku Light. A rock, 1m high, lies close off the islets NE side.

Opakau Islet, 46m high, lies near the center of a patch of foul ground about 1 mile NE of False Head. The channel between Great Barrier Island and Opakau Islet is foul. A rock, 41m high, lies midway between Opakau Islet and False Head. Paget Rock, which lies in the W entrance to Man of War Passage, is awash and may be passed on either side. Paget Rock (36°11'.0S., 175°18.5E) is marked by a lighted beacon, noting a depth of 5m in the channel NE of the rock.

Vessels with local knowledge of a moderate size use Man of War Passage. It is about 100m wide at its narrowest point, with depths of 14.3m and steep-to.

Tidal currents set W on the flood and E on the ebb and attain rates of 1 to 2 knots in the narrow part of the passage.

False Head (36°13'S., 175°17'E.) represents the NW tip of Motuiaiko Island, one of the Broken Islands. This promontory, which rises to 104m, greatly resembles Wellington Head, but has a wide yellow stripe on the cliff which is conspicuous on E bearings. Strong tide rips are in evidence close off False Head.

Rangiahua Island, 49m high, lies close SE of Motutaiko Island to which it is connected by a drying reef. Mahuki Island lies close S of Rangiahua Island and it is separated from it by a narrow boat channel.

Anvil Islet (36°14'S., 175°18'E.) 60m high, cone-shaped, and prominent, lies close off the S tip of Mahuki Island.

The channel that separates Mahuki Island, Rangiahua Island, and Motutaiko Island, also known as the Pig Islands (Broken Islands), is about 0.2 mile wide, with a least depth of about 7.3m in the fairway. This channel can only be used by small vessels with local knowledge. Additionally, small vessels with local knowledge can obtain anchorage off the pebble beach on

the E side of Rangiahua, out of the tidal currents, open to NW winds that send in a swell.

10.35 The **Junction Islands** (36°14'S., 175°19'E.) are a group comprised of four rocky, steep islets that lie about 0.5 mile E of Mahuki Island. A rocky islet, 49m high, lies 0.2 mile W of the S Junction Island. A rock, which dries 0.3m, lies 0.1 mile SW of the S Junction Island, and a rock, 7m high, lies 0.3 mile NE of the same islet.

The Pigeons (Pirogue Rocks) (36°17'S., 175°20'E.) are three bare, cone-shaped, and mostly steep-to islets, of which the NW and highest is 15m high. Three banks, with depths of 22, 24, and 27m, are located almost halfway between The Pigeons and the Junction Islands.

Small vessels with local knowledge can obtain shelter from N winds in a small bay, known as Bowling Alley Bay, which lies 0.5 mile NE of the Junction Islands. An 8.7m patch lies about 0.6 mile ESE of the S entrance point of Bowling Alley Bay.

Whangarara Island (Cliff Island) is a steep, yellow, and wedge-shaped islet, 69m high.

Whangaparapara Harbor (36°15'S., 175°24'E.) is entered about 1 mile E of Whangarara Island. This small harbor affords good shelter to small vessels with local knowledge, except from winds between the SE and SW. Due to the high land on either side, this harbor is subject to violent squalls and gusts.

Anchorage.—The best anchorage lies near the center of the harbor, in a depth of about 14.6m, mud and shells, about 0.3 mile N of the NW entrance point.

Blind Bay is entered about 1.7 miles SE of Whangaparapara Harbor. Allom Bay, at the head of Blind Bay, fronts the town of Okupu. Blind Bay is open to SW winds and is therefore unsuitable as an anchorage. A conspicuous yellow hill, 144m high, stands close N of the N entrance point of Blind Bay. A jetty lies close NE of the prominent hill.

Tryphena Harbor (36°19'S., 175°28'E.) is entered between Amodeo Rocks and Tryphena Point, from which a light is shown. Amodeo Rocks are two pinnacle rocks with a depth of 2.4m. These rocks lie on the tip of a spit that projects SSE from the inner N entrance point.

Bird Islet, 1m high and flat, lies on outer end of a spit that projects from the NW part of Tryphena Harbor. The inner shores of the harbor are comprised of several sandy coves separated by rocky points. Puriri Bay is on the N side of the harbor, and Shoal Bay is on the S.

Tides—Currents.—The tidal currents off Tryphena Harbor set N on the flood and SE with the ebb. Several rocks, both above and below-water, lie within 2 miles SE of the entrance to Tryphena Harbor. A scrub-covered islet, 89m high, lies 1.7 miles SE of the S entrance point to Tryphena Harbor. The channel between this islet and the shore is foul.

Anchorage.—Vessels with local knowledge can obtain good anchorage off the N shore of the harbor between Bird Islet and the head of the harbor, in depths of 11 to 12.8m, sheltered from N and W winds. Shoal Bay affords good anchorage, in depths of 7.3 to 12.8m, sheltered from E and S winds.

10.36 East shore of Great Barrier Island.—Waikaro Point (36°07'S., 175°26'E.) is located about 5 miles SE of Aiguilles Island, and the coast between is steep-to, bold, and cliffy with several indentations. Rangiwhakea Bay represents the largest indentation lying midway between Aiguilles Island and Waikaro Point.

Whangapoua Beach, a sandy bay, is entered between Waikaro Point, which is cliffy with grassy knolls, and a point 1.7 miles further S. Whangapoua Hill, cone-shaped and 239m high, backs the S entrance point.

Anchorage.—Vessels with local knowledge, subject to the swell that rolls in on the beach, can obtain anchorage in Whangapoua Beach in NW to S winds, in depths of about 15.8m, sand.

Rakitu Island (36°08'S., 175°30'E.), is the only off-lying island of any consequence off the E shore of Great Barrier Island. This island, which is steep-to, bold, and cliffy, lies nearly 3 miles E of Waikaro Point.

Several drying rocks project up to 0.3 mile off the N and NE sides of the island. A rock, 37m high, which is steep-to, lies about 0.2 mile SE of the SE tip of Rakitu Island. A 12.2m patch lies about 0.2 mile further E. Two steep-to islets, 13 and 20m high, lie 1 mile ENE and 0.7 mile SSE, respectively, of the SE tip of Rakitu Island.

Whakatautuna Point (36°11'S., 175°30'E.) lies about 4 miles SE of the S entrance point of Whangapoua Bay. The coast, about 5.5 miles S of Whakatautuna Point, is rocky, broken and surrounded by cliffs that rise to Whakaatautuna, a hill. and is indented by several small unusable bays. An area where anchoring and fishing is prohibited, which is best shown on the chart, lies SE of Whakatautuna Point.

Cape Barrier (36°21'S., 175°32'E.) is the S tip of Great Barrier Island, and the land which backs this cape rises steeply to Mount Isaacs, 401m high. Tide rips off Cape Barrier should be given a berth of at least 2 miles by small vessels in bad weather.

Cuvier Island, which is a wildlife sanctuary, lies about 12 miles SE of Cape Barrier. This island, which lies in the E approach to Colville Channel, rises to 229m as a wooded summit on its NW side. A monument stands at a height of 58m on a small islet in the cove NW of the light. A rock, which dries 1.5m, lies 0.2 mile SW of the light.

10.37 West shore of Hauraki Gulf.—Omaha Bay (36°19'S., 174°50'E.) is entered between Cape Rodney and Tokatu Point, 5.5 miles SSE. Little Omaha Bay lies at the head of Omaha Bay. Vessels with local knowledge obtain anchorage, during offshore winds, in depths of 9 to 16.5m, sand. However, this anchorage is open during E winds which send in a heavy swell.

Panetiki Island lies about 0.7 mile S of Cape Rodney. An 8.2m shoal lies about 0.5 mile E of Panetiki Island.

Omaha Cove, located in the NW portion of Omaha Bay, is entered S of Panetiki Island.

Whangateau Harbor is a creek in the NW corner of Little Omaha Bay, but no attempt should be made to enter, due to shoaling in the entrance.

Takatu Point (36°22'S., 174°52'E.) which rises to 95m close W, forms the extremity of the Tawharanui Peninsula. There are very strong tide rips off this point. Flat Rock lies in the approaches to Kawau Bay about 5.5 miles SSE of Takatu Point. Flat Rock is about 1.2m high and steep-to. A shoal, with a least depth of 2.7m, lies 0.2 mile SW of Flat Rock. Vessels can pass

on either side of the rock and shoal, but not between them. Rocky patches, with depths of 9.1m and 13.7m, lie about 0.4 and 0.9 mile SE of Flat Rock. Tarapunga Rock, with a depth of 12m, lies 1 mile W of Flat Rock and is marked by a lighted buoy.

10.38 Kawau Island (36°25'S., 174°51'E.), mostly hilly and wooded, rises to Grey Heights in its SE part to 180m. The E shore of the island is steep, cliffy, and fronted by rocks to a distance of 0.2 mile offshore. Slip Island, 15m high, lies on a bank with a depth of 2.2m, which projects 0.3 mile NE to Fairchild Reef. Nelson Rock, with a depth of 2.9m, lies 0.7 mile NNE of Kawau Point. A 6.5m shoal lies 0.2 mile NW of Nelson Rock.

Burgess Bay, which indents the S part of the E shore of Kawau Island, affords good anchorage for small vessels with winds between SW and NW, in a depth of about 8m.

Kawati Point forms the N tip of Kawau Island. The entrance to North Cove lies between Beaumont Point, 1.2 miles SW of Kawati Point, and Edwards Point, 0.4 mile SW. Pembles Islet, 9.1m high and marked by a light which is partially obscured by trees from SE through SW, lies 0.2 mile NW of Beaumont Point. Small vessels with local knowledge can obtain anchorage in the cove sheltered from all but W winds, in depths of 3.7 to 7.3m, mud.

Bon Accord Harbor (36°25'S., 174°49'E.) indents the W shore of Kawau Island and is entered between Accord Point and Momona Point, 0.6 mile S. The entrance to the harbor, between two banks projecting from the entrance points, is about 0.3 mile wide.

Peaked Rocks, which lie about 0.2 mile S of Momona Point, are prominent and marked by a beacon.

Anchorage.—Upon entering the harbor, vessels should give Accord Point a berth of 0.2 to 0.3 mile. There is a least depth of 7.3m in the approach to the anchorage. The best berth lies in mid-channel, in a depth of 9m, about 0.4 mile within the entrance, with Martello Rock just open W of Momona Point.

Kawau Point represents the SE tip of Kawau Island. Little Markham Islet, 30m high, and Challenger Island, 46m high, lie close off this point.

Kawau Bay, fronted by Kawau Island, is entered between Tokatu Point and Mullet Point, 6 miles SW. This bay affords anchorage, in depths of 6 to 9m, fine sand and mud. Additionally, this bay can be reached by five separate entrance channels.

The N shore of the bay from Tokatu Point leads WSW for 6.5 miles to the entrance of the Matakana River. A rocky reef, which dries 1.2m, lies 0.7 mile E of the N entrance point of the river. The resort of Sandspit is situated about 0.7 mile within the river entrance. There is a jetty at Sandspit with a depth of 7.4m alongside. About 1.5 miles S of the mouth of the Matakana River are prominent white cliffs, 43m high. A rock, with a depth of less than 1.8m, lies 0.1 mile E of the S entrance point of Martins Bay, 1.5 miles SSW of Mullet Point.

Tides—Currents.—Tidal currents set W through the N channel, with the flood at a rate of 1 to 1.5 knots, between the S side of the Tawharanui Peninsula and the N tip of Kawau Island. This current turns S through the channel between Kawau Island and the Mayne Islands, between Edwards Point and Mullet Point, and then through the Inner Channel. The current sets S on the E side of Kawau Island with the flood, and attains a rate of 1 knot between Kawau Point and Flat Rock. The current sets N on both sides of Kawau Island with the ebb, and E through North Channel, where it attains a rate of almost 2 knots at springs In Rosario Channel and South Channel, the currents sets W with flood and E with the ebb, with rates of 0.5 knot at springs.

Caution.—Seaplanes operate out of Bon Accord Harbor. Anchoring is prohibited within 60m of the W side of Mansion House Bay due to seaplane operations.

10.39 Entrance channels to Kawau Bay.—North Channel is about 0.4 mile wide between the coastal banks and has depths less than 9.1m on either side. Maori Rock, which dries 1.1m, lies about 1 mile SW of Tokatu Point. A detached 2.9m patch lies 0.4 mile WSW of Maori Rock. Fairchild Reef, awash at HW, lies on the S side of North Channel. The area between this reef and Slip Islet is foul. A shoal, with a depth of 6.5m, lies nearly 0.3 mile off the NE coast of Kawau Island.

Sunk Kelp Rock, with a depth of 3.5m, lies almost 0.2 mile WNW of Kawati Point. Iris Shoal, with a depth of 6.5m, lies about 1.2 mile WSW of Kawati Point.

The Mayne Islands are two small, wooded islands that lie in the entrance to Kawau Bay. Eclipse Shoal, with a least depth of 3m, lies about 0.5 mile E from the N Mayne Island.

Directions—North Channel.—Vessels approaching from the N should give **Tokatu Point** (36°22'S., 174°52'E.), the tip of the Tawharanui Peninsula, a berth of at least 0.7 mile, and bring Mount Taylor, the highest hill on the NW part of Kawau Island, to bear 219°, and steer for it on that bearing until Kawati Point bears 266°. Vessels approaching from the E should bring Kawati Point to bear 266°, and head for it on that bearing until Mount Taylor bears 219°, or Fairchild Reef bears 246°, distance 0.5 mile. From this position vessels should steer 277° until Pembles Islet is in line with Edwards Point, bearing 201°. Vessels proceeding to Bon Accord Harbor should steer 209° which clears the rocks off Kawati Point, and then through the middle of the channel between Iris Shoal and Kawau Island. Vessels proceeding to Kawau Bay steer 251°, anchoring as convenient, in depths of 6.3 to 11m, fine sand, mud, and broken shell. The channel N of Maori Rock should only be utilized by small vessels of light draft in good weather with extensive local knowledge.

Kawau Bay—South entrance channels.—Rosario Channel is about 0.2 mile wide, with a depth of about 6.2m, and leads between the SW tip of Kawau Island, on the E, and Beehive Islet and Albert Shoal, on the W.

Passage Reef, Beehive Islet, and Albert Shoal all lie on a bank that projects W from the SW end of Kawau Island. Beehive Islet, 21m high and cone-shaped, is bordered by a white sandy beach.

Martello Rock, bordered by a reef and resembling a circular tower, lies about 0.5 mile W of Peaked Rocks.

South Channel lies between Passage Reef and the N side of Motuketekete Island; it is 0.5 mile wide, with depths of 11 to 22m in the fairway.

Motuketekete Island is the NE of the three islands that lie between 1.5 and 3 miles SW of Elizabeth Point, the SW tip of Kawau Island. The middle island, Moturekareka, is joined to the SW island, Motutara, by a drying reef.

Blanche Channel, between Motuketekete Island and Moturekareka Island, is about 0.1 mile wide, with a depth of 11m.

10.40 Motuora Island (36°30'S., 174°48'E.) lies nearly 4 miles SW of Elizabeth Point and is 68m high and conspicuous. The NE and E sides of the island are cliffy, while the W side has a sandy beach.

Inner Channel is bordered by Motutara Island and Motuora Island, on the E, and Te Haupa and the mainland N, on the W. This channel is mostly clear of dangers and has depths of 15m in the fairway. There is a channel, usable by small craft only, between Te Haupa and the mainland with a least depth of 6.4m.

Directions—South Channel.—Vessels should approach Rosario Channel with Peaked Rocks bearing 329° and steer through on that bearing until the point 1 mile W of Mullet Point is just open N of Mullet Point, bearing 286°. This leads N of the shoals off Beehive Islet in a least depth of 6.8m. Vessels should then pass either side of Martello Rock, keeping at least 0.1 mile off.

Vessels approaching South Channel should do so with the right tangent of Mullet Point, bearing 313°, which leads 0.3 mile N of Motuketekete Island and S of Albert Shoal. When the W tip of Rabbit Island opens W of Takangaroa Island, bearing 357°, vessels should steer on that mark until Mullet Point bears 285°, then passing midway between Takangaroa Island and Martello Rock and into Bon Accord Harbor.

Inner Channel has a least width of about 1 mile between Albert Shoal and Mullet Point. Vessels should steer with the W end of Rabbit Island open W of Takangaroa Island, bearing more than 357°, until Mullet Point bears 285°, when course should be changed for either Kawau Bay or Bon Accord Harbor.

10.41 Mahurangi Harbor is entered between Sadler Point and **South Head** (36°31'S., 174°44'E.), about 0.7 mile SSW. In the approach between South Head and Te Haupa Island, depths vary from 6.6 to 9.6m. However, within the entrance depths in the fairway increase sharply to over 12m, and 0.5 mile N of South Head is a depth of 19.4m.

Pudding Island, conical and 18m high, lies on the outer end of a reef which projects 0.2 mile NE from South Head. Casnell Island, 46m high, lies on the E side of the channel about 1.5 miles N of South Head. A drying rock and sand spit connects this islet to the shore N. Above Casnell Island, the channel becomes narrow and shoal.

Anchorage.—Anchorage may be found, in a depth of 14m, 0.2 mile WSW of the S tip of Sadler Point. In this position tidal currents do not exceed 1 knot. Additionally, anchorage may be obtained, in a depth of 10.3m, 0.1 mile W of the boat landing 0.3 mile N of Casnell Island.

Directions.—Vessels heading for Mahurangi Harbor should pass S and W of Te Haupa Island. A 67m summit, 0.3 mile N of Casnell Island, in line with the W tip of Sadler Point, bearing 340°, leads midway between Te Haupa Island and Pudding Island.

10.42 Waiwera Bluff (36°32'S., 174°43'E.) lies about 1.5 miles SSW of South Head, and is conspicuous rising to a height of 148m.

Whangaparaoa Bay is entered between the Waiwara River entrance and Huaroa Point, 6.7 miles ESE. The Orewa River empties into Whangaparaoa Bay, 3.5 miles S of the Waiwara. Except for Orewa Beach, N of the mouth of the Orewa River, the shore of Whangaparaoa Bay is mostly bold and cliffy with a rocky foreshore.

A spit, with depths of less than 5.5m, projects about 0.6 mile N from a point about 0.5 mile W of Huaroa Point. Wellington Rock, with a depth of 2.5m, projects about 1.2 miles WNW of Huaroa Point.

Anchorage.—Anchorage may be found, in depths of 7.3 to 9.1m, during offshore winds, S of Mahurangi Islet. While the holding ground is good, the anchorage is open to winds from the NNE through S. Also, anchorage may be found in Whangaparaoa Bay, in depths of 9.1 to 20.1m, sheltered from W and S winds. Strong NE winds send in a heavy sea that makes this anchorage untenable.

Tiritiri Matangi Island, 79m high and with a barren appearance, lies about 2 miles E of Huaroa Point and is separated from that point by Whangaparaoa Passage. This passage is free of dangers, with depths from 22 to 31m. Tidal currents set S with the flood and N with the ebb attaining a rate of less than 1 knot.

A prohibited anchorage area, best seen on the chart, lies in the passage.

Wooded Islet, 27m high with a bare islet close N, lies 0.2 mile NE of the N tip of Tiritiri Matangi Island. Several rocks that dry, project 0.2 mile NE of Wooded Islet. Shag Rock, a peaked rock 6m high, lies 0.7 mile NE of the light of Tiritiri Matangi Island.

Shearer Rock, steep-to and with a depth of 0.6m, lies 1 mile E of the light. Another rock, with a swept depth of 7m, lies 0.4 mile SE of Shearer Rock. Ballons Rock, with a depth of 1.8m, and a rock 0.1 mile SE of it, lie about 0.2 mile W of the N end of the island.

Karepiro Bay (36°39'S., 174°45'E.) is entered between a point about 4 miles WSW of the SE tip of the Whangaparoa Peninsula and Piripiri Point, 1.5 miles SW. Toroa Point, cliffy and about 40m high, lies about 2 miles SSE of Piripiri Point. Rocks, which dry, project 0.1 mile from it.

Anchorage.—Anchorage may be found in Karepiro Bay, in depths of 7.3 to 11m, mud, during N and W winds. Torbay Bay, lying 0.5 mile S of Toroa Point, is encumbered by several drying and below-water rocks.

Approaches to Auckland Harbor

10.43 Auckland Harbor is accessible to vessels with drafts to 12.7m (2007). Additionally, anchorage is available in the inner harbor, good holding ground, in depths of 9.1 to 21.9m.

Four approach channels lead to Auckland Harbor between the off-lying islands and the mainland of North Island, as follows:

1. Northwest approach—through Rangitoto Channel, between Rangitoto Island and the mainland.
2. North approach—through Motuihe Channel.
3. Northeast approach—through Waiheke Channel.
4. Southeast approach—through Ponui Passage.

Rangitoto Channel—Approach.—Rangitoto Channel is the only channel which can accommodate vessels with drafts of up to 12.7m, while the other channels are limited by a least depth of 5.2m in the fairway in Motukorea Channel.

Each leg of Rangioto Channel approach is well defined by fairway directional and/or range lights whose characteristics

and locations can best be seen on the chart. Entry to the first fairway is just inside the charted Maritime Limit Boundary after passing through a charted Restricted Area that prohibits fishing and anchoring. The extent of the first fairway directional light, Auckland Approach Directional Light (36°48'S., 174°47'E.), marking the approach to the Rangitoto Channel, bears NNW at an approximate range of 3 miles from the N end of Rakino Island.

The inbound track leads SW to Rangitoto Channel, passing NW of Rakino Island, 6.5 miles SSE, and NW of Rangitoto Island, 9.5 miles S. The two pilot boarding locations, referred to as Bravo and Alpha, lie along this first leg of the approach channel.

The next leg in the channel trends SE and is well defined by a pair of range lights and a directional light. The front range light, located at the SE end of the channel (36°49'S., 174°50'E.), is easily recognizable as a white concrete pile structure with red bands. The rear range light also serves as a direction light and is identifiable by its red square on a white pile and is located close off. The channel is followed to a position S of North Head (36°44'S., 174°55'E.) at the entrance to Auckland Harbor.

The Noises are a group of islands that lie on a bank, with depths less than 5.5m, located about 10 miles E of Toroa Point. Motuhoropa Island, the Northwesterners island in The Noises cluster, is 55m high. Otata Island, which lies.0.5 mile SW of Motuhoropa Island, has the highest elevation of The Noises cluster at 65m.

Rakino Island, SW of The Noises, rises to 65m. rock, with a depth of 3.7m, lies about 0.4 mile NW of its W tip. The Three Sisters Islets, 25m high, lie about 0.3 mile S of the same point. South Islet, 11m high, lies 0.1 mile S of the S tip of Rakino Island. Awash Rock, which dries, lies 0.2 mile SSE of South Islet.

Motutapu Island lies SSW of Rakino Island and is separated from it by the 0.5 mile wide Rakino Channel. A drying reef, with a rock 18m high at its outer end, projects about 0.6 mile N from the NW tip of Motutapu Island.

Rangitoto Island

Rangitoto Island (36°47'S., 174°52'E.) lies close W of Motutapo Island and is connected to it by a drying sand bank, Gardiner Gap. Rangitoto Island presents a conspicuous mark visible for 30 miles, as it is covered with stunted pohutukawa, manuka, and scrub, rising to a height of 259m, with a crater summit and two pronounced mounds on either side.

Aspect.—There are four groups of four red obstruction lights shown from the radio masts of the National Broadcasting Station, 10 miles WSW of Rangitoto Lighted Beacon. These lights are visible from sea between Rakino Island and Tiritiri Matangi Island.

A pinnacle rock, with a depth of 0.9m over it, lies about 0.7 mile S of Rangitoto Lighted Beacon. Duder Spit, with depths of 6.1 to 11m over it, projects about 0.7 mile NW from the rock. A rocky spit, with depths less than 5m over it, projects from the SW tip of Rangitoto Island almost to the E edge of Rangitoto Channel.

10.44 West side of Rangitoto Channel.—Takapuna Beach fronts the town of Takapuna; about 0.3 mile NW of the cable beacon on the beach is a church with a red tower. A rocky bank, with depths less than 5.5m, projects 0.2 mile off this shore.

Takapuna Head (36°49'S., 174°48.4'E.) is 18m high and surmounted by a house with a turret on it. Rough Rock, with a depth of 2.6m, lies about 0.6 mile E of Takapuna Head.

East shore of Rangitoto.—A bank, with depths less than 5.5m, joins the S tip of Rangitoto Island with the mainland S. Bean Rocks lie near the W edge of the S part of this bank, about 1.5 SE of Takapuna Head.

10.45 Motuihe Channel—Approaches.—This channel is approached between Motuhoropapa Island and Thumb Point, the NE tip of Waiheke Island, 10.5 miles ESE.

David Rocks, the highest being 19.8m, lie on the N end of a chain of above and below-water rocks surrounded by foul ground, about 3 miles NE of Rakino Island. Maria Island, 29m high, is the highest on this region of foul ground. Ahaaha Rocks, which dry, lie about 1.2 miles ENE of David Rocks.

D'Urville Rocks lies about 2.7 miles SE of Ahaaha Rocks. The NW ends of Motuihe Island and Waiheke Island, in line bearing 236°, leads 0.2 mile SE of the above rocks. The NW end of Waiheke Island, bearing 225°, with the NW end and neck of Motuihe Island well open NW, leads about 0.5 mile NW of the rocks. A rocky shoal, with a swept depth of 4.6m, lies about 1.5 miles SW of D'Urville Rocks.

Waiheke Island (36°48'S., 175°05'E.), whose N coast forms the S side of the approach to Motuihe Channel, is indented, grassy, with rounded hills rising to Maunganui Hill, 230m high.

Gannet Rock, 27m high, lies about 1 mile N of Thumb Point, the N point of Waiheke Island. Onetangi Bay is entered about 5 miles SW of Thumb Point; however, it is open N. There is a sandy beach at the head of the bay, behind which is the town of Onetangi.

Motuihe Island, 62m high and grassy with many trees, lies about 3 miles SW of the NW tip of Waiheke Island. A wharf lies on the S side of the NW point of Motuihe Island. A dangerous rock is located about 150m NW of Motuihe Wharf. Two rocks, with swept depths of 3.6m and 5.8m, lie 0.4 and 0.6 mile SE, respectively, of the S tip of Motutapu Island, at the S end of Motuihe Channel.

Onhanaki and Matiatia are two small bays that indent the N part of the W side of Waiheke Island. There is a wharf at Matiatia Bay.

Sergeant Channel, lying between the E shore of Motuihe Island and the W shore of Waiheke Island, is separated into two parts by a rocky ledge which dries. Papakohatu Islet, 10.4m high, lies upon this rocky ledge. Between this islet and the W shore of Waiheke Island, there are several shoals with depths of 3.3m and less in the fairway. The fairway of the W channel is 0.2 mile wide, with a least depth of 7.9m.

Motukorea Channel joins Motuihe Channel and Tamaki Strait with the approaches to Auckland Harbor; it has a least depth of 3m over the bar S of Rangitoto Island.

Islington Bay, on the N side of the channel, lies between Motutapu Island and Rangitoto Island. There are two small piers on the W side of this bay near the entrance and another small jetty on the W side near the head. Anchorage here is accomplished with the permission of Naval authorities only.

Browns Island (36°50'S., 174°54'E.) is located about 4 miles SW of Motuihe Island and lies on the SE part of the bank, with depths less than 5.5m, that joins Rangitoto Island with the mainland S. A reef, with depths less than 1.8m, connects Browns Island with Musick Point on the mainland S.

West Tamaki Head is located on the mainland, about 1.5 miles SW of Browns Island. The shore in this vicinity is mostly cliffy, and is fronted by a rocky bank. A prominent water tower stands about 0.4 mile WSW of West Tamaki Head.

Waiheke Channel lies between Waiheke Island and an archipelago of islands and islets to the E, and leads to Tamaki Strait at its SW end. This channel has depths of 6m in its SW section.

10.46 West side of Waiheke Channel.—Kauri Point (36°46'S., 175°12'E.) is the NE tip of Waiheke Island. From this point the coast leads about 1 mile SW to the E entrance point of a bay.

Anchorage.—Vessels with local knowledge can obtain anchorage, in a depth of 12m, 0.6 mile W of this point. There is a small jetty in Waiti Bay, close W of the above E entrance point, and a small wharf in Man O War Bay, entered about 1.5 miles SW of the same point.

Taniwhanui Point (36°49'S., 175°10'E.) lies about 2 miles SW of the above E entrance point of the unnamed bay; the shore 1.5 miles S is pocked by numerous small bays.

Pakatoa Island, located on the E side of Waiheke Channel, is 56m high. A reef with a conspicuous rock, 3.7m high, near its outer end projects 0.2 mile NNE of the N tip of the island. Frenchmans Cap, cone-shaped and steep-to, projects 0.5 mile SW of Pakatoa Island. Tarahiki, 58m high, 1.5 miles ENE of Pakatoa, is bare and grey with a jagged outline. This islet is located upon a rocky bank with shoals lying 0.7 mile SW and S of it.

Sunday Rock, with a depth of 1.5m, lies about 0.4 mile E of the SE end of Waiheke Island. There is clear passage on either side of this rock. Ponui Island rises to 173m high and is mostly covered with scrub. Reefs, with rocks, project 0.3 mile from the N side of the NE end of Ponui Island. A beacon lies on the S side of Ruthe Passage, separating Poinui Island from Rotoroa. Ruthe Passage should only be used by vessels with local knowledge. There are three conspicuous white wind generators, each about 24m high, on a hill at the N end of Ponui Island.

Tides—Currents.—Currents in Waiheke Channel set S with the flood and N with the ebb.

10.47 Tamaki Strait.—Tamaki Strait is located between Waiheke Island, to the N, and the mainland of North Island, to the S. This strait affords excellent anchorage as well as smooth water during W winds. There are general depths in this strait of from 3 to 9m.

Whakakaiwhara Point (36°54'S., 175°06'E.) is a rocky point, 89m high, that is located about 4.5 miles W of the S tip of Ponui Island. From this point, the S shore of Tamaki Strait trends about 6 miles WNW to Motukareka, a flat-topped island, 21m high. Motukareka is joined to the shore S by a drying ledge.

The N side of Tamaki Strait is formed by the S coast of Waiheke Island, which is indented by 7 small bays. Passage Rock lies off the entrance to Te Matuku Bay, the easternmost of the Seven Bays.

Tides—Currents.—When the tide at Auckland is rising, currents run into Tamaki Strait through the channels at either end, attaining a rate of about 2 knots in the narrows at springs. When the tide is falling at Auckland, the currents flow out of the strait through the channels at either end. In the central part of the strait, currents are not discernible.

Sandspit Passage (36°54'S., 175°11'E.), located between the S end of Ponui Island and Pauhenehene Spit (Sandspit), forms the SE approach to Tamaki Strait. This passage is about 0.1 mile wide between the banks, with depths of less than 5.5m on either side. Sandspit Passage should not be attempted without local knowledge.

Caution.—A prohibited area 1 mile in radius is centered on the explosives jetty at **Koherurahi Point** (36°55'S., 175°08'E.).

10.48 The Tamaki River is entered S of Browns Island, between Musick Point and West Tamaki Head. This river runs about 8 miles S to Otahuhu. Also, there is a bar in its entrance, over which there is a maximum depth of 1.8m, after which the channel deepens.

The Panmure Bridge spans the Tamaki River roughly 5 miles from its entrance; it has a safe vertical clearance of 8m in the center of the navigation span and a depth of 8.2m in the fairway under the bridge.

The Pakuranga Bridge, with a safe vertical clearance of 14m, crosses the river 0.2 mile above the Panmure Bridge.

Small vessels with extensive local knowledge can obtain anchorage in the river about 0.5 mile SE of **Sandy Point** (36°52'S., 174°53'E.), in depths of 7.3 to 9.1m.

A submarine cable is laid across the river 0.1 mile S of Sandy Point; anchorage is prohibited within 61m of the cable.

Auckland Harbor (36°50'S., 174°47'E.)

World Port Index No. 55060

10.49 Auckland Harbor is located close within the mouth of the Waitemata River and can accommodate vessels with drafts to 11.6m. This port, which may be entered day or night, has facilities for tankers, container ships, and ro-ro vessels.

The port of Auckland is under the jurisdiction of the Auckland Harbor Board.

The city of Auckland lies on a thin neck of land that divides the Waitemata River, on the N, from Manukau Harbor, on the S. This city is known locally as the Queen City.

Ports of Auckland

http://poal.co.nz

Winds—Weather

Fog may be experienced from May to September.

Tides—Currents

At the entrance, tidal currents attain a velocity of 0.5 knot at neaps and 1.5 knots at springs. In Rangitoto Channel and anchorages, 1 knot at neaps and 2 knots at springs may be experienced. In the approaches to the wharves, the rate of the current varies considerably, and as much as 1.5 knots at neaps and 3 knots at springs may be encountered. Caution should therefore be exercised when maneuvering in the vicinity of the wharves.

Both flood and ebb currents along the shores in the harbor begin to run from 30 to 40 minutes earlier than in midstream and, in the vicinity of the main wharves, may begin approximately 2 hours earlier at spring tides. Near the main wharves, Fergusson Container Terminal influences the flood current considerably at certain stages of the tide. Therefore, vessels should inquire as to the best time to come alongside or leave the main wharves.

Depths—Limitations

The Auckland Harbor Bridge is comprised of seven spans on six concrete piers. The maximum vertical clearance under the main navigational span, located between No. 1 Pier and No. 2 Pier, is 42m, gradually reducing to 39.8m at a distance of 76m on either side of center. A daymark (green triangle, white border) is painted on the E and W faces of No 1 Pier. No craft should pass between No 1 Pier and Stokes Point.At night, the center part of the main navigational span is indicated by an orange light, a green light, and a red light, disposed vertically. Red obstruction lights are shown about these lights.

The Commercial Harbor lies on the S side of Auckland Harbor and is bordered on the E by Fergusson Container Terminal and on the W by Wynyard Wharf, 1.2 miles W.

Fergusson Container Terminal has a tanker berth with three dolphins on its E side and Fergusson Wharf, for container traffic, on its W side. The tanker berth can accommodate vessels with a length of 183m and a draft of 10m. Tankers usually berth starboard side-to at slack water; they can undock at any time. Fergusson Wharf is 600m long, with a dredged depth of 12.2m.

Freyberg Wharf lies 0.1 mile W of Fergusson Wharf. The E side is 210m long and has a depth alongside of 11m. The W side is 216m long and has a depth alongside of 11m.

Jellicoe Wharf lies about 0.1 mile W of Freyberg Wharf and can accommodate vessels up to 335m long on its E or W side a Drafts up to 10.1m are accepted alongside.

Bledisloe Terminal, about 0.1 mile W of Jellicoe Wharf, has two berths with stern ro-ro facilities. No. 1 Berth, the inner berth, is 137m long, with dredged depths of 7.5 to 10m. No. 2 Berth, the outer berth, is 224m long, with depths of 9 to 10m. No. 3 Berth can accommodate vessels having a maximum length of 259m, with a maximum draft of 10.5 to 12.5m.

Marsden Wharf can accommodate vessels up to 91m long, with drafts to 7.5m, on its W side. The E side is 198m in length and has depths of 3 to 5m alongside. The four small craft berths are not maintained.

Captain Cook Wharf lies close W of Marsden Wharf. The E side is 247m in length and has depths alongside of 6.5 to 10m, which are not maintained. The W side is 205m in length and has a depth of 9.5m alongside.

Queens Wharf, used for passenger service, lies about 100m W of Captain Cook Wharf. The wharf has a dredged depth of 10.5m alongside its E side and 11.5m alongside its W side.

The basin between Queens and Princes Wharves is dredged to depths of 7 to 11m.

Princes Wharf, lying 0.1 mile W of Queens Wharf, has a dredged depth of 10.5m on its E side; depths alongside its W side are no longer maintained by dredging, but were last reported to be from 9 to 10m.

Hobson Wharf, lying close W of the root of Princes Wharf, can accommodate vessels with drafts of 5.8m on its E side and 5.5m on its W side. A viaduct, with an opening 13.7m wide spanned by a lifting bridge, lies between the root of Hobson Wharf and the root of Wynyard Wharf, 0.3 mile W. There are depths of 3.4 to 4.3m alongside the N part of the viaduct. Wynyard Wharf is dredged to depths of 9.5 to 11.5m.

The Bulk Cement Wharf, situated on the W side of the reclamation, has a limiting draft of 5.5m alongside. On the N side of the Waitemata River is Chelsea Bulk Sugar Wharf (36°49'S., 174°43'E.), which is 95m long and can accommodate vessels with 9.4m drafts.

All wharves in the commercial port, except Fergusson Wharf, the ro-ro berths, Kings Wharf, Marsden Wharf, Hobson Wharf, and Wynyard Wharf, are joined to the main railway system. Vessels may leave berths at night. Cargo vessels are not normally berthed at night, but when possible are berthed before 0800. Vessels are advised to use tugs for berthing. Berthing is carried out at most stages of the tide.

Aspect

The Waitemata River can be navigated by vessels with drafts to 6.1m nearly to **Herald Island** (36°47'S., 174°40'E.). Located on the N shore, between Birkenhead Wharf and **Kauri Point** (36°50'S., 174°43'E.), is a conspicuous chimney at the sugar works at Chelsea. There are also mooring buoys, used to assist is berthing, moored E and W of the wharf.

Torpedo Bay indents the SW side of North Head. A monument and a clock tower stand at the head of Torpedo Bay.

Prominent objects in Auckland include the War Museum, the general hospital, the tower of the University College, and the square tower of St. Mathew Church, situated about 1 mile SW, 1.2 miles WSW, and 1.5 miles W, respectively, of **Point Resolution** (36°51'S., 174°48'E.).

The entrance to Shoal Bay, a large expanse of mud flats and shallow water, lies between Stanley Point and **Stokes Point**

Courtesy of Ports of Auckland Ltd.

Auckland Harbor from W

(36°50'S., 174°45'E.). Both Stokes and Stanley Points can be distinguished by a conspicuous fir tree near their respective tips. Two flagstaffs stand NE of Stokes Point.

There is a prominent clock tower on the Ferries Building, close to the root of the Ferries Wharf. Five white lights mark the end of the Bulk Cement Wharf. Six prominent concrete silos, each 32m high, stand near the jetty. A large green and red neon sign is shown above the E end of the silos.

Pilotage

Pilotage is compulsory for all vessels over 500 gt entering or leaving Auckland Harbor S of latitude 36°46'S, except for those exempt by law. Vessels are either met at the Outer Boarding Area, 3 miles NNE of Rangitoto Light, in position 36°44.2'S, 174°50.5'E, or at the Inner Boarding Area, 1.5 miles NNE of Rangitoto Light, in position 36°45.1'S, 174°49.8'E. If the pilot cannot board, the pilot may lead the vessel in from the pilot boat.

Inbound vessels with a draft of 10.5m or greater, or more than 200m in length, must have a pilot embark before passing the Outer Boarding Area.

Vessels should request pilotage through the Harbormaster, Auckland at least 24 hours in advance, confirming at least 4 hours prior to arrival. If the vessel's ETA is to be altered, a message must be sent at least 4 hours in advance of the vessel's new ETA.

Tankers must arrive at the pilot boarding place not later than 30 minutes before sunset; otherwise berthing is postponed until the following morning. Other vessels with drafts not greater than 11m can enter at any time. Vessels of deeper draft must await HW.

Departing vessels should request the pilot 2 hours in advance.

A radar station, with the scanner placed just E of the signal station on Mount Victoria, offers advisory information on a vessel's position in the approaches to Auckland. The information, available from the signal station, is given as a range and bearing from the signal station.

Regulations

All vessels over 40m long entering the port of Auckland must contact harbor control on VHF channel 12 for arrival instructions when passing the following reporting points:

a. 36°38.5'S, 174°56.0'E.
b. 36°36.7'S, 174°51.5'E.
c. 36°45.0'S, 174°58.3'E.
d. 36°49.5'S, 174°57.6'E.
e. 36°45.2'S, 174°49.7'E.
f. 36°41.7'S, 174°56.7'E.
g. 36°50.5'S, 174°55.0'E.

The quarantine and explosives anchorage lies on the SE side of Rangitoto Island. Vessels awaiting medical examination should anchor within the charted area off Commercial Harbor.

Vessels proceeding under the Auckland Harbor Bridge must have a pilot aboard. Traffic is restricted to one-way travel within 0.7 mile of the bridge, with the vessel stemming the tide giving way to all other vessels.

No person or craft may pass through the following areas without the authority of the Queens Harbormaster, Auckland:

1. Calliope Dock Area.
2. Ngataringa Bay.
3. Onetaunga Bay (Defense Area).
4. Islington Bay.

A Fast Ferry Zone, best seen on the chart, has been established (2005) in the vicinity of **Otahuhu Point** (36°47'S., 174°55'E.). No vessel may impede the passage of a Fast Passenger Ferry, identified by an orange flashing light, within this zone. Anchoring and fishing are prohibited within the Fast Ferry Zone.

Signals

A signal station, painted white, stands on Mount Victoria, 3 miles SSW of Rangitoto Light. Vessels can communicate with the station day or night either visually or by blinker light or via VHF. A continuous listening watch is maintained on 2182 kHz and VHF channel 16.

When the wind in Auckland Harbor and/or Hauraki Gulf is expected to gust over 33 knots, the following visual signals are displayed by day at the signal station:

1. Black cone, point up—Wind expected from the N sector.
2. Black cone, point down—Wind expected from the S sector.

Anchorage

Four charted anchorage berths lie in the approaches to Rangitoto Channel, N of the pilot boarding ground. Depths at the anchorages range from 12 to 26m, good holding ground reported. Anchorage berths lie off Commercial Harbor and offer depths of up to 12.2m, sand and shells, as indicated on the chart.

An explosives anchorages are located within a 0.2-mile radius of position 36°50.3'S, 174°48.2'E. This anchorage is restricted to vessels carrying less then 100 tons of explosives.

Several prohibited anchorages lie in the approaches to, and the waters of Auckland Harbor, and are best seen on the appropriate chart.

Directions

Rangitoto Channel.—Rangitoto Channel can be approached from a position about 3 miles E of Tiritiri Matangi Island within the white sector of Auckland Approach Direction Light, bearing between 214.5° and 217.5°. When Buoy A is abeam to port, vessels should change course S, at night taking care to keep within the white sector of Bean Rocks Light, and when Rangitoto Channel lights come into range, bearing 142.2° with the rear range light showing white, vessels should steer on this alignment; then, be guided by the buoys and lights to the harbor. The white sector of Bean Rocks Light seen over the stern is an excellent steering aid when approaching Commercial Harbor.

Mariners are cautioned that navigational and ship's lights are often difficult to make out because of bright shore lighting.

Those vessels utilizing Motuihe Channel to Motukorea Channel should pass midway between Maria Island and the beacon on D'Urville Rocks. Then vessels should steer 227° and pass NW of the dangers that lie off the NW part of Motuihe Island. Then pass between the W edge of the foul ground off the NW side of Motuihe Island and the 4.9m and 5.8m rocks located 0.8 miles W of the N point of the island. Then from a position SE of the S tip of Motutapu Island vessels should steer for Browns Island Lighted Beacon bearing 225°, until the SE end of Cheltenham Beach is in line with the flagstaff on Mount Victoria bearing 263°, which leads over the bar and, when Bean Rocks Light bears 205°, steer for the entrance of the harbor.

Waiheke Channel—Tamaki Strait.—Vessels with local knowledge entering Waiheke Channel pass halfway between the prominent rock N of Pakatoa Island and the shore of Waiheke Island, remaining in the middle of the fairway until they steer abeam of Finger Point. From this position a vessel should steer to pass 0.2 mile off the shore of Waiheke Island to avoid Sunday Rock, until abeam of the SE tip of the island. Course should then be shaped to pass 0.2 mile SE of Passage Rock. When Passage Rock bears N, head for **Maraeta Point** (36°53'S., 175°02'E.), bearing 261°, to avoid the 5.5m shoal SW of Passage Rock. Vessels should then head for Park Point, bearing 300°, with **Pauhenehene Spit Light** (Sandspit Light) (36°54'S., 175°11'E.) bearing 120°, astern, until they can steer for Browns Lighted Beacon, bearing 281°, and when abeam the S part of Motuihe Island, steer 310°, and proceed as directed above.

Tamaki Strait—Southeast approach.—Vessels should approach Sandspit Passage with Pauhenehene Spit Light (36°54'S., 175°11'E.), bearing 305°, until within about 0.2 mile of it; then steer to pass about 150m NE of it and keep in the fairway between the dangers on either side until about 0.8 mile NW of Pauhenehene Spit Light, when they should steer in that direction with it astern, bearing 123°. When Browns Island Lighted Beacon bears 281°, a vessel should steer for it on that bearing and proceed as directed above. This passage should not be used without local knowledge.

East Shore of Hauraki Gulf

10.50 Cape Colville (36°28'S., 175°21'E.) is the NW extremity of the Moehau Peninsula. The Moehau Range and the Cormandel Range, high and wooded, project NW through this peninsula rising abruptly from the sea.

Port Jackson, entered between Cape Colville and Kaiiti Point, 1 mile SW, affords good anchorage, as charted, in depths of 5 to 10m, only during SE winds. A sandy beach forms the head of this bight. A rock, which dries 0.9m, lies 0.2 mile NW of Kaiiti Point.

The coast, SE from Kaiiti Point, leads for almost 10 miles to Colville Bay, and it is bold, cliffy, and densely wooded.

Colville Bay, entered between Tokotarea and Te Whau Points, is small, open W, shallow, and dries some distance from its head. The coast leads S from Colville Bay, about 5.5 miles, to Hautapu Point.

The Motukawao Group are a chain of islets and dangers whose NW part, Motupotaka Rocks, lies 3.5 miles WSW of Te Whau Point. This chain extends about 5 miles SE from Motupotaka Rocks, which are steep-to. The channels between the islands are deep.

The shore between Hautapu and the SW end of a narrow peninsula, 3.5 miles SSE, is indented by two bays with boulder beaches at their heads. Kikowhakarere, the S of these bays, is fronted by several islands. Two channels lead between these islands and the mainland. The N channel, Hautapu Channel, is entered between Hautapu Point and **Hautapu Rocks** (36°44'S., 175°25'E.), 1 mile SW. This channel is clear of dangers and recommended for use. The S channel, Waimate Channel, is entered between the S end of Waimate Island and Motutapere Island, and it is clear of dangers and deep.

Waimate Island lies about 3 miles S of Hautapu Island. A rock, which dries, lies 0.3 mile W of the NW end of Waimate Island.

Motutapere Island, densely wooded and prominent, lies with its dome-shaped summit about 0.4 mile SE of the SE end of Waimate Island.

Anchorage may be found, in a depth of 14.6m, mud, about 0.4 mile E of the E side of Waimate. Anchorage may be found, in depth of 11m, about 0.4 mile NE of the N tip of Motupere Island.

10.51 Coromandel Harbor (36°48'S., 175°28'E.) projects NE about 4 miles between Whanganui Island on the NW and the mainland on the SE.

Castle Rock Hill, 520m high, is located about 3 miles E of the head of the harbor; its square rock summit is a good mark for identifying Coromandel Harbor.

Tawhiti Rock, with a depth of 3.5m over it lies about 0.3 mile WSW of Tawhiti Point, the SW end of Whanganui Island. Cow Islet, 30m high and bare, lies about 1.5 miles WSW of Tawhiti Point. Calf Islet, 10.7m high, lies on a bank with depths of less than 9.1m over it, which projects 0.4 mile S of Cow Islet.

Rangipukea Island (36°50'S., 175°25'E.) is a rocky island whose N end is a steep-to cliff on the edge of which there is a prominent overhanging bush. A reef, that dries, projects 0.1 mile S from the S end of the island, and it is marked on its W side by a beacon. Shoals, with depths of 10.9 and 14.9m, lie 0.7 mile W and WNW, respectively, off the S tip of Rangipukea Island.

Directions.—Vessels with local knowledge entering Coromandel Harbor should pass halfway between Tawhiti Rock and Cow Islet, or between Calf Islet and Rangipukea Island. Either passage is free of dangers with depths of at least 14.6m.

Anchorage.—Vessels with local knowledge can obtain anchorage within Coromandel Harbor, in depths of not less than 6.7m, as far in as the SE tip of Whanganui Island. At this anchorage the holding ground is good and several moderate gales have been ridden out in about 6.4m, about 0.2 mile E of the SE tip of Whanganui Island.

Te Kouma Harbor (36°49'S., 175°26'E.) is sheltered by Rangipukea Island and is the next bight S of Coromandel Harbor. A rock, awash, lies in the center of the inner part of Te Kouma Harbor. Vessels with local knowledge can obtain anchorage, in a depth of 6.4m, about 0.5 mile within the entrance. However, 0.2 mile further in, the head of the harbor is shoal.

Wekarua Islet is located about 0.5 mile SSE of Rangipukea Harbor. An islet, 50m high, lies 0.1 mile E of Wekaura. A rock lies midway between Wekarua and the islet. Shoals, with depths of 6m and 7.4m, lie 0.3 and 0.9 mile W, respectively, of the island.

Firth of Thames

10.52 East shore.—Deadmans Point (36°51'S., 175°24'E.), the E entrance point of the Firth of Thames, lies about 3 miles S of Cow Islet and reaches an elevation of 194m.

Rocky Point is located about 16 miles SE of Deadmans Point. A conspicuous white water tank stands near the N end of the village of Tararu, about 0.7 miles SSE of Rocky Point. The prominent twin peaked summit of Maumaupaki, 818m high, in the Coromandel Range, may be seen upon passing the town of Tapu, about 7.2 miles N of Rocky Point. As long as the twin peaked summit is open, the firth is comparatively deep, but when it closes in a vessel will be near the 5.5m bank.

10.53 West shore.—Ruakura Point (36°56'S., 175°11'E.) lies 1.7 miles S of the S tip of Ponui Island, which was previously described in paragraph 10.46. The coastal bank, with depths less than 5m and upon which the sea breaks with a N swell, projects about 1 mile NE of Orere Point. Orere Point lies 3 mile ESE of Ruakura Point. Rocks lie near the edge of the bank. Titokarua Reef dries 1.2m and extends about 1 mile NE from Orere Point; it is marked by a beacon on its W side.

From Orere Point, the shore trends SE for 2.5 miles to Waimangu Point. Midway between these two points is a rock, with a depth of less than 1.8m, lying 0.3 mile offshore. At Wharekawa, 4 miles S of Waimangu Point, is a small camber where lighters load gravel. The camber has a depth of 1m alongside its S side; the beached hulk of a wooden mine sweeper, conspicuous from sea, provides shelter from the S.

Caution.—Due to the inshore fishing that is done in the Firth of Thames, vessels should be on the lookout for the presence of fishing gear, marker buoys, submarine buoys, etc.

10.54 Head.—The entire head of the Firth of Thames is bordered by mangroves and is fronted by a drying mud flat that extends up to 2.2 miles offshore. The river entrances are not

easily made out from the offing. Navigation of the various rivers should not be attempted without extensive local knowledge.

There are no known dangers in the Firth of Thames beyond 1 mile offshore, except at the head of the firth, which is very shallow.

Anchorage can be found practically anywhere in the Firth; however, it provides little or no shelter from S or SW winds. Some shelter from E or SE winds may be found near the E shore.

Cape Colville to East Cape

10.55 Cape Colville (36°28'S., 175°21'E.), the NW tip of the Moehau Peninsula, was previously described in paragraph 10.50. A conspicuous cone-shaped bluff, 217m high, lies about 3.2 miles E of Cape Colville.

Square Top Island lies on the outer edge of a spit projecting 0.7 mile NNW from the cone-shaped bluff. A shoal, with a depth of 7m, lies 0.4 mile W of Square Top Island. A 19.5m patch lies 0.7 mile NW of the island.

Te Anaputa, a cliffy point, stands about 8 miles SE of Square Top Island and forms the N entrance point to Waikawau Bay. Waikawau Bay is entered between Te Anaputa and Haupapa Point, 3.5 miles SSE. A rock lies 0.1 mile off Haupapa. Rocks project 0.6 mile N of a point 0.4 mile W of Haupapa.

Waikawau Bay affords anchorage for vessels with winds from the W and S quarters. A rocky shoal, with a depth of 12.8m, lies nearly 1 mile NE of Haupapa Point.

Kennedy Bay, entered about 5 miles SE of Haupapa, affords anchorage, in depths of 5.5 to 9.1m, during winds from the N to S, through W. During strong E and NE winds, the sea breaks across the center of the bay. A rock, awash, lies 0.3 mile E of Anarake, the SE entrance point of Kennedy Bay.

The shore between Anarake and Te Rehutae, the sheer NW entrance point to Whangapoua Harbor, 2.5 miles SE, is distinguished by two sandy beaches separated by a prominent grass covered, conical hill, 72m high.

Whangapoua Harbor has a depth of 0.6m over the bar and is only available for boats with extensive local knowledge.

Mahinapua Bay (Opito Bay)(36°43'S., 175°48'E.) is entered between Tokarahu Point and Opito Point, 2 miles SE.

Anchorage may be found in this sandy bay during winds from the NW through W to SE, in 10 to 20m, sand. A section of Tokarahu Point is nearly severed and several rocks lie NE and E of it. A reef lies 0.5 mile S of the point and extends 0.2 mile offshore.

Rabbit Island lies 0.2 mile N of Opito Point; the passage between is foul. Sunk Rock, awash, lies 0.2 mile E of Rabbit Island. A rock, which dries 0.9m, lies 0.2 mile SSE of Sunk Rock. Koruenga Island (Motukoruenga Island), 52m high and steep, lies 1 mile SE of Sunk Rock. Needle Rock, 77m high and perpendicular, lies 0.3 mile SE of Koruenga Islet. A perforation in this rock is open on NW and SE bearings. A rock, 6m high, lies between Koruenga Islet and Needle Rock.

10.56 Off-lying islands and dangers.—Hole in the Wall is a passage with a least depth of 22m that lies between the Mercury Islands and the mainland. Mariners are warned that passage through Hole in the Wall should not be attempted without local knowledge.

The Mercury Islands, a group of islands lying on the NE side of Hole in the Wall, is comprised of three main and several smaller islands with rocks and reefs between.

Great Mercury Island (36°36'S., 175°47'E.) is the NW and largest of this group. From the NE, it presents a prominent white cliffy face from its summit, Mohi Mountain, which is 230m high. The NW shore of this island is darker in color and joined to the SE part by a low, narrow neck. Reefs project 0.5 mile N from the NW tip, and Never Fail, a rock 3m high and steep-to, lies 0.6 mile NE of the N tip of the island.

Anchorage may be found in a bay on the W side of Great Mercury Island during good weather, in a depth of 22m, sand. The Sisters Rocks, 23m and 24m high, lie 0.5 mile S and 0.5 mile SSE of Maunganui, the N entrance point of the bay. Reefs lie between The Sisters and the point.

A rock, with a swept depth of 16.4m, lies 1.2 miles SW of Maunganui. A reef, with a depth of 5.2m over its outer end, projects 0.4 mile S of the SW tip of Great Mercury Island. A shoal, with a depth of 20m, lies nearly 2 miles SW of the same point.

Red Mercury Island, a wildlife sanctuary, is the easternmost of this group and rises to a height of 154m in its N part. This island is covered with dense scrub and has a reddish appearance when seen from N. It has been reported that this island gives good radar returns at up to 19 miles.

Richards Rock, which dries 0.6m, lies 1.7 miles N of the summit of Red Mercury Island. This rock is steep-to on all sides and breaks when there is a swell. A rocky bank, with a depth of 17.7m, lies 0.7 mile NW of Richards Rock. Rocky shoals, with depths of 5.5m and 20.1m, lie 1.2 and 2 miles SE of the SE end of Red Mercury Island. Within about 1 mile W of the W side of Red Mercury Island is Double Islet, which are two islets joined together by a boulder isthmus. Several rocks and islets lie between Red Mercury Island and Great Mercury Island and are best seen on the chart. The passages between the islands of this group require extensive local knowledge.

Ohinau Island, the S island of the Mercury Group, is 101m high, cliff-bound, and covered with dense scrub. A 12.5m bank lies 1.5 miles E of the S tip of Ohinau. A 24m bank lies 0.7 mile SE of the S tip of Ohinau. Flat Island, a rock 5m high, lies 0.7 mile NW of the N tip of Ohinau. Black Rocks, a rocky islet in two parts, 27m high, lies 0.7 mile N of Flat Island. Reefs and rocks, best shown on the chart, surround Black Rocks.

Old Man Rock, mostly steep-to, lies 1.7 miles NW of Ohinau Island on the NE side of Hole in the Wall. This rock is 64m high, perpendicular, and covered with sparse vegetation. A rock, which dries 1.8m, lies about 150m SE of Old Man Rock.

Danger Rocks, 5m high, lie 1.5 miles NE of the N end of Ohinau Island. Whale Rock, 8m high, lies 2.7 miles NE of Ohinau. An 11.6m patch lies 1 mile W of Whale Rock. Cobra Rock, a pinnacle, with a depth of 6.1m, lies about 3 miles ENE of Whale Rock.

10.57 Mercury Bay (36°47'S., 175°49'E.) is entered between Motukoranga Island and South Sunk Rock, about 4.2 miles S. This bay affords anchorage, during W winds, in sandy bays on the N and S shores. The N shore of the bay is wooded; the S shore is mostly barren and covered with scrub.

North shore.—Motukoranga Island, 107m high, lies about 3

miles WSW of Ohinau Island. A rocky pillar, 32m high, lies close off its SE side. The Twins, two cone-shaped rocks, lie 1.2 miles SW of Motukoranga Island. These rocks are steep-to except for a rock, with a depth of 1.5m, 100m NW of the NW rock.

Matapaua Bay lies about 1 mile W of Motukoranga Island and is used by fishermen for shelter. Mahungarape Island, 43m high, is a steep, rocky island with bushes on top.

Maungatawhiriri, 302m high, is a conspicuous triple-peaked hill located about 4.5 miles SW of Motukoranga Island.

South Shore.—Motukorure Island (Middle Island), 54m high, lies about 1 mile SE of Mahungarape, and a reef projects 0.2 mile off its NE side and 0.1 mile off its S side; the W side being steep-to. Two patches, with depths of 7.4 and 12.8m, lie about 1.5 miles E of Motukorure Island. A rocky patch, with a depth of 12.5m, lies 0.3 mile SE of the same island.

10.58 Cooks Bay, which indents the S shore, is entered between **Shakespeare Cliff** (36°50'S., 175°44'E.) and Cook Bluff, about 1.7 miles NE. Shakespeare Cliff is white in color and 75m high. Pandora Rock, with a depth of 1.8m, lies 0.3 mile NW of the NW part of Shakespeare Cliff. A chain of rocks lies between it and the cliff.

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Shakespeare Cliff

Tides—Currents.—For the most part, tidal currents in Mercury Bay are weak, seldom exceeding 0.3 of a knot. West of a line NNW from Shakespeare Cliff the current has a clockwise rotary motion on the ebb and is fairly strong in shallow depths in the SW extremity of the bay.

In the entrance to Whitianga Harbor, the flood current was observed to obtain a rate of 1.5 knots with the ebb reaching 2.2 knots at springs. However, these rates will vary with the amount of fresh water coming down the river. Additionally, it was reported that a rate of 7 knots was common at springs. Tidal eddies are reported in the harbor in the Narrows and around the piers at all tidal stages.

Anchorage.—Vessels with local knowledge anchor on either side of Motukorure Island, in depths of 7 to 20m. Vessels can also anchor off Shakespeare Cliff, in a depth of 5.8m, with the cliff bearing between 173° and 195°. Vessels should not anchor further in because of Pandora Rock and other dangers. Anchorage may also be found, in a depth of 7.3m, with Moturoa Islet just open of Cook Bluff, bearing 077°.

10.59 Motueka (36°49'S., 175°48'E.) is a steep and broken islet, 87m high. Foul ground extends off its N shore and it is almost connected to the mainland S by foul ground. Moturoa Islet (Tower Rock) is a prominent pillar-shaped rock, 57m high, lying 0.5 mile NE of Motueka Islet. This islet is surrounded with foul ground. An 8.2m shoal lies halfway between Motueka Islet and Moturoa Islet.

South Sunk Rock, which usually breaks, lies about 0.7 mile ENE of Motueka Islet.

Mahurangi Islet, 78m high, lies 0.5 mile S of South Sunk Rock, and it is long and grassy. Between Mahurangi and Hereheretaura Point, 0.5 mile S, are several islets, rocks, and other dangers that are best shown on the chart.

Whitianga Harbor is entered at the SW part of Mercury Bay between Whakapenui Point, a cliffy point on which there are fir trees, and Hukihuki Point, which is low. This harbor can only be entered by small vessels with extensive local knowledge.

Whitianga Wharf is T-shaped and stands on Hukihuki Point. This wharf is 61m long, with depths of 4m alongside. There are depths 5 to 8.5m in the channel off the wharf.

Directions.—Vessels approaching Mercury Bay from the NW should pass either N or E of the Mercury Islands or through Hole In The Wall. When proceeding N or E of the Mercury Islands, **Richards Rock** (36°35'S., 175°56'E.) and **Cobra Rock** (36°41'S., 175°59'E.) should be passed with caution.

Hole In The Wall, the inner passage, is entered halfway between Great Mercury Island and Tokarahu Point. A vessel should then head for the SW end of Ohinau Island, bearing 137°, and open NE of Old Man Rock. When about 1 mile away from Old Man Rock, change course to pass about 0.2 mile SW of it, keeping Needle Rock bearing about 171°, on which bearing the perforation in it is closed so as to pass E of Sunk Rock. When S of Old Man Rock, vessels should head to pass between Ohinau Island and Needle Rock by giving the latter a berth of at least 0.2 mile. Vessels should then proceed into Mercury Bay, passing E of The Twins and between Mahungarape Island and Motukorure Island.

Vessels entering Mercury Bay from the S should not change course W until Cook Bluff bears about 250°, and is open N of Moturoa Islet. This course clears Sunk Rock; a vessel can then steer to pass S of Motukorure Islet, taking care to avoid the foul ground N of Moturoa Islet.

Caution.—Depths considerably less then charted have been reported (2005) in the approaches to Whitianga.

The Bay of Plenty

10.60 The Bay of Plenty lies between Mercury Bay and Cape Runaway, a distance of about 110 miles ESE. This bay has within it many islands and rocks and reefs. The most offlying of the islands is White Island, which lies about 37 miles W of Cape Runaway. The only anchorage of any importance is Tauranga Harbor, as it is the only one that affords shelter to

large vessels.

West shore—Bay of Plenty.—Te Huruhuru Point lies about 10 miles SSE of the S entrance of Mercury Bay; the coast between is pocked with sandy bays separated by cliffy points. Te Huruhuru Point, which is 178m high, and almost blocks the entrance to the Tairua River, consists of two nipple-shaped hills lying E and W of each other at the SE tip of a low, narrow, sandy neck.

The Tairua River empties out into the sea between Te Huruhuru Point and Royal Billy Point, a low pine-covered point, 0.2 mile W. There is a depth of 1.2m over the bar, which breaks with an E swell. The channel is narrow, constantly changing, with depths of 1.2 to 5.6m as far as the wharf, 0.7 mile within the entrance. A smaller wharf lies 0.5 mile NW of Te Huruhuru Point.

Off-lying islands.—Castle Island, 61m high, lies 3.7 miles ESE of **Hereheretaura** (36°50'S., 175°49'E.); it is high, rocky, and steep-to.

Shoe Island, 124m high, lies 1.7 miles ENE of Te Huruhuru Point. This island, when bearing about NE or SE, has the appearance of a shoe. Two black rocks lie about 0.7 mile E of Shoe Island. Shoal patches, with depth of 20m and 27.9m, lie 0.8 mile and 2.2 miles NNE, respectively, of Shoe Island. A shoal, with a depth of 22.2m, lies 3 miles NNE of the island.

10.61 Slipper Island (37°03'S., 175°57'E.) lies about 4.5 miles ESE of Te Huruhuru Point. The N tip rises steeply to a conspicuous summit, 141m high. The S end of the island is undulating and low. Penguin Island and Rabbit Island, joined by rocks that dry, lie off its S end. A rock, 14m high, lies 0.4 mile S of Rabbit Island. Shoals, with depths of 11m and 12.9m, lie 0.5 mile NE and 0.7 mile N, respectively, of Slipper Island Light. A shoal, with a depth of 7.5m, lies 0.4 mile SE of Rabbit Island.

Roller Patch, with a depth of 6.9m, lies 0.8 mile NW of Slipper Island, and breaks with strong NE gales. Blind Rock, with a depth of 0.9m, lies 1 mile SW of Slipper Island and seldom breaks. A shoal, with a depth of 13m, lies 0.5 mile W of Blind Rock.

Shoals, with depths of 8.4m and 10m, lie 0.2 mile and 0.5 mile NNE, respectively, of Blind Rock,. Watchman Rock, 10m high, lies 0.4 mile S of Blind Rock. A sandy patch, with a depth of 8.9m, lies 1.2 miles SW of the rock.

Anchorage may be obtained W of the S end of Slipper Island, in a depth of not less than 8m, during a SE gale. With strong N winds, a heavy swell sets into this anchorage.

Directions.—Vessels proceeding N inside Slipper Island should pass not less than 0.2 mile W of the rock, 14m high, S of Rabbit Island. Then proceed to pass W of Watchman and Blind Rocks, keeping 0.8 mile off the mainland coast.

The Aldermen Islands are a wildlife sanctuary that lie about 10 miles ENE of Slipper Island. All of this group of four islands and several prominent islets and rocks are steep and rocky. The islands are covered in dense vegetation. Around the Aldermen Islands, foul ground extends up to 0.3 mile offshore in places. Vessels should navigate with caution as shoals rise abruptly from the sea bed. Vessels without local knowledge are advised to remain in depths greater than 50m in the vicinity of these islands. A shoal, with a depth of 8m, lies 1.5 miles SE of the southernmost of the Aldermen Islands, and a 26m patch lies 1 mile further SSE.

Whangamata Harbor, utilized by small craft only, is entered about 10 miles SSW of Slipper Island. There is a depth of 2.9m over the bar.

For a distance of about 10 miles SSE of the entrance to the **Otahu River** (37°14'S., 175°53'E.), the shore is composed of scrub-covered steep-to cliffs, with occasional low-lying parts containing sandy beaches with streams. Te Keho (37°19'S., 175°54'E.), a conspicuous peak, 312m high, stands 1.5 miles inland. Bowentown, with a jetty on its W side, stands on the E side of two conspicuous hills, each 92m high, on the N entrance point of Katikati Entrance.

10.62 Mayor Island (37°17'S., 176°15'E.), a wildlife sanctuary, lies about 17 miles NE of the entrance to Katikati Harbor. The summit, 358m high, is at the N end of a high, wooded, conspicuous ridge of hills on the W side of the island. Large blocks of obsidian crop up in parts of the island giving it a remarkable glistening appearance when reflecting the suns rays. At the S end of the island are the remains of an old Pah or Maori fort. Good landing may be obtained in a deep bay E of the fort, except in strong E winds, when fair landing may be effected on the W side of the island at the S end of a dark, sandy beach. Mayor Island has been reported to give good radar returns up to 23 miles.

Anchorage.—Anchorage may be found, sheltered from E winds, off a bight on the W side of the island, in a depth of 18.3m, with the N and S tangents of the island bearing 016° and 158°, respectively.

In calm weather, anchorage can be obtained, in depths from 18.3 to 36.6m, in positions 0.3 to 0.5 mile offshore, at almost any point around the island. A rock, with a depth of 3m, lies 0.5 mile NNW of the NE end of Mayor Island. Tuhua Rocks, awash, lie about 1 mile E of the SE end of the island.

Penguin Shoal, with a depth of 10m, lies 9 miles SSE of Mayor Island. Pudney Rock, with a depth of 19.2m, lies 4.5 miles SW of Penguin Shoal.

Katikati Entrance, only used by small vessels with local knowledge, is located between Bowentown and the N end of Matakana Island, 0.2 mile S. This entrance represents the N entrance to Tauranga Harbor and extensive sand banks, parts of which dry, project for about 1 mile E on both sides of the entrance. Between the outer sections of these banks is a sand bar, 1.2 miles E of the entrance, with depths of 1.2 to 1.5m. This sand bar breaks heavily with an E swell and with fresh onshore winds, making the approach very dangerous during the ebb. In the channel close W of the narrows, the incoming current attains a rate over 2.5 knots and the outgoing current a rate of 3 knots at springs.

A boat channel, which dries and across which is a power cable, connects Katikati Entrance with Western Entrance. The cable is overhead, except for a 75m wide gap, where it is buried.

Depths on the bar are subject to frequent change. It is dangerous to cross the bar without recent local knowledge.

Directions—Katikati Entrance.—Small vessels with local knowledge entering this channel over the bar keep Transit Hill, a scrub-covered hill, 250m high, lying about 3 miles W of Bowentown, in line with the point about 0.3 mile W of that town, bearing about 273°.

Small vessels with local knowledge can obtain anchorage

about 1.7 miles SW of Katikati Entrance, abeam Ongare Point, in depths of 7.3 to 8.5m. Vessels should not anchor in Katikati Entrance as currents are strong and the shifting nature of the sandy bottom may cause the anchor to drag.

Tauranga (37°39'S., 176°11'E.)

World Port Index No. 55080

10.63 Tauranga Harbor represents the only harbor between Mercury Bay and Wellington that affords shelter to vessels of moderate draft in all winds. Mount Maunganui, on the E side of the entrance, is a conspicuous flat-topped hill, with steep, rocky slopes covered with thick scrub that rises abruptly from the sandy shore to an elevation of 231m. From sea, Mount Maunganui appears as an island.

The W side of the entrance to the harbor is formed by undulating sand hills which front pine tree plantations at the SE end of Matakana Island. A pilot cut has been dredged through the bar, which lies at the entrance approaches to the harbor, to a depth of 10.1m over a width of 366m. No. 1 Reach Range Lights lead through the center of the dredged channel.

Local magnetic anomalies may be experienced in the vicinity of Tauranga when in depths of less than 30m.

Port of Tauranga

http://www.port-tauranga.co.nz

Tides—Currents.—The tidal rise at Tauranga is 2.0m at springs, 1.3m at neaps.

The tidal currents at the entrance and in the channels leading to the wharves can be greatly affected by prevailing weather conditions. Ebb and flood tides flow approximately 3 knots at neaps and 5 knots at springs through the entrance channel.

Due to the strong tidal currents in the port entrance, vessels generally plan to arrive and depart between slack water and a maximum tidal rate of 1.5 knots.

The flood current sets W from the approaches to No. 1 Reach until reaching the vicinity of North West Rock, where it joins a S set making into No. 2 Reach. It begins about 30 minutes after the Auckland LW tidal predictions. This S set continues until abeam of Panepane Point, where it fans out into the harbor. In the vicinity of Panepane Point, the currents attain rates of up to 4 knots at springs. In No. 3 Reach, the flood runs in the general direction of the channel and rates up to 0.5 knots can be experienced during spring tides. In Cutter Channel the flood runs in the general direction of the channel and then into the Maunganui Roads. At Berth No. 1 and Berth No. 2, a set is felt onto them. In Cutter Channel and Maunganui Roads, the flood current attains rates of 0.8 to 1.5 knots at springs.

The ebb current sets out of No. 1 Reach in a NE direction until reaching the vicinity of North Rock, where it leads in an E direction. It begins about 30 minutes after Auckland HW tidal predictions. The current attains rates up to 3 knots at springs; the SW current is of short duration and is barely discernible at times.

In No. 2 Reach, the ebb begins to run N along the E side about 30 minutes before the turn of the tide. During spring tides, the ebb sets up overfalls over the rock shoal lying 295°, 0.2 mile from Stony Point Light.

In No. 3 Reach, Cutter Channel, and Maunganui Roads, the ebb current runs opposite to the flood current described above.

Depths—Limitations.—Vessels entering, departing, or transiting Tauranga Harbor are limited to a length of 290m, at the harbormaster's discretion. The maximum draft permitted while in the waters of the port is 13m at HW and 11.7m at LW.

Mount Maungauni Wharf, divided into N and S sectors, has a total length of 2,055m between them, with dredged depths of 10.4 to 12.5m alongside. The wharf offers 11 berths. A tanker berth, situated about 0.2 mile S of the S end of Mount Maungauni Wharf, has a dredged depth of 12m alongside.

On the W side of Stella Passage is Sulphur Point Wharf, with three berths, each with a dredged depth of 14.5m alongside.

The port's entrance channel, which leads through Matakana Bank, is segmented into No. 1 Reach, No. 2 Reach, and No. 3 Reach. Cutter Channel leads to Maunganui Roads. No. 3 Reach was dredged to a depth of 10.4m.

Western Channel, which leads W from Cutter Channel towards Rangiwaea Island, is marked by beacons and buoys and is subject to drying at the NW end off Matakana Point.

Stella Passage, the continuation S of Maunganui Roads, leads S through Town Reach to the Railway Wharf at Tauranga. There was a least depth of 3.4m on the Town Reach range line in 1980.

Aspect.—A bar, which breaks during N and E gales, fronts the entrance channel between Matakana Bank and Mount Maunganui. Mount Maunganui, conspicuous with steep, rocky sides, rises to a height of 231m. Stony Point lies 0.4 mile SSW of the summit, with a reef projecting 100m from it. North West Rock, 15m high, with a light on it, projects from the coast about 0.3 mile WNW of the summit.

The signal station, a prominent octagonal building painted white, is situated about 0.6 mile ESE of the mountain top. The building has a flag staff, and a radio tower stands close by.

Red obstruction lights are shown from radio masts situated 0.6 mile and 3 miles SE of the mountain top.

Pilotage.— The Pilotage Limit area comprises all waters of Tauranga Harbor bounded by the arc of a circle radius 3 miles centered on North Rock (37°34.9'S., 176°10.5'E.) and includes the commercial area of the harbor. Pilotage is compulsory for all vessels over 250 gt.

The pilot boards 3 miles NE of North Rock Light. Two pilot launches are in service. One is 16m long, yellow colored, and named Arataki. The other is 12.6m long and colored orange, with the words Survey/Pilot on its side.

If the pilot cannot board because of bad weather, then the pilot vessel will lead the vessel into smoother waters and board. Inbound vessels must give 24 hour notice via radio of this ETA. Vessels bound from Auckland or other close ports should send their ETA immediately after departure, requesting a pilot at this time. A second message confirming or amending the first is to be sent 4 hours prior to arrival, but if the vessel is ahead of schedule, the confirming message should be sent 4 hours in advance of its new ETA. Vessels arriving on weekends should provide an ETA to the harbormaster before 1600 on Friday. All communications should be addressed to Harbormaster, Tauranga.

Regulations.—Docking or undocking of all vessels, including tankers, is usually accomplished 24 hours. Tankers are ber-

thed starboard side-to in order to ease departure in case of emergency.

Vessels entering at HWS dock on the ebb current, while those entering at LWS berth at Maunganui Wharf at slack water, or at Railway Wharf on the flood. Those not possessing extensive local knowledge should only enter at slack water.

Departing vessels equipped with a radiotelephone must advise the signal station when clear of the harbor limits. Vessels should contact Tauranga Port Radio when passing A Beacon (37°36.1'S, 176°10.7'E) both inbound and outbound.

Anchorage.—Vessels awaiting a pilot can find anchorage, in 25 to 27m, in anchor berths numbered 1 to 3, SE of the pilot boarding position (37°34.9'S., 176°12.5'E.). Anchorage may be found closer to shore, in depths of 20 to 22m, about 1.5 miles NE of North Rock (37°37.4'S., 176°1.5'E.). A prohibited anchoring and fishing area, best shown on the chart, lies NE of Mount Maunganui.

The quarantine anchorage lies about 3 miles ENE of Mount Maunganui Light.

Six additional anchor berths have been established to the ENE of Matakana Island in positions centered, as follows:

Tauranga—Outer Anchorages	
Anchorage	**Position**
No. 4	37°33.40'S, 176°10.00'E
No. 5	35°15.09'S, 174°05.87'E
No. 6	35°15.76'S, 174°06.62'E
No. 7	35°16.90'S, 174°06.75'E
No. 8	35°16.90'S, 174°06.75'E
No. 9	35°16.90'S, 174°06.75'E
No. 10	35°16.90'S, 174°06.75'E

Prohibited anchorage exists in the Harbor Approach Area, which is the sector of a circle radius 2.5 miles, centered on No. 1 Reach Rear Leading Light (37°38.1'S., 176°09.4'E.), contained between the bearings of 026 °and 037° from the light, which can best be seen on the chart.

A prohibited anchorage exists within 50m of the commercial wharves. The channels leading from the harbor entrance to Tauranga and off the berths are restricted anchorages, except in an emergency.

Vessels are advised not to anchor in the channel W of Stony Point Light as the ground is foul.

Directions.—Vessels should steer for Mount Maunganui, bearing 195°, until No. 1 Reach Range Lights are in line, and can be steered for. Stay on this range until Stony Point Light is open W of the shore SW of Mount Maunganui, and course can be changed to bring No. 2 Reach Range Lights into alignment. When the Cutter Reach range is in alignment, alter course onto the range line, and proceed to Maunganui Roads. If proceeding to Railway Wharf, steer through Stella Passage, being guided by the buoys and lights, until the Town Reach Range Lights can be steered for. These lights lead to the wharf.

Vessels entering the harbor against the ebb current must make full allowance for it off Stony Point Light. This ebb current tends to take a vessel N and inshore, and this inclination is more pronounced during strong W winds. Those vessels entering on a strong flood current should make their turn earlier from No. 2 Reach on to Cutter Channel Range, taking care to avoid the coastal bank W of Stony Point.

Caution.—Local magnetic anomalies may be experienced in depths of less than 30m in the approaches to Tauranga

The approaches to Tauranga are dangerous to navigation during strong NE winds and swells. Dangerous breaking seas can be expected, particularly during an ebb tide.

10.64 Otanewainuku Mountain, 639m high, lies about 13 miles S of Tauranga, and from it a prominent flat-topped range of hills, 305m high, projects NW.

Town Point (37°45'S., 176°28'E.), which lies 16 miles SE of Tauranga Harbor entrance, is a sheer grass-topped cliff rising gradually to two summits. The white cliffs forming the E side of Town Point are conspicuous. Town Shoals, with depths less than 5.5m, extend about 2 miles N from Town Point. Shoals, with depths of 19.2, 20, and 18.9m, lie 2.2 miles N, 2.5 miles NE, and 2.2 miles NE, respectively, of Town Point. Town Point should not be approached within a distance of 2 miles.

Motiti Island (37°38'S., 176°25'E.), 64m high in its NE part, is faced with cliffs and grass-covered. The NE and E sides are fronted by a ledge of rocks. Motiti Spit, with depths less than 5.5m, projects about 1 mile SW from the S tip of Motiti Island. Matatapu Rocks, 1.8m high, lie about 0.5 mile SE of the S tip of Motiti Island.

Okaparu Reef and Brewis Shoal lie on a bank with general depths of 18.3m and 36.6m. Okaparu Reef, which breaks during all swells, particularly during NE and N gales, has within it two rocks with depths less than 1.8m. A 5.8m shoal lies 0.4 mile SE of Okaparu Reefs.

Caution.—Numerous uncharted rocks lie NE of Motiti Island between Taikanapa Point, Tumu Bay, and Waihi Point.

Astrolabe Reef (37°32'S., 176°26'E.), a flat rock which breaks in all swells, dries 1.5m and lies about 4 miles N of the N end of Motiti Island. Astrolabe Reef appears, in calm weather, as a boat.

Motuhaku Island (Schooner Island), 15m high, lies about 6.2 miles SE of Astrolabe Reef.

Motunau Island, 45m high, is rocky and mostly steep-to except off its S side. Motunau Patch, 0.5 mile S of Motunau Island, is comprised of two close together rocky heads with a least depth of 5.5m. Tokeroa Shoal, a rocky shoal with a depth of 4m, lies 1.5 miles SW of Motunau Island.

Caution.—The passages between Motunau Patch, Tokeroa Shoal and Motunau Island should not be used for navigation.

10.65 Te Pareoterawahirua (Te Para), 228m high and conspicuous, stands about 8 miles SE of Town Point. A dangerous below-water rock lies 4.5 miles SE of Town Point. Mount Edgecumbe, 821m high and prominent, rises from the plain about 18.5 miles SE of Te Pareoterawahirua.

Matata (37°54'S., 176°45'E.) is situated at the E termination of white cliffs, 183m high. From Matata to the entrance of the Whakatane River, about 13 miles ESE, the shore is formed by low scrub-covered sandhills backed by an extensive plain intersected by canals.

The Rurima Islands is the largest of a cluster of islets and

rocks, above-water and awash, that stand on the NE part of a bank with depths less than 18.3m. This bank projects about 7 miles NE from the shore near Matata. These rocks should be given a wide berth. Those vessels using the channel between Rurima Rocks and the shore should keep nearer the shore as it shelves gradually. This channel has depths from 12.8 to 14.6m.

Motuhora (Whale Island) (37°52'S., 176°58'E.), which lies nearly 5 miles E of Rurima Rocks, is conspicuous and appears bell-shaped from sea. On the SW side of this island, abeam the anchorage and E of a sandy beach, there is a gully where there are boiling springs.

Anchorage.—There is good anchorage off the SW side of Motuhora Island; the best position is, in 12.8m, sand, with the SW end of the island bearing 335° and the SE end bearing 080°. With good ground tackle, a gale could be ridden out here as the holding ground is good.

Gales mostly begin from the N and veer through W to SW, bringing a heavy sea into the anchorage. However, a vessel should not anchor too close in, as when the wind gets round to the SW there would not be enough room to veer or weigh if necessary. This is the only area in the Bay of Plenty, between Tauranga and Cape Runaway, that affords shelter in a NE gale.

Caution.—Shoals are reported to exist between the W end of Motuhora Island and the Rurima Islands.

White Island (Whakaari Island) (37°32'S., 177°11'E.), which lies almost centered in the Bay of Plenty, is rugged, barren, with an active volcano. The Volkner Islets lie 3.5 miles NW of the summit of White Island and are steep, rocky and inaccessible. Both the Volkner Islets and White Island lie upon a bank with depths of 47.5 to 179.2m. Off the N and E coast of White Island, many pinnacle rocks rise from the sea bed.

Caution.—Rumble Three Seamount, with a depth of 119m, lies about 125 miles NE of White Island.

10.66 The Whakatane River is entered W of **Kohi Point** (37°56'S., 177°01'E.), the NE entrance point. The entrance channel to the river, marked by beacons, lies between large boulder rocks, which dry. The bar, which breaks right across under certain conditions of weather, should not be attempted without extensive local knowledge. The depth on the bar at HWS is seldom less than 2.1m.

Anchorage may be found, in a depth of 18.3m, about 1.5 miles NNW of Kohi Point; the holding ground is reported good, comprised of fine silty sand. This anchorage, while not providing shelter during strong onshore winds, does afford some security in moderately bad weather.

Opotiki Harbor is entered through the Opotiki River, about 13 miles E of Kohi Point, which is about 0.1 mile wide. The bar, which has a depth of about 0.3m, frequently shifts. The river is no longer considered to be navigable. There is anchorage, 1.2 miles N of the entrance to the river, in a depth of 12.8m.

Opape Point (37°58'S., 177°21'E.), lying 7 miles E of Opotiki Harbor, is the place on the coast where the sandy beach is backed by low sand hills, which extend from Town Point. Haurere Point lies 1 mile NE of Opape Point and is fronted by rocky ledges. Several peaks stand on Haurere Point.

Pehitari Point lies 2.5 miles NE of Haurere Point, and it is a bold bluff, 165m high. The shore NE for 19 miles from Pehitari Point is comprised of sand and shingle beaches separated by rocky points.

Omaio Bay is entered between Pokahinu Point and **Motunui Islet** (37°47'S., 177°39'E.), 2 miles NE. Vessels can obtain good anchorage in Omaio Bay, in a depth of 16.5m, mud, with Motunui bearing 027°, distance 0.4 mile. Strong winds from the NW quadrant have been ridden out here, but, it is not recommended.

10.67 Te Kaha Point (37°45'S., 177°40'E.) lies 3 miles NNE of Motunui and it is a low, flat point with the town of Te Kaha on it. The church at Te Kaha is conspicuous. Rocks project 0.3 mile W of Te Kaha Point; they should be given a wide berth. Te Paraua is a prominent 375m high hill, bare on its seaward side, located about 8.5 miles NE by E of Te Kaha Point.

Whangaparaoa Roads is entered between Orete Point, which is low and flat, and Cape Runaway, 5.5 miles NE. The shore 2.5 miles E of Orete Point is comprised of a rocky foreshore with patches of sand. White cliffs, 24m high, distinguish the shore a further 1.5 miles NNE. From the NE end of the cliffs, a sand and shingle beach projects 1.5 miles NE to the mouth of the Whangaparaoa River. From here, the rocky shore continues to Cape Runaway. Foul ground projects 0.5 mile offshore from the N part of the white cliffs, while the S side of the roads is fronted by a rocky bank.

Cape Runaway (37°32'S., 177°59'E.), the E entrance point of the Bay of Plenty, is dark, oval, and appears from sea as an island. Cape Runaway is reportedly radar conspicuous at 14 miles. There is always a swell off the cape and tidal currents in its vicinity are strong; therefore, vessels should give Cape Runaway a wide berth.

Whangaparaoa Road affords anchorage in its S part, sheltered from W and SW winds, in depths of 12.8 to 20.1m, fine sand and mud, with Orete Point bearing 267°, distant 1 mile. With N winds, a long swell sets in.

Additionally, there is anchorage, during NE and SE winds, 2 miles S of Cape Runaway. Large vessels should not approach the shore within a depth of 22m and should anchor about 1 mile W of a 164m high cone-shaped hill, lying 0.5 mile NW of the mouth of the Whangaparaoa River. Northwest and W winds send a heavy sea into the anchorage.

10.68 Hikurangi (37°55'S., 178°04'E.), 1,753m high, lies about 23 miles S of Cape Runaway. This prominent peak is the highest land on the peninsula. On W bearings, the peak appears as two distinct peaks close together.

Honokawa, 1,328m high, has a triple summit and is located 4.5 miles NW of Hikurangi.

The shore, 16 miles E from Cape Runaway to Matakaoa Point, is backed by hills that are steep and densely wooded. Lottin Point, lying 9 miles E of Cape Runaway, is 149m high, prominent, and appears yellow from sea. Patangata, 282m high, stands about 1.5 miles W of Matakaoa Point, and is conspicuous from N.

Caution.—Due to the presence of a continual swell and strong tidal currents, this section of coast should be given a wide berth.

Hicks Bay is entered between Matakaoa Point and Te Koau Point, about 2 miles S. Te Koau Point is steep with a conspicuous pillar of rock on its summit.

The N and S shores of Hicks bay are steep and mostly faced with cliffs; the head of the bay is sandy. A wharf, 46m long, lies on the N shore of Hicks Bay. The town of Hicks Bay, where there is a prominent church, stands near the S end of the beach.

Hicks Bay affords good shelter from winds from the W. A vessel of about 1,000 gt anchored, in a depth of 16.5m, blue clay, with the pier head bearing 311°, Matakoa Point bearing 056°, and the church bearing 208°. From this position, which is reported to have the best holding ground, the water shoals gradually towards the head of the bay.

Vessels can find shelter from SE winds by anchoring under the lee of Te Koau Point, however, should a gale come up it is advisable to put to sea or proceed to Whangaparaoa Road. Northeast gales, which generally commence from the E and gradually freshen, give sufficient warning, as the swell comes in a day or two before.

Kawa Kawa Roads lies off the sandy beach that projects E for 3.5 miles from the inner part of Te Koau Point to the mouth of the Awatere River. Kawa Kawa Roads affords some shelter during SE winds, in depths of 16.5 to 21.9m, about 1.5 miles NW of the entrance to the Awatere River and 1 mile offshore.

Aspect.—Paoneone Hill (Table Hill), 268m high and prominent, lies about 1.7 miles SW of the entrance to the Awatere River. Oukeamaru, 992m high and prominent, stands 6.5 miles WSW of this entrance. For about 2.5 miles E of the entrance to the Awatere River, the shore is comprised of conspicuous white cliffs, 122 to 152m high.

Horoera Point (37°38'S., 178°29'E.), with Maungakaka its summit, is prominent and lies about 2.5 miles E of the E end of the white cliffs.

10.69 East Cape (37°41'S., 178°33'E.) is the E point of New Zealand and is very mountainous. East Cape is comprised of a remarkable white clay sand, with rocks projecting E from it. The summits of five distinct ranges backed by the snow-capped Hikurangi, 27 miles SW, visible from sea in good weather.

Tides—Currents.—In the vicinity S of East Cape, the current sets N with the flood, and after rounding the cape, WNW along the coast at a rate of about 1 knot. Off East Island and in the channel W of the island, the rate becomes much greater and causes heavy tide rips.

At East Cape, SE winds are common and are said to be strong at times. Violent squalls from the mountains are to be expected during SW gales in the roadsteads between Cape Runaway and East Cape. Winds on either side of East Cape are often very different, even when strong. The strong W winds in the Bay of Plenty suddenly fail when passing S of the Cape; the distinct wind line being shown on the surface of the water.

East Island lies about 1 mile E of East Cape and is 127m high, conspicuous, and steep. Vessels should pass about 2 miles E of the island. There are two shoal patches off East Cape, coupled with the strong tidal currents, which make passage between the Cape and the island dangerous. Strong tide rips occur about 3 miles ENE of East Island.

A bank, with depths less than 183m, projects about 25 miles NE from East Cape. Ranfurly Bank lies on the E part of this bank. The tide rips are heavy over these banks, and a constant current has been experienced setting at a rate of 3 to 4 knots, and at times of 5 to 6 knots, causing, with a wind, a very heavy sea. Both the strong current and the heavy sea were found only on the banks.

A depth of 19m lies 23.5 miles ENE of East Cape Light.

East Cape to Cape Palliser

10.70 The E coast of North Island, S from East Cape to Cape Palliser, has many dangers within 3 miles of it as well as a heavy surf upon it, making approaches difficult except in fine weather. Off this section of shore the bottom is green mud outside the 50m line and fine sand within. When navigating off this coast, advantage may be taken of the tidal currents by standing offshore or inshore.

Tides—Currents.—Off the coast between East Cape and Gable End Foreland, the tidal currents set N with the flood and S with the ebb, at rates from 0.5 to 1 knot. Their influence is not felt at more than 5 miles offshore. There is a constant current that sets S at a rate of about 1 knot, outside of the 183m curve, but it is dependent on the force and direction of wind.

The Waiapu River empties out into the sea about 6 miles SSW of East Cape. Pouhautea, a prominent hill, 130m high, which generally appears dark from sea, lies on the S side of the entrance.

Whararikі Point, which lies about 3.5 miles SW of the entrance to the Waiapu River, is a conspicuous rounded rocky point. Eclipse Rock, lying 0.7 mile NE of Whararikі Point, breaks only in a moderate swell, but there is a swirl over it in good weather. This rock is the N end of the foul ground extending off the point.

Anchorage may be taken, with offshore winds, in depths of 12.8 to 14.6m fine sand, on either side of the Waiapu River entrance, 1 mile offshore.

Caution.—Depths shallower than charted may exist from East Island to Whararikі Point out to the 20m contour.

Tuparoa is a brown-colored hill, 282m high, that has a unique cleft in its E side, similar to those on Whararikі Point.

Kaimoho Head, a rounded bluff, lies 7 miles SSW of Whararikі Point. Otua, a conspicuous summit, 505m high, stands 2.5 miles W of the head. Anvil Summit, a prominent hill, lies about 2.7 miles SW of Kaimoho Head.

Open Bay is entered between Matahau Point and Te Tara Head, 4 miles S. Te Tara Head rises to a sharp summit and it is bold and cliffy. Several detached rocks lie close off the head.

Small vessels with local knowledge can obtain anchorage in Open Bay inside the ridge in the NW part of Open Bay. However, the most sheltered anchorage is in a depth of 14.6m, about 0.5 mile NW of Te Tara Head. Southeast gales can be ridden out in safety here.

10.71 Tokomaru Bay (38°08'S., 178°22'E.) is entered between Kotunui Point and Mawhai Point, 4 miles S. There is a pier in Waima Cove on the N side of the bay. This pier has depths of 3.7 to 4.9m alongside each side at the outer end. In 1984, the pier was in a state of disrepair. Hikutu Rock, a rocky patch, the top of which is formed by two isolated rocks, awash, lies almost in the center of the bay.

Good anchorage may be found, in a depth of 22m, about 0.5 mile S of the pierhead. Large vessels anchoring at night should not proceed inside a depth of 25.6m.

Anaura Bay is entered between Morahahi Head and Motuoroi Island (Anaura Island), 1.5 miles S. This bay has a sandy beach at its head and is bordered on its N side by rocks. In 1769, Captain Cook landed at Anaura, located at the S end of the bay.

There is anchorage in the center of Anaura Bay during offshore winds, in depths of 12.8 to 14.6m. However, E winds send a heavy swell into this anchorage.

Marau Point, a prominent rounded bluff of light color, lies 2.5 miles SSE of the E end of Motuoroi. Steep cliffs line the points N side and steep grassy slopes its S side. Takamapuhia Reef, steep-to and which usually breaks, lies 1 mile ESE of Marau Point. Tokatea Rocks, with a depth of less than 1.8m, lie 0.4 mile SSW of the S part of Marau Point.

The N entrance point of Tolaga Bay is sheer on its S side, 168m high, white, and conspicuous. Motuheka lies 0.4 mile NE of the N entrance of Tolaga Bay and it is surrounded by rocks. Tatara Reef, which dries and usually breaks, lies 1.5 miles NE of the N entrance point. A rocky patch lies about 1 mile N of Tatara Reef.

Titirangi, 343m high and conspicuous, stands 1.2 miles SSW of the S entrance point of Tolaga Bay. Mitre Rocks lie 0.2 mile N of the N end of Pourewa Island. The easternmost of these rocks is shaped as a beehive. Both Mitre Rocks and Pourewa Island are honey-combed with caves.

A 7m rocky patch lies about 0.5 mile NE of the E Mitre Rock. There is a jetty that projects from the SW corner of Tolaga Bay. This jetty is about 0.3 mile long, with a least depth of 4.9m alongside. Small coasters with local knowledge use this facility.

Anchorage may be found in Tolaga Bay during winds from the W semicircle; the best berth being in a depth of 12.8m, about 0.7 mile from the N entrance point of the bay, with Marau Point just shut in. Vessels should anchor well inside the line joining the entrance points of the bay, as the holding ground between them is reported poor.

10.72 Gable End Foreland (38°32'S., 178°18'E.) was so called by Captain Cook because of its prominent triangular face resembling the whitewashed gable of a house. This appearance is less pronounced within 3 miles of land, but from a greater distance to the E it is very noticeable. Also, this point has been reported to give good radar returns at up to 19 miles. Gable End Foreland should not be approached nearer than 1.5 miles. Gable Rocks, with a depth of 1.2m, lie 1 mile N of the Foreland. Gable Islet lies 0.4 mile SW of Gable End Foreland, connected to it by a narrow ridge of rocks. A rock, with a depth of 18.9m, lies about 4.5 miles ENE of Gable Islet. The shore between Gable End Foreland and Tatapouri Point, 10 miles SW, should not be approached within a depth of 37m.

Whangara Island lies 3.5 miles SW of Gable End Foreland and is connected to the shore by a ledge of rocks that dry. Small vessels with local knowledge anchor close N of the island, but have to put to sea when the wind shifts SE. Monowai Rocks, which seldom break, lie about 2 miles SE of Whangara Island, and are two pinnacle rocks with a least depth of 5.5m. A 12.8m shoal lies 0.5 mile SSE of Monowai Rocks.

Ariel Bank lies about 10.5 miles SE of Gable End Foreland, and it has depths of less than 37m. Ariel Rocks is the shallowest part of this bank, and it has a least depth of 0.9m, which breaks in bad weather. A 5.8m patch lies about 0.7 mile SW of the shallowest part of Ariel Rocks. Penguin Rock, with a depth of 10.4m, lies about 1.7 miles S of the N end of the bank. An 11.9m patch lies 3 miles SE of Ariel Rocks.

Caution.—Mariners should be advised that the depths E of Ariel Bank are very irregular and with any wind there is a confused sea. Therefore, vessels should pass either well inside or well outside it in depths of over 183m.

Additionally, mariners should exercise considerable caution when navigating off the coast between Gable End Foreland and Poverty Bay during the summer season, because of the heavy smoke created by the burning of the bush and undergrowth. This smoke, which quickly settles to sea level about 6 miles offshore, brings visibility down to less than 0.2 mile. This smoke generally comes over at noon, lifting at night.

10.73 Tuaheni Point (38°43'S., 178°04'E.), light gray in color, rises to a height of 121m and should be given a berth of at least 2.5 miles. A submerged reef projects 0.5 mile SSE from it and Tuaheni Rocks, which breaks only in bad weather, extend about 1 mile SE from the outer end of this reef. In this vicinity the sea is usually confused and discolored because of the unevenness of the bottom within the 20m curve. Cooper Bank lies about 2.2 miles ESE of Tuaheni Point.

Poverty Bay (38°44'S., 178°02'E.) is entered between Tuaheni Point and Young Nicks Head, about 5.5 miles SW. The port of Gisborne lies on the N side of the bay and is described in paragraph 10.75. The first place that Captain Cook landed in New Zealand was in this bay near the **Turanganui River** (38°40'S., 178°01'E.). A monument marks the landing spot.

Tides—Currents.—The tidal currents outside of Poverty Bay set N with the flood and S with the ebb, with the S set being the more prominent; their influence is felt up to 10 miles offshore. The rates of the currents average about 1 knot, but it is affected by wind. Within Poverty Bay, tidal currents are negligible.

10.74 Northeast shore of Poverty Bay.—Tuamotu Island, 42m high, is light gray in color, and lies 1 mile W of Tuaheni Point. A reef, that dries, connects the island with the mainland N. Also, a reef extends almost 0.5 mile S from the island. This NE shore of Poverty Bay is encumbered by foul ground and rocky ledges that project up to 0.5 mile offshore in places.

Waihora Rocks are two pinnacles, nearly 0.1 mile apart, that lie 1 mile W of Tuamotu Island. A buoy is moored W of the W rock. Pinnacle Rocks, with swept depths of 8.5m and 10.1m, lie about 1 mile WSW of Pah Hill, 1 mile NNE of Tuamotu Island.

The Foul Grounds, an area of very uneven depths more than 0.8 mile in extent NW and SE, on which are several rocks with sandy bottom between, is located abreast of and 1 mile distant from the entrance to Gisborne Harbor. Temoana Rock, which lies 0.2 mile from the SE end of The Foul Grounds, is the middle of three pinnacle rocks, each of which has a depth of 6.4m. The N of the three rocks is Hawea Rock. Tokomaru Rock, 0.3 mile NW of Temoana Rock, has a depth of 5.5m. Two rocks, with a depth of 5.8m and 5.2m, lie 0.1 mile and 0.2 mile NE, respectively, of Tokomaru Rocks.

Anchorage.—Gisborne Roads lies in the NE part of Poverty Bay, and it is exposed to SE winds which even when light, send

Gisborne Harbor from SE

a heavy sea into the anchorage.

The best anchorage in the bay, during S gales, is in a depth of 18.3m, fine sand, with Young Nicks Head bearing 185° and a beacon 1.2 miles SW of the Waipoa River Entrance bearing 260.7°. Vessels should take care to avoid the Prohibited Anchorage Area which lies in foul ground NNE of the aforementioned anchorage area and can best be seen on the chart.

Gisborne (38°41'S., 178°01'E.)

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10.75 Gisborne lies S and E of the entrance to the Turanganui River on the N side of Poverty Bay. Gisborne has berths for general, bulk, and oil cargo. A breakwater projects about 0.3 mile SW from the S entrance point of the harbor. A rubble bed projects about 122m further in the same direction from the end of the breakwater, with a depth of 2.4m. A training wall extends along the NW boundary of the harbor.

Eastland Port Limited—Gisborne

http://www.eastland.co.nz/eastland-port/

Vessels should not proceed further up to the entrance channel than the buoys marking The Foul Grounds until signaled to do so. The roadstead is exposed to SE winds which, even when light, send a heavy sea and swell into the anchorage.

Tides—Currents.—The mean tidal rise for Gisborne is 1.4m at springs and 1.2m at neaps. Currents in the approaches do not appear to be a hindrance.

Depths—Limitations.—A 91m-wide channel, about 1 mile long, which was dredged (2006) to a depth of 10.1m, leads into the harbor and passes NW of The Foul Grounds to the entrance of Kaiti Basin. The largest vessel handled in the port has a length of 200m and a draft of 10.1m.

The smallest wharf is 95m in length; the largest wharf is 213m long. Berth No. 1 through Berth No. 6 have alongside depths of 3.8 to 5.8m. Berth No. 7, which serves as a tanker facility, has an alongside depth of 9.7m.

The swell setting into the harbor sometimes causes vessels to surge alongside the dock.

Aspect.—Gisborne, lying on both banks of the Turanganui River and its tributaries, is the capital of the Poverty Bay district.

Cooks Monument and a lookout flagstaff stand close E and 0.2 mile E of the root of the breakwater. Another monument stands about 0.1 mile NNE of the lookout flagstaff.

Outer Range Lights, in line bearing 332°, are shown from a

position about 1.5 miles W of the entrance to the Turanganui River. These lights lead through Poverty Bay to Gisborne Roads. The inner harbor leading lights, in line 054.6°, lead from W of The Foul Grounds to the mouth of the Taranganui River. Breakwater Light is shown from a white steel tower situated at the end of the breakwater. The end of Butlers Wall, lying on the N side of the dredged channel, is illuminated by a shielded light at night.

Pilotage.—Pilotage is compulsory for vessels of 100 gt and over. Requests for pilotage and tugs should be sent along with the vessel's ETA at least 24 hours in advance or by 1600 on Friday when the ETA falls between 1700 on Friday and 0800 the following Monday.

Pilots board 3 miles S of Breakwater Light in position 38°43.5'S, 178°01.4'E.

The berth allocated to a vessel will be given from the signal station by VHF or by visual signaling. On arrival, ships must establish communication with the signal station to notify their maximum draft and obtain the latest depth in the channel; they must not enter the harbor until they have received permission to do so and have been allocated a berth.

Regulations.—Vessels less than 175m may enter, berth, undock, or dock during the hours of darkness. Vessels between 175 and 200m long are berthed during daylight hours only, but may depart during darkness. Weather and sea conditions may affect these movements.

Signals.—A signal station lies on the breakwater, but a continuous watch is not maintained. A vessel making the port should notify the harbormaster of approximate time of arrival, when arrangements will be made for a berthing officer to be in attendance at the signal station 1 hour prior to arrival time. Vessels can communicate via VHF or Morse code by blinker light.

Entrance signals are displayed from the signal station yardarm. During daylight, failing contact by radio or visual signaling, a black ball shall mean "port closed." At night, a red light will be shown.

The number of the berth a vessel is to occupy will be signaled from the signal station; exempted vessels may proceed into the harbor on receipt of this signal.

Anchorage.—Anchorage may be obtained SW of The Foul Ground.

The quarantine anchorage lies in the position 30°40.8'S, 177°59.9'E.

Directions.—Vessels approach Gisborne Harbor with the Outer Range Lights in line bearing 332°, which leads about 0.5 mile SW of The Foul Grounds. When the Inner Range Lights come into line, bearing 054.5°, vessels should change course NE and steer for them. At night, when the green sector of the Inner Range lights bears 054.5°, a vessel should proceed as above.

10.76 West shore of Poverty Bay.—The shore W of the Outer Range Lights to the Waipaoa River, about 3.5 miles, is comprised of a sandy beach backed by low, flat ground.

Young Nicks Head (38°46'S., 177°58'E.), SW entrance point of Poverty Bay, is conspicuous for its white cliffs.

Kuri Banks has depths less than 18.3m; a least depth of 10.7m lies near its S end, nearly 1 mile ENE of Young Nicks Head.

Directions.—Vessels should avoid Kuri Banks, passing E and NE of these banks in depths of more than 18.3m. At night, vessels bound for Poverty Bay from the S, should not alter course NW until making the Gisborne Outer Range Lights, in line bearing 332°, when they should be headed for. This course leads about 1.2 miles E of the 10.7m patch mentioned above.

The neck of the Mahia Peninsula lies about 20 miles S of Young Nicks Head and the coast between is bold and backed by hills.

Anchorage.—There is anchorage during SW winds, in a depth of about 18.3m, about 1 mile off Pukenui Beach, which forms the E side of the neck joining the Mahia Peninsula to the mainland. Mungawhio Lake is entered at the S end of Pukenui Beach. When in flood, this lake gives the peninsula the appearance of an island.

Whangawehi Road, which lies about 2 miles E of the entrance to Mungawhio Lake, affords anchorage during S and W winds, in a depth of 18.3m, mud. However, vessels should leave this anchorage if the wind becomes easterly.

10.77 Table Cape (39°06'S., 178°00'E.), marked by a light, is the E termination of the Mahia Peninsula and the off-lying coast is foul. Numerous rocks and shoals lie off this section of coast and they are best shown on the chart.

A conspicuous radio mast, 94m high and painted in red and white bands, lies about 2.2 miles W of Table Cape.

Portland Island lies 1 mile S of the S end of the Mahia Peninsula and its flat summit rises to a height of 91m. Small vessels with local knowledge use the 0.2 mile wide channel, with depths of 5.5m in the middle, between the peninsula and the mainland. Tidal currents in the channel attain rates up to 2 knots.

A submarine power cable is laid from the S end of the Mahia Peninsula and the NW side of Portland Island; anchoring and fishing is prohibited in the vicinity. A spit, with depths less than 11m, projects about 0.7 mile SW from the S end of Portland Island. A 10.1m patch lies about 0.5 mile ESE of the outer end of the spit. Overfalls have been observed 2 miles S of Portland Island. The S tip of Portland Island should be given a wide berth.

Hawke Bay

10.78 Hawke Bay is entered between Portland Island and Cape Kidnappers, about 40 miles WSW. The shore N of Hawke Bay is sandy to the Wairoa River, then mountainous with wooded valleys at Wairda, Mohaka, and Tangoio Bluff on the NW side of the bay. South of Tangoio Bluff are impassable white cliffs, backed with undulating downs, which are curious for the great regularity of the rises and hollows.

From Tangoio Bluff to Napier Inner Harbor, the coast consists of shingle backed by low hills. Between Napier Inner Harbor to Breakwater Harbor the coast is strewn with boulders, with Bluff Hill overlooking Breakwater Harbor. The group of hills that forms the peninsula that ends in Bluff Hill appears as an island when viewed from the NE.

From Breakwater Inner Harbor the coast is low and sandy for about 11 miles. The remaining coast to Cape Kidnapers is sheer.

Winds—Weather.—West winds prevail but sudden southeasters require caution. Southwest gales give warning by an

overcast sky, and are violent, especially in winter. The heaviest W gales occur from September to November, with a low barometer, but generally good weather. The black northeasters blow from March to May. The wind comes on very gradually, shifting from the N to E and SE with a falling barometer, and blowing very hard between the NE and SE, accompanied by rain and a heavy sea.

The ordinary summer wind is a fine northeaster, with hazy weather, setting in about 1000 and dying away at sunset, being succeeded by a land wind. Rain falls with N winds and the black northeasters, and often with SW winds; sometimes dry southeasters last for many days.

Northwest winds are frequent in Hawke Bay, while the wind is NE at Long Point.

The climate is generally mild, but is hot and dry along the shore. Rainfall is slight, but increases inland and in the bush districts.

Tides—Currents.—For the most part, tidal currents are negligible in Hawke Bay, but strong in the entrances to rivers. The flood current sets N and the ebb current sets S.

Anchorage.—The primary anchorages for Hawke Bay lie off Long Point on the W side of the Mahia Peninsula, at Ahuriri, and at Cape Kidnappers. Long Point affords shelter during NE and SE winds, while Cape Kidnappers affords shelter in SW gale.

Caution.—Ritchie Banks lies roughly 30 miles SE of Portland Island; it has depths of 249 to 732m.

Lachlan Ridge has depths of 68 to 146m and it lies, with its NE end, about 10 miles S of the S tip of Portland Island, extending 10 miles SW. Lachlan Banks, with depths of 91 to 161m, lie about 24 miles SW of Portland Island.

10.79 Northeast shore of Hawke Bay.—Long Point (39°10'S., 177°49'E.) forms the only major projection along the W side of the Mahia Peninsula. Black Reef lies about 4.5 miles SSE of Long Point. Small vessels with local knowledge can obtain anchorage under Black Reef, but it affords only partial shelter.

Long Point Anchorage is sheltered from E winds. During S winds, it is necessary to get close inside Long Point, until an opening or cleft shows itself, anchoring in a depth of 12.8m, with Long Point bearing 248°. However, shelter should not be taken here in bad weather as the holding ground is bad and the bottom rocky.

The **Wairoa River** (39°02'S., 177°25'E.) empties out into the bay on the N shore of Hawke Bay. Vessels can anchor off the Wairoa River or the Mohaka River, 11 miles SW. However, this anchorage can only be used in good weather as a heavy swell sets into the bay. On the approach of a S wind, the sea occasionally breaks in a depth of about 22m.

10.80 Southwest shore of Hawke Bay.—Cape Kidnappers (39°39'S., 177°05'E.), the SW entrance point of Hawke Bay, is high with white cliffs composed of clay on either side of it, and a notable white pinnacle rock, 41m high, lying close off it. The conspicuous chimney of the Awatoto Fertilizer Works, and a mast, 27m high, stands about 0.7 mile N of the entrance of the Ngaruroro River and the Tutaekuri River.

There is anchorage, in depths of 9.1 to 12.8m, about 4 miles NW of Cape Kidnappers and partly sheltered from SE and S winds by **Black Reef** (39°38'S., 177°05'E.).

Caution should be exercised approaching this anchorage, as a submarine pipeline extends about 1.5 miles offshore from a position about 0.5 mile NNW of the Tukituki River entrance. The pipeline is marked by range beacons. Additionally, two buoys are moored about 0.2 mile apart off the seaward end. Anchoring and fishing are prohibited between the buoys, or in the vicinity of the pipeline; a pipeline also extends 0.8 mile seaward from the fertilizer works.

When approaching the above anchorage, the point NW of Cape Kidnappers should be kept open W of the cape; caution should be exercised with a wind shift N of E, as a heavy swell sets into the anchorage making it untenable.

Napier from E

Napier Harbors (39°29'S., 176°54'E.)

World Port Index No. 55130

10.81 Napier Harbors is comprised of Napier Road; Breakwater Harbor, where all cargo handling takes place; and Inner Harbor (Port Ahuriri), which is used by small vessels only. The Breakwater Harbor has nine overseas berths.

Port of Napier

http://www.portofnapier.co.nz

Tides—Currents.—The mean spring range at Napier Harbor is 1.8m, the mean neap range is 1.2m.

In Napier Road and the surrounding waters, the tidal currents set NW with the flood and SE with the ebb. At springs, in the entrance channel and approach to the berths, a rate of 1 knot may be experienced.

When SE conditions prevail, a NE set of up to 1 knot may be experienced across the entrance to Breakwater Harbor.

Depths—Limitations.—The controlling depths at MLWS are 12m in the outer fairway, 11.6m in the inner fairway, and 11.2m in the approaches to berths. The maximum permissible draft in the dredged channel and alongside the wharves is 10.4m. The bottom in the approaches, fairways, and alongside the wharves is sand and mud.

A survey in April 2005 showed changes to the currently charted dredged areas. Mariners should contact the port authorities for the latest information.

Pilotage and towing services are available 24 hours for both daylight and nighttime arrivals and departures.

Alpha Wharf extends between the roots of Higgins Wharf and Geddis Wharf and can accommodate vessels with lengths to 80m and drafts of 9.7m.

For details on the specific berthing accommodations, see the table titled **Napier Harbors Berthing Information.**

Aspect.—The bold white cliffs of Ahuriri Bluff, 100m high, are conspicuous from sea. This bluff is the NE end of a group of hills which, rising from low land, forms a peninsula that appears as an island and is named Scinde Island.

Two sets of range lights are shown on the W shore of Napier Road, 2.7 miles NW of Ahuriri Bluff. A red occulting obstruction light is occasionally shown from a pole 3.5 miles NW, and an aero light is occasionally shown at the airfield 2.5 miles WNW, respectively, of Ahuriri Bluff. Three radio masts stand about 0.3 mile S of the airfield light.

Large pulp and fertilizer sheds behind are conspicuous from sea and are situated within almost 0.2 mile NE of Ahuriri Bluff.

Napier Harbors Berthing Information

Wharf	Length	Dredged depth (2010)	Max. vessel length	Max. draft	Remarks
Kirkpatrick Wharf					
	390m	12.2m	281m	11.0m	Containers
Herrick Wharf					
East berth	270m	12.2m	180m	9.0m	Tankers
West berth	270m	12.2m	190m	9.8m	Tankers
Geddis Wharf					
East berth	210m	7.8m	158m	9.2m	Bunkers
West berth	80m	8.5m	168m	9.7m	Cement
Higgins Wharf					
North berth	85m	11.7m	190m	11.0m	Bulk cargo and cruise ships
South berth	85m	11.7m	190m	11.3m	Tankers and bunkers
Cassidy Quay					
No. 1 Wharf	250m	11.7m	250m	11.3m	Bulk and breakbulk cargo

Pilotage.—Pilotage is compulsory for vessels over 40m in length.

Vessels must advise the harbormaster of their ETA at least 24 hours in advance; changes in the ETA must be sent at least 2.25 hours in advance. Final confirmation of the ETA should be sent by 1615 (Monday through Friday) or by 0845 (Saturday, Sunday, and holidays) local time.

All inbound vessels should contact Napier Harbor Radio 1 hour prior to arrival on VHF channel 16 for confirmation of pilot boarding position and time.

Pilot Boarding No. Station 1 is situated S of Anchorage Berth No. 1, in position 39°28.4'S, 176°58.9'E. In very heavy swell conditions, vessels approaching should do so with caution and may be directed by Napier Harbor Radio to Pilot Boarding Station No. 2.

Pilot Boarding Station No. 2 is situated SSE of Anchorage Berth No. 2, in position 39°25.1'S, 176°58.6'E. Inbound vessels with a draft greater than 7.3m shall proceed to this station unless otherwise directed.

Pilots will disembark outbound vessels at the outer end of

the dredged entrance channel.

Regulations.—The quarantine anchorage is in the vicinity of Anchorage Berth No. 1.

Anchorage.—Napier Road lies NW of Ahuriri Bluff. This roadstead affords shelter from S, SW, and NW winds, and from the ordinary summer NE sea breezes. Strong NE winds, accompanied by overcast thick weather, which blow on the E sides of deep depressions, give ample warning of their approach. A heavy swell is often felt here, even with strong offshore winds.

There are two numbered anchoring berths. Anchorage Berth No. 1, situated about 3 miles ENE of the breakwater head, has a depth of 20m, sand and mud. Anchorage Berth No. 2, situated on the alignment of the N range lights and about 4.5 miles NE of Ahuriri Bluff, has a depth of 20.1m, sand.

Directions.—Vessels approaching from SE should, when 3 miles ENE of Ahuriri Bluff, head to pass about 1.2 miles N of the bluff with the S range lights in line, bearing 282°, passing close S of South Pania buoy, anchoring as required.

Vessels proceeding to Breakwater Harbor should adhere to the above directions until the head of the breakwater bears about 180°, when course should be changed to head for the direction light 0.7 mile E of the entrance to Inner Harbor, bearing 193°. When Breakwater Harbor Range Lights come into line, course should be changed to 168° on the range line through the outer part of the dredged entrance channel. The W limit of the dredged Breakwater Harbor approach channel is marked by two neon lights, exhibited on reclaimed land, in line bearing 171°.

Vessels approaching Napier Road from the NE must remain NW of North Pania buoy. The N set of range lights on the W side of Napier Road, in line bearing 250°, leads about 0.4 mile NW of North Pania Buoy (41°22'S., 175°49'E.).

Caution.—Mariners should be wary of the bottom charted between **Castle Point** (40°54'S., 176°14'E.) and Cape Palliser, as due to its pinnacle nature it cannot be ascertained that all dangers have been discovered. Therefore, large vessels navigating off this portion of coast should keep in depths greater than 55m.

A submarine exercise area exists between 20 and 60 miles from the coast and extending from abreast Bare Island to abreast Castle Point.

10.82 The coast, roughly 145 miles SW between Cape Kidnappers and Cape Palliser, does not afford shelter nor anchorages off it. The only prominent feature off the N part of this coast is the white cliffs 1 mile N and a patch of sand 22 miles SW, respectively, of Cape Turnagain. On the S part of this coast, the notable features include the buildings about 2.7 and 10 miles NE of Honeycomb Rock.

Bare Island, 92m high, lies about 1.2 miles ENE of Te Wainohu, a point lying about 12.5 miles SSW of Cape Kidnappers. Foul Ground extends 0.7 mile NE from Te Wainhou. Foul Ground projects 0.4 mile SW, and a reef, with a depth of 7m over its outer end, extends about 1 mile N, respectively, from Bare Island. Capstan Rock, 1.5m high, lies 0.5 mile SW of Bare Island. A submerged rock, over which the sea breaks, lies 0.7 mile SE of the S end of the island. A channel, with a depth of 7.6m, is situated between the foul ground projecting off Te Wainohu and the rocks projecting off the W side of Bare Island. Small vessels with local knowledge can obtain anchorage off the W side of Bare Island.

Cape Turnagain (40°30'S., 176°37'E.), 290m high, is a well-marked cliffy promontory that appears as a prominent white bluff from the N, and as a tableland from the S. The shore between Cape Kidnappers and Cape Turnagain should not be approached within a distance of 1.5 miles. Cooks Tooth, a conspicuous rocky outcrop, stands on a high ridge 7 miles N of Cape Turnagain. A 64m bank lies about 5 miles SE of Cape Turnagain. North and South Madden Banks, with depths of 187m and 165m, respectively, lie 28 miles ENE and 20 miles ESE of Cape Turnagain.

10.83 Castle Point (40°55'S., 176°13'E.) is a bluff promontory that is almost separated from the mainland; on S bearings the point resembles a square tower on the end of a low point.

Small vessels with local knowledge can obtain anchorage, with winds from SSW to W to NNW, in a depth of 7.3m, about 0.2 mile NW from the point. However, if the wind backs S of SSW this anchorage must be left.

Uruti Point stands 15 miles SSW of Castle Point and is remarkable for the land behind the point being lower and more open-featured than on any part of the coast between Cape Kidnappers and Cape Palliser. A bank, with a depth of about 25.6m, lies about 3.7 miles SE of Uruti Point.

Flat Point, low with a sandy tongue extending from it, lies 8.5 miles SW of Uruti Point and between the shore is mostly rocky. A prominent white building stands 0.5 mile N of the point. Foul ground with rocks, best seen on the chart, project offshore from this part of the coast.

Honeycomb Rock (41°22'S., 175°49'E.) is a high limestone rock lying 10 miles SW of Flat Point; a conspicuous white building stands 2.7 miles NNE of it.

Mount Adams, 663m high, stands about 10 miles WSW of Flat Point and can be made out from the higher peaks behind by its remarkable cone-shaped summit.

Kahau Rocks, the highest being 6.7m high, lie about 2 miles ENE of Honeycomb Rock. Small vessels with local knowledge can anchor under the lee of this reef during N winds, but they must leave this anchorage at first sign of a S wind.

10.84 Cape Palliser (41°37'S., 175°17'E.) represents the S end of North Island and has been reported to give good radar returns up to 23 miles. From a distance this cape appears bold, however, upon approach, two low shelving points are seen to project. Mangatoetoe and Mount Barton (Mount Hugh) are the highest S summits of the Aorangi Range that end in Cape Palliser and rise about 2 and 4.5 miles NE of the Cape. A reef, partly above-water and awash, with sunken rocks at its outer end, extends S about 0.7 mile from the E of the two low shelving points. Black Rocks, 4.6m high, extend S 0.5 mile from the W point, located 2 miles WNW of Cape Palliser.

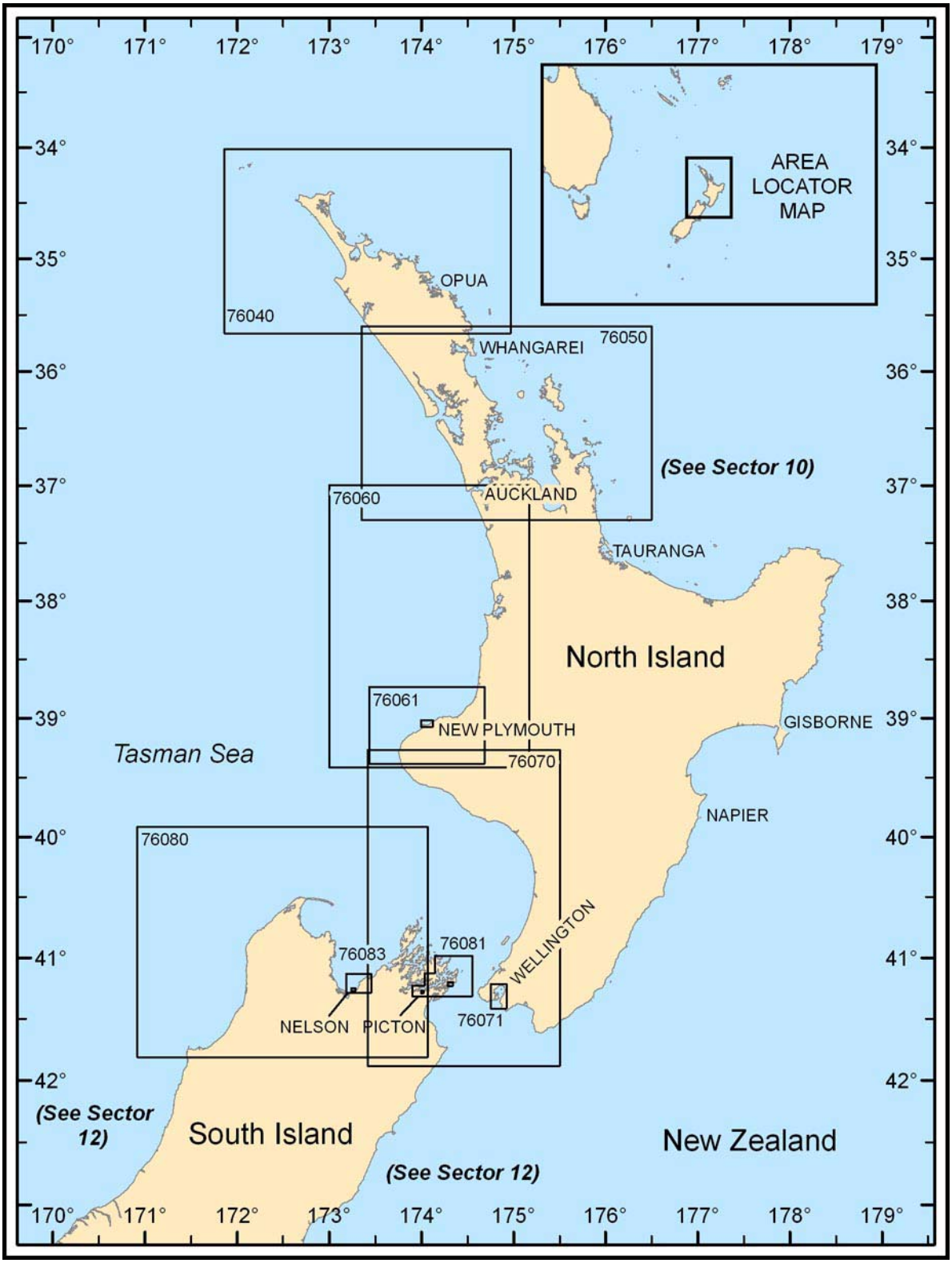
The 20m curve projects S from Cape Palliser in the form of a spit for about 1.7 miles. Strong tide rips are present in the vicinity of the spit, which should not be approached within 3 miles.

Winds—Weather.—In the vicinity of Cape Palliser SW, NW gales are common. Beginning with a N wind, the squalls blow out of the valleys with great violence. When the wind

backs W, it usually moderates; soon afterwards the barometer rises and SW and S gales follow.

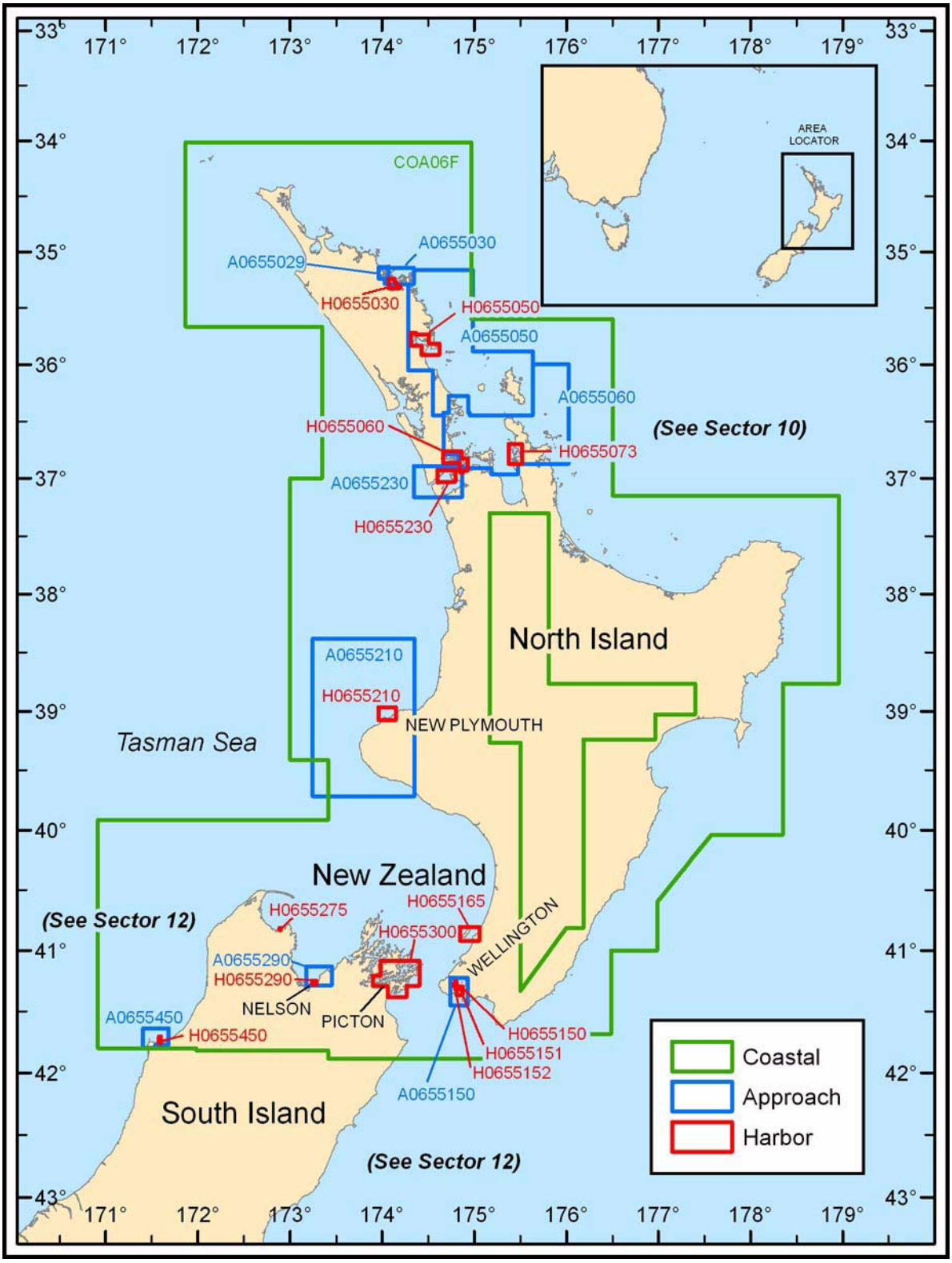
Caution.—A submarine exercise area lies centered about 20 miles SSW of Cape Palliser.

An explosives dumping ground lies centered about 17 miles SW of Cape Palliser.



Additional chart coverage may be found in NGA/DLIS Catalog of Maps, Charts, and Related Products (Unlimited Distribution).

SECTOR **11** — CHART INFORMATION



Additional DNC library coverage may be found in NGA DNC 6 (Limited Distribution) disc within the README\GRAPHICS folder.

SECTOR 11 — DNC LIBRARY INFORMATION

SECTOR 11

NEW ZEALAND—WEST COAST OF NORTH ISLAND, INCLUDING COOK STRAIT

Plan.—This sector describes the W shore of North Island from Cape Maria Van Diemen to Cape Palliser, and includes the narrative of Cook Strait. The description of Cook Strait includes the NE coast of South Island from Cape Farewell to Cape Campbell. The descriptive sequence is from N to S.

Caution.—A voluntary code of shipping routes around the New Zealand coast, to reduce the potential for pollution of the marine environment, has been introduced. For further information, see Pub. 120, Sailing Directions (Planning Guide) Pacific Ocean and Southeast Asia.

Cape Maria Van Diemen to Cape Egmont

11.1 Cape Maria Van Diemen (34°29'S., 172°39'E.), a promontory, 88m high, is located nearly 3.5 miles SW of Cape Reinga, which is described in paragraph 10.3.

Due to the great sand drift from the W, a large part of this coast is combined with fine yellow sand for some miles inland.

Pandora Bank, comprised of fine sand and which often breaks, lies centered about 5 miles SW of Cape Maria Van Diemen. This bank has a least depth of about 6m lying nearly 5 miles SW of the Cape. During strong S and W weather, seas break heavily over this bank and vessels should pass about 10 miles W to avoid the confused seas which develop.

During good weather, vessels may make a safe passage between Pandora Bank and the mainland, where there is a least depth of 29m. During adverse weather conditions, mariners are advised to pass at least 2 miles to seaward of the 100m depth contour when navigating in the vicinity of Pandora Bank.

Twilight Beach (34°30'S., 172°42'E.) projects 1.5 miles SSE from a position 2 miles ESE of Cape Maria Van Diemen. Vessels with local knowledge can obtain anchorage 1 mile off this sandy beach, in a depth of 30m, fine gray sand, protected from winds from the N to ESE. This anchorage is untenable with winds and swell from other directions.

Motupia Islet, which is rocky, is located about 11 miles SE of Cape Maria Van Diemen. Except in very good weather or with E winds, heavy rollers run into the channel between the islet and the coast. The Bluff, detached from the coast at HW, is a rocky promontory standing 7 miles SE of Motupia Islet. Hukatere, a prominent cone-shaped hill covered with scrub, stands 16 miles SE of The Bluff, and it has a forestry lookout upon its summit.

Ahipara Bay, entered about 15 miles S of Hukatere, has as its W entrance point Tauroa (Reef) Point. A reef that breaks projects 1 mile W from the point. North Ahipara Bank and South Ahipara Bank lie about 13.5 miles NW and 8 miles W, respectively, of Tauroa Point. Local vessels anchor, in a depth of 9m, sand, about 2.7 miles E of Tauroa Point and nearly 1 mile offshore. Ahipara Bay is sheltered from SW, SE and NE winds; but gales from the NE shift to NW.

Tides—Currents.—Tidal currents in Cook Strait run quite quickly attaining rates of 5 knots and upwards at springs. When the wind runs against the tidal currents, a troubled sea is raised, and with heavy gales the strait may be dangerous even for large vessels. The sea caused under these conditions is not as heavy on the W as on the E side of the strait. Local vessels, when bound through the narrow part of the strait against a S gale, stay as much as possible in mid-channel and usually navigate during the last quarter of the S current.

High water on the W side of Cook Strait occurs about 5 hours later than on the E side, so that when it is HW on one side, it is nearly LW on the other. The tidal currents are occasioned by these differences in level. If in addition, meteorological conditions are such that mean sea level is raised on one side of the strait, then the flow from the other side will be considerably increased in strength and duration, while the flow from the other side is correspondingly reduced, or under extreme conditions, even reversed.

During NW or SE gales, or winds of long duration from other directions, the flow in the strait is affected by the drift current raised from them. The duration and rate of the NW flow will be increased, and those of the SE current correspondingly reduced by SE winds, while NW winds will have the reverse effect.

In the center of the narrowest part of the strait, between **Cape Terawhiti** (41°17'S., 174°37'E.) and Perano Head, N current begins 4 hours before HW on the shore in that part of the strait, and runs for 6 hours; the S current then runs for the same period. The rate of both currents is 1 to 3.5 knots, but during spring tides and gales, the current setting with the wind may attain rates of up to 5 knots. Heavy tide rips are experienced in this area, where there is an uneven bottom, depths varying from 160 to 400m, sand.

Off the shore between Cape Terawhiti and Sinclair Head, 7 miles SE, currents attain a rate of 5 knots during springs and after strong NW gales, the S current sometimes attains a rate of 6 knots. Tide rips project 2 or 3 miles off this shore. This shore should therefore be given a wide berth to avoid being set onto one of the detached dangers.

At the S entrance to Cook Strait, the N current begins 3 hours before HW on the shore in that part of the strait and runs for 6 hours. The S current runs for the same period.

A cold bottom current, probably from the S or sub-Antarctic, appears to run underneath into the deep submarine canyons of Cook Strait. This current is forced to the surface by meeting the steep slopes near the 200m curve. The forcing of this current to the surface may have some influence on the broken water experienced in Cook Strait as well as modifying tidal currents. Off **Turakirae Head** (41°25'S., 174°55'E.), there is a strong set WNW which projects for 2 miles to sea.

East of Sinclair Head and inside a line between it and Baring Head, the tidal currents are negligible and usually there is an eddy with the N current setting E along the shore towards the entrance to Wellington Harbor.

There are overfalls 6 to 7 miles SW of Sinclair Head and the heavy rips that occur during springs are dangerous to small craft.

The tidal currents in and around Cook Strait are unreliable, and masters are warned to exercise every precaution when navigating in the vicinity. The currents often run in one direction for 8 to 10 hours; it has been found that the opposite current is much weaker and, in some cases, hardly noticeable. The maximum rates which are usually attained at springs are also liable to be experienced at any other time. In the vicinity of Karori Rock and Cape Terawhiti, a rate of up to 7 knots is frequently experienced, but as a rule it does not last for more than about an hour. Small vessels are warned to keep well clear of tide rips, as they may lose steerage way and may in extreme cases capsize.

Additionally, vessels are cautioned not to approach the land in thick weather, unless certain of their position. The influence of strong gales on the tidal currents is felt when the disturbance is from 24 to 48 hours away, and the influence of the current caused by the winds may prolong or retard the duration of the tidal current by up to 3 hours.

The tidal current 5 miles off Tauroa Point sets SSE before HW at Westport and NNW after HW, at a rate of about 0.2 knot, the stronger flow being closer inshore. Within Ahipara Bay, tidal currents are barely felt. A NW current of about 0.5 knot runs off Tauroa Point.

Herekino Harbor is entered about 9 miles SE of Tauroa Point, but it is small and dangerous and seldom used except by small craft in good weather with local knowledge. Over the N entrance point are sandhills dotted with green patches and from the S head, bare hills rise to a height of 244m continuing and increasing to over 335m high at Whangape, 5.5 miles SE, with a table-shaped summit and deep ravines than can be seen from sea.

Whangape is a small port with bold entrance heads that can only be used by small vessels with extensive local knowledge because of the ever changing channel over the bar. At Whangape, 2 miles within the entrance, there are three wharves with depths of 1.5 to 3.7m alongside.

Hokianga Harbor

11.2 Hokianga Harbor (35°32'S., 173°22'E.), the N port on the W shore of North Island, can be utilized by vessels of moderate tonnage with local knowledge. This harbor projects in a NE direction for about 20 miles between wooded ranges, whose steep sides approach the banks at distances of 4 to 10 miles. These mountain ranges are from 457 to 750m high and Maungataniwha, the highest point of a sharp-peaked mountain, at the head of the Mangamuka River, is 655m high.

Fog or mist is experienced during night or early morning in the upper reaches of the harbor.

Tides—Currents.—On the outer coast, the flood current runs to the S while the ebb current runs to the N. About 3 miles offshore, the current's strength is 2 knots; about 6 miles offshore it attains a rate of 1 knot. In the entrance to the harbor tidal currents attain a rate of 3 to 4 knots. Inside the heads, the rate is 2 to 3 knots while in The Narrows it may be as much as 4 knots. The ebb current sets directly on to South Head and in leaving the harbor due allowance must be made for clearing it.

Depths—Limitations.—Hokianga Harbor is navigable by vessels of moderate draft for about 13 miles above the entrance to Kohukohu, about 1 mile above The Narrows and has few obstructions when inside the bar. Depths outside the bar decrease rapidly.

The bar is located about 1.5 miles outside of the heads of the harbor. Between the heads, within the bar, there are depths of 18.3 to 42m, but there are dangers on the N side of the channel which narrow it down considerably.

Caution.—The bar is liable to frequent change. It is dangerous for mariners without local knowledge to attempt to cross it. In 1980, there was a least depth of 5.2m in the channel across the bar, about 1 mile WNW of South Head. Contact Hokianga Coastguard Radio on VHF channel 82 before and after crossing the bar.

11.3 West side.—North Head (35°31'S., 173°22'E.) represents the end of conspicuous yellow sandhills forming the S tip of the W side of Hokianga Harbor. Vessels approaching Hokianga Harbor should take care to ensure the proper latitude, that is, by positively identifying North Head, as the appearance of this port from sea greatly resembles those of other small ports N. South of North Head, no sandhills are to be seen till S of Maunganui Bluff, which falls abruptly to the sea 18 miles SE of Hokianga Harbor. On a fairly clear day, Maunganui Bluff will be seen from a vessel approaching from the N or W long before reaching the entrance to the harbor. The old signal station stands on South Head.

The harbor bottom is primarily mud, except near the entrance, where Middle Bank is composed of hard sand. For about 5 miles above the entrance the bottom is sandy, caused by the great sand drift from W.

White cliffs comprised of clay, 4.6 to 9.1m high, falling perpendicularly to the HW mark, are common to both sides of the river's banks. Large iron sandstone boulders project along the shore, with some of them nearly round and 9.1m high.

Northwest Reef, with a least depth of 2.4m, lies about 0.6 mile SW of North Head. A spit, with depths less than 5.5m, projects 0.5 mile S from North Head.

Middle Bank, with a least depth of 0.3m, lies in mid-channel and extends N for about 1 mile from a position about 0.5 mile ENE of North Head.

Kawehitiki Point lies on the W side of the harbor, 2.2 miles N of North Head. Rangi Point lies 1.5 miles N of Kawehitiki Point. A few buildings stand close S of Rangi Point.

Te Karaka Point, lying 3.5 miles NNE of Kawehitiki Point is the E entrance of Waireia Creek, which dries. Between Kawehitiki Point and Te Karaka Point, shoal water, with depths less than 4.9m, projects from the W shore of the harbor as far as the line joining the two points.

Gilbeys Rock, with a depth of 3m, lies in the center of the fairway, 0.6 mile SSE of Te Karaka Point.

Between Te Karaka Point and Motukauri Point, 1.5 miles NE, the harbor turns E. Matawhera Point, on the N side of the harbor, lies about 3 miles E of Motukauri Point, and it is steep-to. Motukaraka Wharf, which dries, lies 0.1 mile N of the E entrance point of the Tapuwae River, about 0.8 mile N of Matawhera Point. A church with a prominent spire, stands 0.1 mile NW of Motukaraka Wharf. Long Wharf, with a depth of 3.7m alongside, lies 1.5 miles E of Motukaraka Wharf. Shoal water projects from the shore to a line joining the two wharves.

The Narrows (35°23'S., 173°32'E.), 0.1 mile wide at their SW end, continue 0.7 mile NE where the harbor opens out

again. Takataka Rock, from which a light is shown, lies 0.1 mile S of the N entrance point of the upper entrance to The Narrows. This rock is steep-to on its S side and is just covered at HW.

Kohukohu lies on the W shore of the harbor, 1 mile NE of Takataka Rock. There is a concrete wharf at Kohukohu, with a depth of 0.3m alongside. The center of the fairway, between Takataka Rock and Kohukohu, which shoals to a depth of 4.6m, lies about 0.3 mile from the W shore. There are depths of 3m very close to the fairway on either side. Off Kohukohu, the center of the fairway lies 0.2 mile off the wharf and has a depth of 8.8m, mud and sand.

Motiti, a low sandy islet, lies 0.5 mile NE of Kohukohu and marks the limit of how far up vessels can proceed. The Mangamuka River is entered between Kohukohu and Motiti.

11.4 East side.—Outer South Head (35°33'S., 173°22'E.) lies about 0.5 mile SSW of South Head, the S entrance point of the harbor. Three shoal patches, with depths of 13.7 to 16.5m, lie about 1.2 miles SSW of Outer South Head.

Waiarohea Stream (35°31'S., 173°23'E.) empties out into Hokianga Harbor, about 1.5 miles NE of South Head. Foul ground projects on each side of its mouth frequently causing a race. There is an L-shaped wharf at Opononi, 0.7 mile N of the entrance to Waiarohea Stream.

Koutu Point lies 2 miles N of Opononi Wharf. Mahena Island lies in a bay 0.7 mile NE of Koutu Point, with drying rocks between it and Kouwarre Point, 0.6 mile N.

Onoke Bank, with a least depth of 0.3m, projects nearly 0.5 mile offshore between Kouwarre Point and Onoke Point, 2 miles further NNE. A jetty, which dries, stands 0.1 mile E of Onoke Point. The entrance to the Whirinaki River lies 0.5 mile NE by E of Onoke Point; there is a depth of 0.3m in the river's entrance.

The Omanaia River is entered about 0.3 mile S of **Matawhera Point** (35°24'S., 173°29'E.). There is a depth of 1m in the entrance to the river. A drying bank projects about 1.5 miles SW from the E entrance point of the river. A ferry ramp lies on the E entrance point of the Omanaia River on which is the town of Rawene. Close W of the ferry ramp is Rawene Wharf, which is L-shaped, with depths of 0.9 to 1.2m alongside.

Motukiore Islet lies in the entrance to the Perunui River on the E side of the harbor, 0.5 mile SE of the N end of The Narrows. **Ruapapaka Islet** (35°21'S., 173°35'E.) lies in the entrance to the Waihou River, about 1.5 miles E of Motiti Islet.

Horeke Jetty, with a depth of 4.9m alongside, lies on the S bank of the Waihou River, about 0.4 mile SE of Ruapapaka Islet. Another jetty lies 0.2 mile E of Horeke jetty.

Anchorage.—Anchorage may be found by vessels with local knowledge, in depths of 5.5 to 7.3m, off **Opononi** (35°30'S., 173°23'E.), about 0.4 mile WSW of the wharf.

Larger vessels can anchor about 0.5 mile NW of the wharf, in depths of 11 to 14.6m. Additionally, there is anchorage, in depths of 5.5 to 9.1m, good holding ground, in mid-channel above Rawene.

Anchorage is prohibited within 100m of the submarine cable laid between the town of **Rawene** (35°24'S., 173°30'E.) and the shore NNE.

Anchorage may be found, in a depth of 8.2m, 0.2 mile SE of Kohukohu Wharf.

Anchorage is prohibited in the vicinity of the submarine cable that lies between 0.5 and 1.2 miles S of the Mangamuka Bridge, situated about 7 miles above the entrance to the Mangamuka River.

Overhead cables, with a minimum clearance of 31m above MHWS, span The Narrows about 0.2 mile above their S entrance.

Directions.—A vessel with local knowledge approaching Hokianga Harbor should bring South Head to bear 100° and cross the bar on this bearing. The most opportune time for entry is at half flood. Should the first of the ebb be making and the bar appears passable, it should be kept in mind that there is a tidal current running at a rate of 4 knots to contend with, that sets on to South Head.

The bar generally breaks and a continual swell from W breaks on the beach. Vessels should be prepared when crossing the bar for shipping a sea; three rollers are usually experienced before the bar is passed. Often, the lapse of an hour may make the bar unworkable, and although the weather inside may be perfectly calm, a heavy sea may be running on the bar.

On account of the frequent changes of the bar, information should be secured in advance at some other New Zealand port; a telegram to the harbormaster at Hokianga will secure the latest bearings for the channel.

Vessels should pass South Head at a distance of 244m, when South Head bears 180° she should steer to make good a course of 116° until South Head bears 261°, and when she should change course NE and make good a course of 045°. Care should be taken to avoid the rocky foreshore surrounding South Head.

When North Head bears 282° vessels should change course N and head for Kawehitiki Point, bearing 006°, until Opononi Wharf bears 070°, she should haul slightly E and head for the center of Motukauri Point, bearing 018°, until abeam Te Karaka Point. This course passes 0.1 mile W of a drying rock near the entrance to Waiarohea stream and 0.3 mile off Opononi Wharf. A shoal W of Opononi is crossed in a depth of 4m. A deeper channel lies W of Middle Bank, but it is only about 0.1 mile wide. It has depths from 10 to 20.1m. This course also passes about 0.1 mile W of Gilbeys Rock.

From abeam of Te Karaka Point vessels should steer to make good a course of 352° until Onoke Point bears 066°; then steering for Motukauri Point, bearing 030°. When Onoke Point bears 140° a mid-channel course should be made until 0.2 mile SSE of Matawhera Point. From this position make good a course of 038° until Motukaraka Church Spire bears 310°, when course should be changed to head for the S entrance point of The Narrows, bearing 088°. Then steer a mid-channel course through The Narrows. From a position at the N end of The Narrows, 100m SE of Takataka Rock Light, make good a course of 053°; when Motiti Islet bears 010°, steer for it and this leads to the anchorage SE of Kohukohu Wharf.

Outbound vessels will find that after a bad bar it is generally the last quarter flood before it is fit to be worked. In such cases, the sea is usually very heavy on the first of ebb and vessels are not allowed to leave at this time. Vessels of more than 5.2m draft should not go below Opononi anchorage until 0.7 flood.

11.5 Maunganui Bluff (35°45'S., 173°34'E.) is a conspic-

uous heavily-wooded landmark that rises immediately over the sea to a height of 483m, about 18 miles SE of Hokianga Harbor. Maunganui Bluff can be distinguished a long distance from seaward. The shore between Hokianga Harbor and the entrance to Kaipara Harbor, 64 miles SE, is comprised of cliffs bordered, except at the base of Maunganui Bluff, by a hard sandy beach. There is a short break in the cliffs about 2 miles S from Maunganui Bluff, when they again commence and extend uninterruptedly in a straight line for 30 miles, to within 8 miles of the North Head of Kaipara Harbor. These cliffs are topped with sandy hillocks which reach a short distance inland and are backed by a range of moderate height parallel with the coast.

The villages of Baylys Beach and Glinks Gully, lying about 14.5 and 24 miles SE of Maunganui Bluff, are conspicuous. At night, the lights from these villages provide useful marks on this otherwise featureless stretch of shore.

Kaipara Harbor

11.6 Kaipara Harbor (36°25'N., 174°09'E), 28.5 miles SE of Maunganui Bluff, is one of the most extensive inlets in New Zealand. The entrance to Kaipara is encumbered with navigational hazards, as is the case with most ports on the W coast of North Island, but once within it affords good security for a number of vessels of moderate size. Kaipara Harbor should not be entered without extensive local knowledge.

The bar at the entrance is frequently shifting and depths shown on the chart cannot be relied upon. At various distances within The Heads, four rivers, the Wairoa River, the Otamatea River, the Oruawaru River, and the Kaipara River, branch off in different directions winding through some of the most fertile land in New Zealand. These rivers are navigable for many miles by vessels of moderate tonnage with local knowledge.

Tides—Currents.—The tidal currents outside of Kaipara Harbor follow the direction of the shore, setting S with the flood and N with the ebb. However, when the current strikes the outer banks, both currents set directly over them as well as through the channel.

The tidal currents vary in strength according to winds and freshets. These currents are strongest between Tory Shoal and North Sandspit, and off the N shore, until reaching the first white cliffs in the Wairoa River, when the influence of the Otamatea River and the Oruawaru River may be said to cease. Currents at springs may run at 5 knots, but during freshets and strong gales, attain rates of 6 or 7 knots. In the Kaipara River, up to the first anchorage, springs run 3 knots; above the first anchorage, springs run at not more than 2 knots.

In the upper parts of the Wairoa River, the current runs 2 knots and continues at that strength until near the head of the river. The tidal currents of the river follow the courses of the channels. Above Dargaville, a bore of considerable strength carries up the first of the flood, breaking upon the N bank.

Winter fogs are common, especially in the Wairoa River. These fogs usually first appear on the flats, but quickly extend to the river. Additionally, they generally develop at night, clear a few hours after sunrise and may be dense at times.

Depths—Limitations.—The bar channel lies between the W end of North Spit and the W extremity of Outer Southern Shoal. The shoals bordering the entrance channel shift. South of North Head, Tory Shoal, which breaks except in very good weather, is extending W. Outer Southern Shoal and the extension of North Spit break only in moderate to rough weather. The bottom is very irregular, the depths varying from 5.8 to 45.7m, and there is a very heavy breaking sea during W gales.

The Kaipara River is entered between South Head and Te Ngaio Point, 3 miles NE, and has a least depth of 1.1m. This river is best navigated near LW when the banks are uncovered. Helensville lies at the head of navigation of the Kaipara River; there are some small wharfs there.

The Wairoa River is full of shifting sand banks with a channel between. In 1964, vessels drawing less than 3.7m could proceed up to Ruawai, situated on the E bank of the river 16 miles above Pouto.

The Otamatea River is entered between **The Bluff** (36°16'S., 174°15'E.), lying 7 miles NNE of Pouto Point and a point 1.2 miles E. This river is navigable for vessels with local knowledge of 500 gt to the loading ground where there is a depth of 4.6m. There is a jetty at Tinopai, lying about 0.5 mile ENE of The Bluff.

The Arapaoa River empties out into the Otamatea River, on the N side, and the Whakaki River, on the S side, about 3.5 miles above The Bluff. The Arapaoa River can be used by vessels with local knowledge with drafts to 5.2m, but they will be aground at LW.

The Oruwharo River is entered between Motukamara Point, a narrow point 52m high, and a steep scrub-covered hill, 125m high, 0.7 mile S. The town of Port Albert lies about 7 miles E of Motukamara Point.

Aspect.—A good lookout should be maintained from the masthead for the breakers on North Spit and Southern Shoals, which will usually be seen long before the distinctive features of the land are visible. Good marks for identifying the entrance to Kaipara Harbor are the shifting sand hills inland of North Head, which has patches of scrub on their ridges and end abruptly in a sand cliff on their seaward side. The land S of Kaipara Harbor is higher than that N. Pukitu, a large green triangular tuft, will be seen on the top of a shifting sand range, lying 5 miles S of South Head Light. In clear weather, dark hills on the E shores of the harbor mouth will be seen through the entrance.

Mount Wakahurangi (36°19'S., 174°18'E.) a conspicuous peak, 145m high, is located at the entrance to the Oruawharo River, 8 miles NE of the heads.

The old lighthouse, lying 3.5 miles E of North Head, is a white tower, 12m high, with a white cupola. A flagstaff, 27.4m high, stands in front of Pouto.

South Head is a red cliff, 39m high, whose summit is treelined. This head can be passed at a distance of about 0.3 mile.

Aotea Cliffs, white, conspicuous, and 29m high, stand roughly 11 miles SE of South Head Light.

Pilotage.—Mariners intending to enter Kaipara Harbor should obtain the latest information from the Superintendent, Marine Department, Auckland before attempting to enter the port.

Because of the shifting nature of the shoals, mariners should head for the anchorage off Pouto, lying 2.7 miles NE of Kaipara Head, and try to obtain the services of an individual with local knowledge. In 1965, all buoys in Kaipara Harbor were withdrawn and channels were marked by beacons.

Anchorage.—Anchorage may be obtained by vessels with

local knowledge, in depths of 12.8 to 16.5m, about 0.6 mile N of Aotea cliffs. Reportedly, this above anchorage is the safest in the river.

The recommended anchorages in the Wairoa River lie in the following places:

a. 5.6 miles S of Pouto.
b. 1.2 and 2.2 miles above Pouto.
c. 1.5 miles N of Ru Point.
d. 0.9 mile WNW of Sail Point.
e. 0.8 mile off Ruawai.
f. 0.6 mile SE of Dargaville Wharf, 0.7 mile below the road bridge.

Directions.—Kaipara Harbor should not be entered without extensive local knowledge. Vessels are cautioned against getting too close in to the land before daylight especially with a SW wind and swell. Except in an emergency, vessels should not anchor outside the heads. No vessel should cross the bar unless a safe anchorage can be found inside Kaipara Head, 4.5 miles E of North Head or South Head, before dark. Vessels entering should exercise caution after passing Tory Shoal, as both flood and ebb currents set toward the N shore. Many of the shoals lying above a line joining Kaipara and South Heads are frequently shifting and require extensive local knowledge for passage.

Rangitira Beach, which projects 24 miles SE from the S entrance point of Kaipara Harbor, is comprised of hard sand. This beach is backed by low sand hills, and at its S end is the town of Muriwai Beach. This town represents the only landmark on this otherwise featureless stretch of shore.

Caution.—Anchoring and fishing are prohibited in an area, best shown on the chart, off Rangatira Beach due to the presence of telegraph cables.

From Oaia Islet, lying 1 mile SW of Muriwai Beach, to Manukau Harbor the shore is rugged and cliffy broken only occasionally by sandy bays and beaches.

Lion Rock (36°57'S., 174°28'E.) lies about 7 miles SSE of Oaia Islet and fronts the town of Piha. About 1 mile S of Lion Rock the cliffs at Te Ahu Point rise to a height of about 213m, and about 1.5 miles SSE of the Point is Mount Zion, 294m high.

Manukau Harbor (Onehunga Harbor) (36°55'S., 174°30'E.)

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11.7 Manukau Harbor (Onehunga Harbor) is an extensive inlet located on an exposed coast with a shifting bar, on which there are banks and shoals, extending 5 miles to seaward of the entrance covering an area of 152 square miles with a waterfront of 240 miles, and provides access from the W coast to the Auckland District.

Using Wairopa Channel, access can be gained to the port of Onehunga. Papakura Channel gives access to Papakura and Drury. Waiuku Channel gives access to Waiuku. There is a cargo service between Onehunga and other New Zealand and Pacific Island ports.

Winds—Weather.—The prevailing winds are from the SW to NW. Gales seldom blow from the S; the wind moderates as it draws from SW toward S.

East gales are not frequent, and generally shift suddenly to the NW, in a violent squall, with very heavy rain, working to the W with a rising barometer.

A falling barometer indicates a change of wind to the N, with rain; but when it rises above 1016mb, say about 1026mb, and the land appears nearer than usual, a change of wind to the E may be expected. A clear, cloudless night is also is an indication of a change being at hand, and if accompanied with heavy dew, the wind will in most cases come from the NE quarter; but when lightning is seen to the W, in dark, cloudy weather, a blow may be expected from the SW.

Tides—Currents.—The tidal rise at Onehunga is 3.6m at MHWS and1.9m at MLWN.

On the outer coast the tidal currents set S with the flood and N with the ebb. The tidal currents on the bar attain rates from 1 to 2 knots. Within the inlet the currents, follow the direction of the channels running at a rate of 2.2 knots at springs.

There is a strong set towards the N bank soon after crossing the bar with the ebb. Otherwise, currents are not strong on the banks even when they are well-covered. In the narrow part of the channel off Paratutai, the currents run at a mean spring rate of 2.7 knots. Above Puponga Point, in both Wairopa Channel and Waiku Channel, the average rate at springs is 2.5 knots.

Depths—Limitations.—Depths of water in the bar area are unstable. All vessels should contact Manukau Harbor Radio for the latest information. Depths shown on the chart cannot be relied upon and vessels should not attempt to enter without extensive local knowledge. The bar breaks in heavy weather.

The bar at the entrance to Manukau Harbor breaks with a slight W swell. Inside the bar the channels are generally plainly visible, except when there is no swell, as the banks on either side break. There are frequently large areas of disturbed water caused by the tide in the channel.

Mariners are cautioned that, as the depths on Manukau Bar are subject to frequent change, it is dangerous to attempt to cross it without local knowledge.

Middle Deep, located between North Bank and South Bank, leads from W into the harbor entrance off South Head. The seaward end of the deep is obstructed by Western Shoals, which lie on the outer part of the bar. Passage across this part of the bar may be practicable and may afford the better approach from time to time.

South Channel leads from S across the inner part of the bar into the harbor entrance, but does not maintain a constant depth and is not recommended by the Port Authority.

The Harbor Authority strongly advises against entry and departure at night.

The maximum acceptable draft is 4.9m.

There are small jetties at Cornwallis and Grahams Beach.

Inner channels.—In Manukau Harbor, E of **Puponga Point** (37°01'S., 174°36'E.), there is a junction where the four primary channels come together, being separated by sand banks. Wairopa Channel projects along the N shore of Manukau, the N channel, is considered to be the most significant of the four.

Strong tide rips have been reported (1995) to extend at least 200m seaward between Puponga Point and Lady Bell Point.

Generally, these channels are straight and having dry banks on either side at LW, afford sheltered anchorage for those vessels with local knowledge. The sweeping flats between the four channels could be used by boats according to the tides, and, un-

like the banks outside, the smoothest water is over them, with the tidal currents following the channels. The banks are usually covered after the first quarter flood, but their height vary. The bottom in all four of the channels is green sand and mud, good holding ground. The banks are comprised of soft mud, sand, and shells.

Wairopa Channel projects along the N shore of Manukau Harbor from E of Puponga Point roughly NE to Onehunga, a suburb of Auckland.

A flat projects about 0.5 mile offshore fronting the village of Cornwallis, which is situated on the shore between Puponga Point and Mill Point, nearly 2 miles NE. From abeam Mill Point there is a channel to Shag Point, 3 miles NE, with depths of 5.8 to 11m. Northeast of Shag Point, Wairopa Channel is separated into two parts by Motukaraka Bank. The S or primary channel to Onehunga is narrow with depths of 2.1 to 7.3m. Off Cape Horn, where the N and S channels rejoin, there is a least depth of 3.3m.

A wharf stands on the W side of Wairopa Channel, 0.6 mile N of Puponga Point. A monument, 115m high, stands 0.1 mile N of Puponga Point. Another monument stands about 1 mile NW of Puponga Point.

An oil pipeline crosses Wairopa Channel in approximate position 36°56'18"S, 174°45'24"E.

Onehunga Wharf, from which a light is shown, is 293m long, with dredged depths of 3.4 to 5m alongside the S side; contact the port for the latest information.

Purakau Channel is entered about 1 mile E of Puponga Point, and it has a least depth of about 0.9m 6 miles NE from its entrance.

Papakura Channel is entered SE of Purakau Channel. This channel leads E for 12 miles to Te Pau, the N entrance of Pahurehure Inlet separated from Purakau Channel N, by Karore Bank and from the shore S, by Poutawa and Hikihiki Banks. This channel has depths ranging from 5.8 to 25.6m.

An LPG terminal is situated on the N side of Papakura Channel, 10.5 miles E of Puponga Point. The channel as far as the terminal is marked by lighted beacons.

Waiuku Channel is the S of four channels leading through Manukau Harbor.

Aspect.—Whatipu (North Head) and South Head are easily discernible from sea. North of Whatipu, the land is covered by an extensive forest, while that S, presents a bold barren face of brown sandy soil; with parts being scrub-covered.

When approaching from the W, the most prominent landmarks first visible include the three cone-shaped peaks near Whatipu. One of these peaks is the summit of Paratutai Islet, which is joined to Whatipu by a causeway.

Ninepin Rock, about 0.4 mile WSW of Paratutai Islet, is easily made out due to its cone-shaped appearance. Cutter Rock, white with an orange central patch, is 27m high and stands 0.3 mile N of Ninepin Rock. On the S side of the harbor entrance, about 2.2 miles S of South Head Signal Station, are some conspicuous trees.

Dry Rock, which dries 0.3m, lies about 0.3 mile N of the signal station, on the S side of the fairway.

Huia Banks (37°02'S., 174°35'E.), with a least depth of 4m, extends from a position close W of Puponga Point, about 2.5 miles WSW.

The Mangere Bridge and a connecting causeway cross the harbor E of the wharf. Two conspicuous silos and a prominent pylon stand close W of the N end of the bridge.

Pilotage.—Pilotage is compulsory for vessels of 500 gross tons or more, unless the master is exempt, and for vessels of 40m in length or more unless fitted with an operational AIS.

Pilots will board vessels off Taratara Point, located about 2 miles NE of South Head Main Light, S of Huai Banks.

Whether or not a pilot is embarked, a constant radiotelephone watch must be kept with the Officer-in-Charge, Onehunga, for traffic information, conditions in the harbor, and berthing instructions.

Regulations.—All vessels over 500 tons must contact Harbor Radio on VHF channel 11 for arrival and departure instructions when passing the following reporting points:

a. 37°05.3'S, 174°25.3'E (inbound and outbound).
b. 37°02.3'S, 174°34.0'E (inbound and outbound).
c. 37°00.1'S, 174°36.8'E (outbound).

Signals.—A signal station and mast stand on South Head, about 0.6 mile NNE of South Head Main Light. Communication can be established via VHF channels 10, 11, 12, 13, 14, and 16 (call sign: ZLEF). Phone contact can be made with the signalman at 9-235-1013 for the latest conditions. Vessels equipped with radiotelephone must maintain contact with the signal station while working the bar. Weather conditions permitting, information regarding bar conditions will be supplied on request to the signal station. However, this information can only be used as a guide, as the station lies 5 miles from the bar and is 244m high.

Listening watches are maintained, as follows:

a. 0800-0830—2012 kHz; 2182 kHz; VHF channel 16.
b. 0830-0900—2012 kHz; VHF channels 11 and 16.
c. 1800-1830—2012 kHz; 2182 kHz; VHF channel 16.
d. 1830-1900—2012 kHz; VHF channel 16.

All other times are by arrangement.

Should a vessel be crossing the bar during the scheduled watch periods, the signalman will be working on 2012 kHz with that vessel and not listening on 2182 kHz or VHF channel 16.

A fixed red light, which may be observed upon rounding Puponga Point, lying 3.5 miles NE of the signal station, will be shown at night from the signal station when the bar is unsafe for vessels to proceed to sea. New Zealand authorities advise on observing this light that vessels should come to anchor.

Anchorage.—Vessels with local knowledge, after crossing the bar, are not advised to anchor until after rounding Puponga Point, if proceeding to Onehunga, or after rounding Kauri Point, located 2.5 miles SE of Puponga Point, if proceeding to the S.

After rounding Puponga Point, vessels should pass W of Te Tau Bank, which lies between Wairopa Channel and Purakau Channel, where good anchorage can be found, in a depth of 7.3m, about 0.2 mile E of the head of Cornwallis Wharf (37°01'S., 174°36'E.).

The anchorage above **Cape Horn** (36°56'S., 174°44'E.) is wider than that close off the lower end of Onehunga, where there is a pool, with a depth of 7.3m. The usual anchorage lies about 1.5 miles below Onehunga Wharf, in a depth of 4.6m.

Anchorage may be found by vessels with extensive local knowledge at the E terminus of Papakura Channel within the heads at Te Pua, in a depth of 8.2m.

Anchorage is prohibited within 100m of a submarine pipeline laid in a 152° direction across Wairopa Channel, 1 mile W of Onehunga Wharf.

A prohibited anchoring and fishing area lies within an area projecting 2 miles from Destruction Gully front beacon, in a 182° direction, with a width of about 150m. Destruction Gully lies about 1.2 miles NE from **Paratutai Island** (37°03'S., 174°31'E.).

Anchoring and fishing are prohibited within an area adjacent to Auckland Airport which is situated N of Papakura Channel.

Directions.—Vessels planning a voyage here are encouraged to contact the local authorities for the latest information and channel depths. On no occasion should a vessel attempt to enter or depart without contacting the signal station for information and advice; attempting to enter or leave after dark is not recommended.

In 1983, a vessel entering from seaward was advised to keep in depths of at least 37m to clear the banks extending up to 5.5 miles offshore. South Channel was entered from a position about 5 miles SW of South Head Light. A line of breakers, which breaks in moderate seas, lies 0.5 mile W and parallel to the channel.

The harbor entrance bar breaks with a slight W swell. Inside the bar the channels are easily seen, as the banks bracketing them break.

Outbound vessels are advised to keep on the N side of the fairway after passing Huia Banks.

Caution.—A survey of South Channel was carried out by New Zealand authorities in 1991. Mariners are warned that the bar remains unstable, depths are liable to change, and the channel may be closed to vessel traffic. The Officer-in-Charge, Onehunga, and the Signalman, South Head, will advise mariners of the situation.

Depths over Western Shoals and in South Channel are obtained by periodic survey and are promulgated together with advice as to where the best water is to be found, in New Zealand Temporary Notices to Mariners; the latest notice should always be consulted before calling at Manukau Harbor. Copies of the surveys are available from the Harbormaster, Auckland, or from the Officer-in-Charge, Onehunga.

Manukau Harbor to Port Taranaki

11.8 The **Waikato River** (37°24'S., 174°45'E.), one of the largest in New Zealand, rises in Tongariro Mountain near the center of North Island. This river has a shifting bar and is available only to small vessels with extensive local knowledge. The shore from the Waikato River, 24 miles NNW to South Head, is comprised of a bold, barren face of brown sandy soil covered in scrub.

The N entrance point of the Waikato River is made up of sand hills NE of which is forestland. The S entrance point is also formed of sand hills and rises steeply 0.7 mile inland to scrub-covered hills, about 166m high. The village of Port Waikato is situated on the S bank of the river, about 2 miles SE of the S entrance point.

Tides—Currents.—Tidal currents attain rates of 4 knots in the entrance, and 2.5 knots above Port Waikato.

Due to the changing nature of the bar and shoreline at the entrance to the river, the positions of the beacons cannot be depended upon.

Anchorage.—Vessels with local knowledge and drafts from 3 to 4m can obtain anchorage close in off Port Waikato. The bottom here is hard, coarse, black and white sand mixed with pumice, and under this is mud.

11.9 **Rangitoto Point** (37°48'S., 174°51'E.) stands about 22 miles SSE of the mouth of the Waikato River; it represents the N entrance point of Raglan Harbor. Kapiapia Rock, 6m high, is a black rock that is located about 14 miles NNW of Rangitoto Point and nearly 1.5 miles offshore. A rock, with a depth of 2.8m, was reported (1997) to lie about 2.6 miles SW of Kapiapia Rock.

Raglan Harbor (37°48'S., 174°50'E.) is entered between Rangitoto Point and a point 0.2 mile S. New Zealand authorities advise that the alignment of the directional light (leading through the entrance of the harbor) may be altered because of the periodical shifting of the main channel. Depths on the bar are subject to frequent change and it is dangerous for mariners without local knowledge to attempt to cross it. Mariners without local knowledge are advised to contact the harbormaster by radiotelephone, through Auckland Coast Radio Station (ZLD), before attempting to enter the harbor.

Tides—Currents.—Tidal currents within the heads attain a rate of from 2.5 to 4 knots. At the anchorage, 0.2 mile NNE of Raglan Wharf, a rate of 1.5 to 2 knots is experienced.

Depths—Limitations.—In approaching this harbor, the depths shoal from a depth of 14.6m, which is found about 2 miles offshore, to a depth of 1.4m on the bar; the channel then deepens to a depth of 6.3 between the heads, but close within them is an inner bar with a least depth of 2.7m.

The town of Raglan lies on the S side of the harbor on the E side of the mouth of the Opoturu River. Raglan Wharf, 40.0m long, with a depth of 3m alongside, lies at the NE corner of the town, about 0.4 mile SSE of **Tokatoka Point** (37°47.4'S., 174°52.6'E.).

Aspect.—Upon close approach, the entrance to Raglan Harbor can be identified by remarkable gray, bare, sand hills which rise from Rangitoto Point towards Horea, 149m high, 1 mile NE. The S entrance point to Raglan Harbor, which lies about 0.2 mile S of Rangitoto Point, is low, rising to South Head, 80m high, and grass-covered, 0.5 mile SW. A black post stands on the S entrance point. A monument stands about 0.2 mile SE of the post.

Manu Bay lies about 1.7 miles SW of Rangitoto Point, and a swell usually breaks on the rocks in the bay. Tattooed Rocks, with a depth of 0.8m, stand off the E entrance of Manu Bay. Bryant Home, with a white gable and a conspicuous flagstaff, stands on a cliff 1 mile SSW of South Head.

A red beacon stands on a drying rock in the entrance to the Opoturu River, on the S side of the harbor, about 1 mile E of Rangitoto Point. Three prominent pine trees stand on the E entrance point of the river.

A submarine cable is laid across Raglan Harbor in a N-S direction, about 0.2 mile E of the entrance to the Opoturu River.

Raglan Wharf, with a length of 40m and alongside depths of about 3m, stands at the NE corner of the town.

Pilotage.—Pilotage is not available. There is a part-time har-

bormaster.

Anchorage.—Vessels with local knowledge can anchor virtually in any part of this harbor. There is good anchorage 0.2 mile NNE of Raglan Wharf, in a depth of about 3.7m. Farther SE the holding ground is poor, mud over smooth rock.

Directions.—Raglan Harbor should not be entered without local knowledge. Contact the Harbormaster via VHF radiotelephone through Auckland Coast Radio Station (ZLD) before attempting to enter.

Generally, vessels do not proceed beyond Raglan Wharf, 2 miles within the entrance. When about 0.5 mile within the entrance, when the range lights on the S entrance point are in line bearing 234°, astern, steer NE, then head for Tokatoka Point Light bearing 056°, at night, keeping within the white sector. In 1978, there was a least depth of 2.4m on this track, 0.5 mile SW by W of Tokatoka Point. When about 0.2 mile from Tokatoka Point and when Raglan Wharf bears 128°, change course for the anchorage or the wharf.

11.10 Jackson Reef (Patuatini Rock) (37°53'S., 174°43'E.) is located about 1.7 miles NW of Papanui Point (Waipapa Point). This reef breaks in heavy W gales.

Gannet Island (Karewha), 13m high, and white with guano from the sea birds, is a wildlife sanctuary situated about 10.5 miles WSW of Papanui Point.

Tides—Currents.—Off this portion of coast the N current, with the flood from Cook Strait, meets the S current, with the flood from off Manukau Harbor, in the vicinity of Gannet Island.

Aotea Harbor (38°01'S., 174°48'E.) is entered about 8 miles S by E of Papanui Point, and it is used only by those vessels with extensive local knowledge. From sea the entrance to this restricted inlet appears as a large gap in the sand hills on either side. The river freshets, and W gales, possibly vary the configuration of the spit and depths in the channel, thus necessitating the use of a pilot.

Aotea Reef lies about 1.5 miles NNW of Potahi Point, the N entrance point of Aotea Harbor.

Tides—Currents.—Between the heads of Aotea Harbor, currents attain rates of 3 to 5 knots, and at the anchorage off the red cliffs, 1.5 miles E of Potahi, a rate of 2 to 4 knots.

11.11 Kawhia Harbor (38°05'S., 174°47'E.), which can only be utilized by those vessels with extensive local knowledge, is entered over a constantly shifting bar and between Tauratahi on the N side and Opapaka Point, 0.5 mile SW. Opapaka Point is 33.5m high with a conspicuous yellow patch on it.

The approach can be made out from sea by Pirongia Mountain, which is located 15 miles inland, rising in notched peaks to a height of 960m. There are depths of 5.5 to 16.5m between the bar and the town of Kawhia. Kawhia lies 2.2 miles ENE of Tauratahi, and there is a wharf there with a least depth of 3m alongside.

The entrance channel, between shallow or drying banks on both sides, is narrow and tortuous and had a least depth of about 2m in 1984, over a bar which lies 1.5 miles NW of Tauratahi Point. The bar is subject to unpredictable change and should not be attempted without recent local knowledge.

A dangerous wreck lies near the N side of the entrance to the channel.

Aspect.—The fairway to Kawhia is about 0.1 mile wide and it lies between sandbanks. The banks dry and are usually marked by tide rips.

Tides—Currents.—Tidal currents within the heads attain a rate of 3 to 5 knots and within the entrance of 2 knots. The ebb current sets in a WSW direction over South Bank, and the flood in the opposite direction. The flood within the entrance sets SE over the banks toward Te Motu island, 1.7 miles SE of Tauratahi. At Kawhia Wharf, the flood has been observed to continue for about 1 hour after HW. The ebb sets off the wharf.

Directions.—Kawhia Harbor should not be entered without extensive local knowledge.

Anchorage.—Vessels with local knowledge can obtain anchorage 0.5 mile above **Matatua Point** (38°04'S., 174°50'E.), in a depth of 7.3m.

Within Kawhia Harbor, when the tide is out, the channels leading to Oparau, Kauri, Awaroa, Rakaunui, and the Waihara-Keke River are all plainly made out.

Small vessels with local knowledge can anchor in the S part of the harbor rounding Opapaka Point at less than 100m off, and keeping along the S shore for about 0.5 mile.

Approaching from the W, vessels should head for **Pirongia Mountain** (38°00'S., 175°08'E.) until Albatross Point shuts in the land S of it, when the vessel will be about 5 miles offshore. During SW winds and with the ebb, there is a heavy sea off Albatross Point; vessels should give it a wide berth.

No directions are given for crossing the bar as local knowledge is required. After crossing the bar, when Opapaka Point is abeam, a vessel should alter course as required for the N channel towards Matatua Point.

11.12 Albatross Point (38°07'S., 174°41'E.) is bare and steep, rising to 183m at Taungatara, about 0.3 mile S of the point. Albatross Point lies about 4.2 miles WSW of Urawhitiki Point and the shore between forms a bay where anchorage can be found, in depths of 7.3 to 14.6m, in good weather, with offshore winds, sandy bottom. A black mooring buoy stands 0.7 mile ESE of Albatross Point.

Taharoa Ironsand Terminal (38°10'S., 174°41'E.) (World Port Index No. 55225) is situated 4 miles S of Albatross Point and is comprised of a Single Point Mooring (SPM), 11m in diameter, painted orange, moored in a depth of 29.3m. Submarine pipelines connect the SPM to the shore E.

Taharoa Light is shown from a tower, painted red, 16m high, 3.5 miles SSE of Albatross Point. A fixed red obstruction light is shown from the tower. The pumping station stands 0.5 mile SSE of Taharoa Light. Close E of the pumping station is the ironsand stockpile and 4 prominent black towers about 20m high. Floodlights illuminate these towers at night. The port operations office, a small cream-colored building, stands on a sand hill at a height of 30.5m, 0.1 mile N of Taharoa. A framework tower, painted in red and white bands, stands close S of the office. A red light is occasionally shown from the tower.

Range beacons, in line bearing 158°, lead about 0.5 mile E of the SPM, and are shown from a position roughly 4 miles S of Taharoa Light.

An area prohibited to anchoring and fishing lies in close proximity to the SPM and is bound by the following approximate positions:

a. The shore at 38°10'S, 174°42'E.
b. 38°10'S, 174°40'E.
c. 38°11'S, 174°40'E.
d. The shore at 38°11'S, 174°42'E.

Vessels, other than those bound for the offshore terminal, should remain outside the limits of the port area.

Pilotage.—Pilotage is compulsory and pilots embark and disembark via helicopter. Vessels can be berthed by day and at night. Berthing during darkness is dependent on suitable weather.

Vessels arriving should turn towards the wind about 3 miles WNW of the SPM and await the pilot.

11.13 The shore between Albatross Point and Port Taranaki, about 69 miles SSW, is devoid of any anchorage or shelter, except in the small rivers which are used by small coasters with local knowledge in good weather.

Tirua Point (38°23'S., 174°38'E.), which shows as a yellow cliff from the N, lies about 17 miles S of Albatross Point. Tokamapuna Rock, awash, lies about 11.5 miles S of Albatross Point. Piritoki Reef stands about 1 mile N of Tirua Point. Whareorino Mountain rises to 648m, about 3 miles ESE of Tirua Point.

The Mokau River lies about 19 miles S of Tirua Point; the bar at its entrance has a depth of about 0.9m. Small local vessels can cross the bar under favorable conditions, and there is good anchorage within. The N entrance point of the river is comprised of sand dunes; the S entrance of cliffs. Epiha Rocks lie almost 0.2 mile W of the S entrance point, with foul ground between.

The shore S of the Mokau River is comprised of yellow sandstone cliffs, about 30.5m high, on which the constant action of the sea has produced a unique effect by isolating portions of projecting points, wearing them into pillars of incredible shapes.

White Cliffs (38°52'S., 174°33'E.), prominent and 243m high, stand about 10.5 miles S of the entrance of the Mokau River.

The Waitara River lies about 17 miles SW of White Cliffs; its entrance forms the S entrance point of North Taranaki Bight. The entrance points to the river are made up of dark rock which distinguishes them from the surrounding shoreline. At night, the lights of the town of Waitara are a useful mark. A directional light is shown on a shed 0.6 mile inside the entrance to the river.

A bar, with a depth of about 0.6m, fronts the river's entrance, and no vessel should cross it without extensive local knowledge. The bar is sheltered from the prevailing SW swell by the reefs W, but it is exposed NW. Whenever there is a swell off the entrance, breakers occur on the bar. A directional light, showing white, leads over the bar into the river.

Tides—Currents.—Outside the bar, tidal currents set E with the flood and W with the ebb. They attain rates from 1 to 2 knots. In the entrance, the flood attains a rate of from 2 to 3 knots; the ebb attains a rate of from 3 to 4 knots.

Aspect.—An aero light is shown 2.5 miles WSW of the entrance to the Waitara River. Prominent radio masts, from which red obstruction lights are shown, stand about 3 miles SSW and 5.2 miles SW, respectively, of the entrance to the Waitara River.

Port Taranaki (39°03'S., 174°02'E.)

World Port Index No. 55210

11.14 Port Taranaki (New Plymouth) is one of the few harbors on the W shore of North Island that can accommodate a vessel of moderate size. The approach to the port is considered safe, easily navigable, and has no bar. The port is protected by breakwaters. Three wharves are situated to the W of the breakwaters. There is a sand bank around the head of, and along the main breakwater, which is liable to alteration and is being continually dredged.

Crude oil condensates from the Maui Gas Field and the Kapuni Gas Field are shipped out of the port to Marsden Point refinery on the E coast. Port Taranaki is also a fishing port and a base for vessels servicing the gasfield installations.

Coastal vessels may enter, berth, unberth, or depart at any time. Overseas vessels are not berthed during the hours of darkness. The nature of the bottom at the port entrance and in the approach channel is mud and sand; alongside the berths it is mud.

The city of New Plymouth lies about 2 miles E of the port.

Port Taranaki (Westgate)

http://www.porttaranaki.co.nz

Port Taranaki

Winds—Weather.—During the summer season, November to February, regular land and sea breezes prevail; the latter from the SW. In the winter season the weather is variable, with frequent SE winds and clear weather. Gales are reported to be strongest during autumn and spring; these are from points W. Mount Egmont is usually clearly visible when winds are from this quarter.

In the roadstead lying N and NW of the main breakwater, strong winds may be experienced between SW to N to ENE. A heavy swell is reported to precede the arrival of this wind.

Tides—Currents.—The flood current sets W and the ebb E; both attain rates of about 1 knot and are much influenced by winds. There are strong wind influenced currents in the offing. A NE current sometimes sets along the shore at 1.5 knots.

During January, February, and March with E weather, an inshore current sets SW; in the offing it sets S with a rate of 1 to 1.5 knots.

Depths—Limitations.—Vessels with a maximum draft of 12.5m, a maximum length of 225m, and a maximum beam of 35m may be accommodated at Port Taranaki. The maximum draft may be exceeded upon consultation with the harbormaster.

There are three main wharves at Port Taranaki; from S to N they are Blyde Terminal, Newton King Tanker Terminal, and Moturoa Wharf. A buoy lies 0.1 mile E of the head of Blyde Wharf, marking the S limit of the deep water in the harbor; vessels should not approach within 30m of the buoy.

Blyde Terminal is an intergrated cargo handling facility. Containers as well as general and refrigerated cargo is handled here. The terminal is 420m long on its N side and 80m long on its SE side.

Vessels of up to 225m in length, having a beam of up to 32.3m, and a deep draft of 10m, can be accommodated at Berth No. 1 and Berth No. 2, which are situated on the N side of the terminal. Vessels of up to 78m in length, having a beam of 20m, and a 6.5m draft, can berth at Blyde No. 3, situated on the SE side of the terminal.

At the root of the main breakwater there is a heavy lift berth, 122m in length, with a dredged depth alongside of 7m. The berth is also used by oil field supply vessels and fishing vessels.

Newton King Tanker Terminal offers bulk petroleum facilities, as well as LPG loading equipment.

The terminal pier is 302m long. No. 1 Berth, on the N side, can accommodate vessels with a maximum length of 212m and has a dredged depth alongside of 10m. No. 2 Berth, on the S side, can accommodate vessels with a maximum length of 212m long and has a dredged depth alongside of 13.5m.

Moturoa Wharf, the N wharf, generally handles dry bulk cargo. The urea loader is one of the most noticeable features of the port. Vessels of up to 98m in length, having a 20m beam and a deep draft of 6.0m, can be accommodated at Moturoa Berth No. 1. Vessels of up to 196m in length, having a maximum beam of 32.3m and a deep draft of 9.8m, can be accommodated at Moturoa Berth No. 2. Vessels of up to 75m in length, having a maximum beam of 20m and a deep draft of 5.5m, can be accommodated at Moturoa Berth No. 3.

Aspect.—The Sugar Loaf Islands are made up of two conspicuous islands; Moturoa is the SE island and Saddleback is the NW island. Both islands are wildlife sanctuaries. Moturoa is a prominent cone-shaped island. Saddleback is, as its name implies, saddle-backed, with a conspicuous cone-shaped summit. Three rocks, the highest being 12.2m high, lie close off the S end of Moturoa, with Lion Rock lying further S. Corinna Rocks, two pinnacles, lie close off the N end of Moturoa.

The approach from sea can be easily identified by the Sugar Loaf Islands, described above, as well by Paritutu, a prominent dome-shaped hill, 152m high, and Mount Egmont, lying some 14.5 miles S of Paritutu.

Upon close approach, a radio mast, from which red obstruction lights are shown, lying about 4.2 miles ENE of the head of the breakwater, is prominent. Additional landmarks include a church spire, a hotel, a chimney, and a radio tower lying 1.7 miles and 1.2 miles ENE, 1.5 miles SE, and 1 mile S, respectively, from the breakwater head. A conspicuous chimney stands 0.2 mile WSW of Mikothai Light.

The shore fronting the town of New Plymouth is rocky; foul ground projects up to 0.7 mile offshore in spots, breaking in a moderate to heavy swell. Seaward of the foul ground there is an uneven bottom of sand, stones, and rock ledges.

Shoaling was reported (1990) E and S of the head of the main breakwater.

Pilotage.—Pilotage is compulsory for all vessels over 100m in length or over 100 gt. Vessels requiring a pilot on arrival should send their ETA 24 hours in advance. All messages can be addressed Harbormaster, New Plymouth. At least 2 hours notice must be given before sailing.

Pilots board in position 39°00.9'S, 174°02.8'E. Pilots disembark from outbound vessels inside the breakwater heads.

Signals.—The port is equipped with both medium frequency SSB and VHF radiotelephone. Instructions for berthing are given by VHF or medium frequency radiotelephone. Vessels must not attempt to enter the port unless instructions are received by radiotelephone or a pilot is on board.

Anchorage.—Taranaki Roads affords anchorage W of the harbor approach leading line; the recommended berth indicated on the chart is 1 mile N of the head of the main breakwater, in a depth of about 24m, sand and mud, good holding ground. Heavy swell may develop in the roadstead.

Quarantine anchorage may be found in the navigable waters enclosed by an arc of a circle, radius 2 miles, centered on **Mikotahi Light** (39°03'S., 174°02'E.), clear of the range line or in such a position as directed by the harbormaster.

Directions.—Vessels approach the port with the range lights in line. The heads of main and lee breakwaters slope outward under water and vessels should not approach within 120m of the breakwaters.

Caution.—Shoaling was reported (1990) E and S of the head of the main breakwater. A significant surge can develop in the port during periods of strong winds preceding storms.

Cape Egmont to Cape Palliser, including Cook Strait

11.15 Cape Egmont (39°17'S., 173°45'E.), a generally featureless projection, lies about 18 miles SW of Port Taranaki; the shore between is low, rocky, with sand or shingle beaches. Urupa Memorial stands about 5.2 miles NE of the cape.

Mount Egmont is not the highest peak in New Zealand, but it is certainly the most prominent, rising to a perfect cone, 2,516m high. This peak presents the same appearance from all bearings. Its summit, an extinct crater, is flat, and above 1,829m, it is always snow-covered. Pouakai, 1,398m high, is a saddle-shaped spur NW of Mount Egmont. Fanthams Peak, 1,961m high, lies about 1 mile S of Mount Egmont.

South Taranaki Bight is formed between the town of **Opunake** (39°27'S., 173°51'E.) and the entrance to the Patea River, about 35 miles SE. The shore of this bight is faced with cliffs about 30m high. A gas production station, with two towers 39m high, stands 1 mile inland, 3.5 miles NNW of Opunake; a conspicuous flare is burnt from one of the towers. Opunake Bay, which fronts the town of Opunake, is only suitable for small vessels with less than 3m draft. A prominent water tower marked by a red light stands at **Hawera** (39°36'S.,

174°17'E.).

Caution.—Petroleum exploration rigs, gas production platforms, and floating production, storage and off-loading installations (FPSO) are found SW of Cape Egmont in the Maui Gas Field, where the Maui A and Maui B gas production platforms are in operation. Maui A stands 22 miles SW of Cape Egmont; gas pipelines connect the platform to the shore ENE and from the platform to Maui B, a production platform standing 9 miles SW. A 135,000 ton tanker, the Whakaaropi, is permanently moored about 1 mile SW of Maui B and serves as an FPSO. Unauthorized navigation is prohibited within 500m of the platforms and FPSO. These pipelines contain flammable gas and a vessel damaging them would face a certain fire hazard. As charted, anchoring and fishing are prohibited within the vicinity of the pipeline. Additionally, flaring of gas takes place from time to time from Maui A platform. Unlighted buoys and other obstructions may lie near the platforms; construction operations are underway in the vicinity of Maui B. Supply and service vessels may be operating in the vicinity of both platforms. Vessels are recommended to give platforms and the FPSO a berth of at least 2.5 miles.

Patea Banks, with a least depth of 15.2m, lie about 5 miles W of the Patea River Entrance.

North Trap and South Trap, with depths of 6.4m and 7.8m, lie on Whenuakura Spur, about 5 and 6 miles SSE of the entrance to the Patea River. Graham Bank, with a least depth of 11m, lies about 8.5 miles SSW of Patea River Light.

The Rolling Ground, a detached shoal with a least depth of 16.5m, lies 16 miles WSW of Patea Light.

11.16 Patea Harbor (39°47'S., 174°29'E.) (World Port Index No. 55190), which can only be utilized by very small vessels with local knowledge, is no longer used by coastal vessels. The entrance to the Patea River should not be approached at night inside the 10m curve.

The entrance to the Patea River is comprised of scrub and lupin-covered cliffs, about 30m high, from which breakwaters project. Inside the bar, the river is navigable as far as the town bridge, 1 mile above the entrance. The width between the breakwaters is 67m. An overhead cable crosses the river 0.2 mile within the entrance. The wharves lie on the E bank below the bridge.

A prominent white water tank stands at a height of 60m at the NW end of Patea, and a radio tower on Bluff No. 2, at a height of 353m, stands about 8 miles N of the town.

The bar at the entrance to the Patea River extends only a short distance seaward of the LW mark on the coast. The bar is exposed to the prevailing W winds from which heavy seas are experienced. There is a depth of about 2.7m on the bar at HWN and 4m at HWS. Freshets occur from June to August.

Tides—Currents.—Outside of the bar it is reported that the flood runs for 5 hours; the ebb runs for 7 hours. Higher tides can be expected with N winds, and the reverse with S winds. Tidal currents set parallel to the coast and the set is considerable during W, S, and SE winds.

Anchorage.—From 1 to 2 miles offshore the bottom is composed of fine sand, with occasional patches of rock. In moderate weather, vessels can anchor, in depths of 11 to 18.3m. An anchor buoy is necessary due to the bottom being foul in spots.

The shore in this vicinity is nondescript. Patea water tank can be seen at a distance of 15 miles. A small water tank near the W end of a group of houses at Beach Camp, 7.5 miles ESE of the Patea River Entrance, is prominent in the afternoon sun.

Caution.—Submarine pipelines may exist up to 7 miles SE of the Patea River Entrance.

Wanganui Harbor (39°57'S., 174°59'E.)

World Port Index No. 55180

11.17 The port of Castlecliff is situated at the mouth of the Wanganui River. The city of Wanganui lies on the N bank of the river, about 4 miles from Castlecliff. The entrance to Castlecliff is between two moles, the outer parts of which project in a SW direction for about 305m and are about 183m apart. A timber training wall, 145m long, in ruins, runs from the South Mole in a W direction, beginning at a position 227m from the mole end. The distance between the end of this wall and the N mole is about 129m. There is a sand bar off the entrance, with depths varying from 1.8 to 3.5m below chart datum. The town channel is closed to shipping.

Local deflection of the magnetic compass is reported to occur in the vicinity of the Waitotara River.

Tides—Currents.—Off the coast adjacent to the harbor, the current sets N with the flood and S with the ebb at a rate of 1 to 2 knots. When approaching the entrance to the port, the current is much influenced by the direction of the wind. It has been found that the current sets to the S during and for a period of time after a W wind has been blowing. Rates from 2 to 3 knots at neaps and 3 to 5 knots at springs have been observed at the entrance and in the channel up to the wharves. All information regarding bar conditions and tides is relayed by radiotelephone or VHF.

Depths—Limitations.—Vessels may enter, berth, unberth, or depart during the hours of darkness. A vessel, 100m in length and with a draft of 4.5m, can berth alongside. The nature of the bottom in the channel is sand; within the swinging basin, the bottom is mud. Shoaling has been reported (1993) in the swinging basin and the basin now includes drying areas and reduced depths alongside. The harbormaster should be contacted for the latest information.

This harbor should not be entered without local knowledge.

Castlecliff Swinging Basin is formed on its N side by wharves, numbered 1 to 3, which afford three berths, with an overall length of 579m and depths of 0.2 to 4.5m alongside. The swinging basin is dredged to a depth of 3m.

The channel, E of Castlecliff Swinging Basin, leading to Wanganui is closed to shipping. Depths over the bar range from 2.7 to 3.5m, sand.

Aspect.—Mount Egmont and Mount Ruapehu, lying 84 miles E of Cape Egmont, which was previously described in paragraph 11.15, are distinctly visible from sea. Taupiri, a sharp double-peaked hill, 16 miles inland, in line with Mount Ruapehu, bearing 038°, leads directly to the entrance. When the mountains cannot be seen, the Seven Hummocks, a conspicuous range of hillocks lying 12.5 miles NNW of the rivers entrance are a good guide.

About 2 miles N of the rivers entrance, the shore changes from cliffs to low sand hills. Landguard, a prominent bluff 37m high, lies on the S side of the river about 1.6 miles ESE of the S

entrance point of the Wanganui River.

Durie Hill War Memorial Tower (39°56'S., 175°04'E.), 114m high, lies about 2 miles NE of Landguard, 3 miles E of Castlecliff, and is plainly visible from sea in clear weather. The water tower on Bastia Hill, close N of the War Memorial, is 151.2m high and the most conspicuous object on the skyline from the anchorage.

The white surf club, on the beach 0.6 mile NW of the N entrance point of the Wanganui River, is prominent.

Red obstruction lights are shown from a mast, 53m high, about 0.6 mile SE of Landguard. Red lights are shown from another mast 2.2 miles ENE of Landguard.

Pilotage.—According to the Wanganui Harbor Board Bylaws, there are two types of pilotage in Wanganui; pilotage and special pilotage.

Pilotage is the service whereby vessels are directed by radiotelephone from the harbormaster and is compulsory. Masters should not attempt to enter without first receiving from the harbormaster permission to do so as well as directions regarding prevailing depths, bar conditions, etc.

Special Pilotage involves the actual boarding of a pilot and it is not compulsory except in certain circumstances when required by the harbormaster. However, vessels may request a pilot. A pilot will board about 2 miles SW of the harbor entrance. At least 4 hours notice prior ETA should be given via radio to the harbormaster to obtain services of a pilot. The pilot boat is a red and blue launch, 17m in length, with a high wheel house amidships, equipped with radiotelephone. The launch assists vessels to berth.

Signals.—A signal station, although still visible is not used, lies on the summit of Castlecliff. Vessels can communicate via radiotelephone or VHF with the harbormaster. All information regarding bar conditions, tides, and berthing is communicated via radiotelephone or VHF. The harbormaster may be contacted by telephone (6-344-7684) or cell phone (274-425-489) when the VHF is not being monitored.

Anchorage.—Vessels can obtain anchorage outside the bar, in a depth of about 12.8m, 0.8 mile WSW of the river entrance, on the alignment of the anchorage lighted beacons, with the light on North Mole Head in line with the entrance rear leading lighted beacon, bearing 063.5°. Should winds become strong from a S or W direction, it is recommended that masters shift berth further seaward.

Quarantine anchorage in the roadstead may be found, in a depth of 18m, with the signal station flagstaff bearing 061°, or in a position within port limits as directed by the harbormaster according to wind directions.

Directions.—In moderate weather, vessels with local knowledge can approach safely within signaling distance, and then, if necessary to wait for the tide, anchor, in depths of 11 to 16.5m, 1 to 2 miles from the bar.

A vessel upon receiving permission to enter should normally steer with the bar range beacons in line until nearing the end of the North Mole, when course should be changed to pass close off the North Mole. When abeam of the beacon on the North Mole, 0.3 mile ENE of the head of the mole, course should be changed for the wharves. Mariners should pay particular attention to any instructions which may be given by radiotelephone.

11.18 The shore between the mouth of the Wanganui River and the mouth of the Rangitikei River, 23 miles SE, is a sandy beach backed by low drifting sand dunes with patches of marram grass. The Rangitikei River is only used by small local craft.

The Manawatu River lies 11 miles S of the Rangitikei River and is distinguished by the Foxton Beach Surf Club tower and a group of radio masts, showing red lights, situated 0.5 mile N and 5.5 miles NE, respectively, of the river's entrance. About 3 miles E of the rivers entrance, on the N bank, is a prominent group of trees on the W side of the town of Foxton, which has not been used by shipping for years.

Cook Strait

11.19 The description of Cook Strait which follows begins with the E side from **Kapiti Island** (40°51'S., 174°55'E.), SW to Wellington, and then SE to Cape Palliser; this is followed by a descriptive narrative of the W side of Cook Strait, from **Cape Farewell** (40°30'S., 172°41'E.) E by S to Stephens Island (including Tasman Bay), and then SE to the Brothers, and finally S to **Cape Campbell** (41°44'S., 174°16'E.).

For the most part there are only a few off-lying rocks in Cook Strait. The W side affords many secure harbors that are easy to access in NW or SE gales, which are the only violent winds. When passing through the strait, vessels generally keep to the W side where the land is high.

Tides—Currents.—The tidal currents in and around Cook Strait are unreliable, and masters are warned to exercise every precaution when navigating in the vicinity. The currents often run in one direction for 8 to 10 hours, while cases have been reported of them going for 18 hours and more. When the currents have been running in one direction, for 8 to 10 hours, it has been found that the opposite current is much weaker, and in some cases, hardly noticeable. The maximum rates shown on the chart, which are usually attained at springs, are also liable to be experienced at any other time. In the vicinity of Karori Rock and Cape Terawhiti, a rate of up to 7 knots is frequently experienced, but as a rule it does not last for more than about 1 hour. Small vessels are warned to keep well clear of tide rips, as they may lose steerage way, and may in extreme cases, capsize.

Additionally, vessels are cautioned not to approach the land in thick weather, unless certain of their position. The influence of strong gales on the tidal currents is felt when the disturbance is from 24 to 48 hours away, and the influence of the current caused by the winds may prolong or retard the duration of the tidal currents by from 1 to 3 hours.

Tidal currents in the strait run quite quickly, attaining rates of 5 knots and upwards at springs. When the wind runs against the tidal currents, a troubled sea is raised and with heavy gales the strait may be dangerous even for large vessels. The sea caused under these conditions is not as heavy on the W as on the E side of the strait. Local vessels, when bound through the narrow part of the strait against a S gale, stay as much as possible in mid-channel, and usually navigate during the last quarter of the S current.

High water on the W side of Cook Strait occurs about 5 hours later than on the E side, so that when it is HW on one side it is nearly LW on the other. The tidal currents are occasioned by these differences in level. If in addition, meteorolog-

ical conditions are such that mean sea level is raised on one side of the strait, then the flow from the other side will be considerably increased in strength and duration, while the flow from the other side is correspondingly reduced or, under extreme conditions, even reversed.

During NW or SE gales, or winds of long duration from other directions, especially the former, the flow in the strait is affected by the drift current raising from them. The duration and rate of the NW flow will be increased, and those of the SE corresponding reduced by SE winds, while NW winds will have reverse effect.

In the center of the narrowest part of the strait, between **Cape Terawhiti** (41°17'S., 174°37'E.) and Perano Head, N current begins 15 minutes before Wellington or 4 hours before HW on the shore in that part of the strait, and runs for 6 hours; the S current then runs for the same period. The rate of both currents is from 1 to 3.5 knots, but during spring tides and gales the current setting with the wind may attain rates up to 5 knots. Heavy tide rips are experienced in this area, where there is an uneven bottom, depths varying from 146 to 366m, sand.

Off the shore between Cape Terawhiti and Sinclair Head, 7 miles SE, currents attain a rate of 5 knots during springs and within 1 mile of the Cape, after strong NW gales, the S current sometimes attains a rate of 6 knots. Tide rips project 2 or 3 miles off this shore. This shore should therefore be given a wide berth to avoid being set onto one of the detached dangers.

At the S entrance to Cook Strait, the N current begins 3 hours before HW on the shore in that part of the strait and runs for 6 hours. The S current runs for the same period.

A cold bottom current, probably from the S or subantarctic, appears to run underneath into the deep submarine canyons of Cook Strait. This current is forced to the surface by meeting the steep slopes near the 183m curve. The forcing of this current to the surface may have some influence on the broken water experienced in Cook Strait as well as modifying tidal currents. Off **Turakirae Head** (41°25'S., 174°55'E.), there is a strong set WNW which projects for 2 miles to sea.

East of Sinclair Head and inside a line between it and Baring Head, the tidal currents are negligible and usually there is an eddy with the N current setting E along the shore towards the entrance to Wellington Harbor.

There are overfalls 6 and 7 miles SW of Sinclair Head and the heavy rips that occur during springs are dangerous to small craft.

Caution.—Ferries regularly transit Cook Strait between **Wellington Harbor** (41°21'S., 174°50'E.) and the entrance to **Tory Channel** (41°13'S., 174°19'E.).

Fishermens Rock, a pinnacle with a depth of 9.4m, is located about 19 miles SW of Kapiti Island. Fishermens Rock should be given a wide berth by vessels of deep draft. Tide rips project NNE and SSW of the rock.

Transpower New Zealand

http://www.transpower.co.nz

The Cook Strait Cable Protection Zone (CPZ) protects vital submarine cable links between the North Island and South Island. Anchoring and fishing are prohibited in the CPZ. The area is patrolled to ensure compliance and failure to comply may lead to substantial fines and vessel seizure. Further information on the CPZ can be found on the Transpower New Zealand web site under "Publications."

A magnetic anomaly is reported to exist in the vicinity of the Cook Strait submarine cables.

Cook Strait—East Side

11.20 Kapiti Island (40°52'S., 174°55'E.), wooded and mountainous, and which has an observation tower on the summit at an elevation of 529m, lies about 3.5 miles NW of the entrance to the Waikanae River. Kapiti No. 2, the highest peak on the island, is 255m high. A wildlife sanctuary, the W side of the island, is precipitous; the E side rises more gradually from the beach.

Rauoterangi Channel separates Kapiti Island from the mainland E; it has general depths of 37 to 69m in it. For the most part, the channel is clear of dangers except for the reefs projecting from the islets forming Entry Anchorage. Tarapunga Shoal, with a least depth of 11m, extends between 0.7 and 1.2 miles SSW of Taharirimongo Point, the S tip of Kapiti Island. The channel between the reef and the island has depths of 33 to 64m.

Kurukohatu Point, the NE point of Kapiti Island, is a low, round, flat, shingle point. There is shelter from NW winds for small vessels in Waiorua Bay on the S side of Kurukohatu Point. However, vessels should not lie here with any sign of a SE gale.

Tides—Currents.—In Rauoterangi Channel, both the N and S currents are affected by local weather conditions; a S gale increases the N current, while a strong NW wind increases the S current.

Caution.—In heavy W weather, a steep sea develops 0.5 mile off Taharirimongo Point; it is dangerous to small vessels. Tide rips, formed by the wind against the current, lie about 0.3 mile E of Kurukohatu Point, and these should be avoided by small craft.

11.21 Entry Anchorage (40°53'S., 174°55'E.), available to those vessels with local knowledge, is entered at the SE end of Kapiti Island through an opening formed by three cone-shaped islets with reefs projecting off them. This anchorage is protected from the SW by the islets and reefs, and from the NW by Kapiti Island. The E side of Entry Anchorage is formed by Passage Rocks and Tokomapuna Islet, and surrounding reefs. Passage Rocks, with depths less than 1.8m, marked by kelp, lie halfway between Tokomapuna Islet and Kapiti Island, at the NW end of a spit of foul ground projecting 0.4 mile NW from Tokomapuna Islet. The channel between Passage Rocks and Kapiti Island has a least depth of about 6.7m. Tokomapuna Islet, 11m high, lies about 0.4 mile SE of Passage Rocks and a reef of above-water and sunken rocks projects 0.6 mile S from it. The W side of Entry Anchorage is formed by Motungarara Islet and Tahoramaurea Islet, which are bordered by reefs. A monument stands on the N end of Motungarara Islet, the N of the two islets. Between Motungarara Islet and Kapiti Island is a channel with a depth of 4.3m in it.

Anchorage.—Vessels approaching Entry Anchorage, with local knowledge, pass between the end of the reefs projecting S of Tokomapuna Islet and Tahoramaurea Islet. The depths at

Entry Anchorage range from 22 to 31m, sand and broken shells.

11.22 The **Waikanae River** (40°52'S., 175°00'E.) is located on the mainland cross-channel from Kapiti Island. The towns of Waikanae Beach, Paraparaumu Beach, with Raumati S of it, stand 1.5 miles NE, 1.5 miles SW, respectively, of the rivers entrance. An aircraft light is occasionally shown from an airfield between Paraparaumu Beach and Raumati. A prominent white statue, 73m high, occasionally floodlit, stands 1 mile SSE of the airfield.

Hunter Bank (40°58'S., 174°49'E.), with a depth of 16.8m, rock, lies about 5.5 miles SW by S of the S end of Kapiti Island.

The shore between Wairaka Point and Te Rewarewa Point, the N entrance to Porirua Harbor, is high and cliffy. A reef with a rock that dries, projects about 0.3 mile W of Te Rewarewa Point. A reef projects 0.4 mile N from Wairaka Point.

11.23 Porirua Harbor (41°05'S., 174°50'E.) is entered between Te Rewarewa Point and the N end of an isthmus, 1.5 miles SE. The entrance to the harbor is obstructed by a bar with a depth of 1.5m. Small vessels, with local knowledge, drawing 2m can cross the bar before the flood tide, in all but heavy W weather.

In good weather, with offshore winds, vessels with local knowledge can obtain temporary anchorage in the bay close within Te Rewarewa Point, but they should proceed to sea when the wind shifts NW, and find anchorage further S, either under Mana Island or in Cook Strait.

Aspect.—Mana Island fronts the harbor; its NW end is flat-topped and covered with pasture land. The N and W sides are steep with rocks offshore; the E side is sloping. A concrete jetty lies 0.2 mile SW of Single Point, which projects midway along the E shore of Mana Island, kelp lies off Shingle Point. South Point, the SW end of Mana Island, is fronted by a shingle beach. A 8.8m patch lies about 0.4 mile SSW of South Point.

The Bridge, a rocky bar with depths of 4 to 8.8m, connects the SE part of Mana Island to the mainland. There is generally a heavy tide rip on it, and currents attain rates to 3 knots.

A conspicuous radio mast, showing red lights, stands about 0.3 mile S of the N end of the peninsula forming the S side of the entrance to Porirua Harbor. Mount Cooper, 105m high, stands about 0.6 mile SW of the N end of the peninsula. Another conspicuous radio mast, showing red lights, stands about 0.2 mile E of Mount Cooper.

A rock, about 0.9m high, stands on the NW end of foul ground about 0.4 mile N of the N end of the peninsula. Another rock, 0.8m high, stands close E. These dangers are marked by the red sector of the light on **Goat Point** (41°05'S., 174°52'E.), about 1.7 miles SE of Te Rewarewa Point. A conspicuous reservoir stands on Walker Hill, 96.6m high, about 0.2 mile E of Goat Point. Another conspicuous reservoir stands 1.2 miles further S.

Within the bar there are depths of 1.8 to 11.2m off the town of Mana, on the E shore, where the harbor divides; Porirua Harbor projects SSW for about 1.7 miles at the head of which is the town of Porirua East.

Anchorage.—Vessels with local knowledge can obtain anchorage, sheltered from NW winds, 0.3 mile off the S side of Mana Island, W of The Bridge, close E of the 8.8m patch off South Point, in a depth of about 18.3m, coarse sand. Vessels have ridden out strong NW gales here. Additional anchorage may be found NE of The Bridge, in depths of 9.1 to 14.6m, in the entrance to Titahi Bay.

Anchoring and mooring areas, which are allocated by the harbormaster, lie on both sides of the fairway leading E towards the Hana-Paremata Bridge.

Directions.—This port should not be entered without extensive local knowledge. The entrance range, consisting of Goat Point Light, a beacon close E, and the conspicuous reservoir on Walker Hill, all in line bearing 100°, lead through the entrance channel that lies between the N end of the peninsula on the S side and the 1.5 and 1.8m shoals. At night, vessels should approach the harbor steering in the white sector of Goat Point Light. This course should be held until roughly 0.2 mile W of Goat Point, when leading beacons at Paremata come into range bearing 171.2°, when course should be changed S to head for them. At night, vessels should keep in the narrow white sector of Paremata Light, which leads to the junction of Porirua Harbor and Golden Gate.

11.24 Ohau Point (41°14'S., 174°39'E.) lies about 11 miles SSW of Mana Island; the shore between consists of cliffs fronted by scattered rocks. An 18.3m shoal lies 1.5 miles NE of Ohau Point and there is a 4.2m shoal 0.6 mile W of the first shoal. A dangerous rock lies 0.5 mile ENE and a rock, with a depth of less than 1.8m, lies about 0.7 mile W, respectively, of Ohau Point.

Cape Terawhiti (41°17'S., 174°37'E.) is a conspicuous bold promontory that rises steeply from the sea to a height of 458m in an almost semi-circular hill, about 1.2 miles NNE of the S end of the cape. From N and S the cape's outline is convex and well-marked. Southeast of Cape Terawhiti to Sinclair Head, the shore is mostly bold and cliffy. Several peaks are located along this section of shore including Outlook Hill, 534m high, which has a radar tower 14m high on the summit, lying about 2 miles SE of Cape Terawhiti; Te Kopahou, 484m high; and Hawkins Hill, with a radar scanner standing at an elevation of 495m about 0.2 mile SW of it, about 1.2 miles N and 2.2 miles NNE, respectively, of Sinclair Head.

Caution.—Abnormal variation may be experienced in shallow water in close proximity to the submarine power cables laid across Cook Strait between Cape Terawhiti and Fighting Bay, on South Island. As charted, anchoring and fishing are prohibited in the vicinity of these cables.

Luna Rock is steep-to with a depth of less than 1.8m, and it lies about 1 mile NW of **Karori Rock** (41°21'S., 174°39'E.). To pass SW of Luna Rock a vessel should keep the tower on Karori Rock bearing not more than 110°. Thoms Rock, which dries, lies about 1 mile SE of Karori Rock. The ground is foul between Thoms Rock and the shore NE. A rock, with a depth of 7.3m, lies 0.4 mile SW of Thoms Rock and 1.5 miles off the coast. There are tide rips in the vicinity of this rock, especially during the NW current.

Cape Terawhiti, well open W of Karori Rock, bearing about 335°, leads SW, and Pencarrow Light, about 6 miles E of Sinclair Head, well open S of that head, bearing about 086°, leads S of Thoms Rock and the 7.3m rock.

Wellington Harbor (41°21'S., 174°50'E.)

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11.25 Wellington Harbor, previously known as Port Nicholson, is landlocked, with depths varying from 11.3 to 22m. The main entrance, which leads into the harbor, is clear of known dangers and has no bar. All vessels may enter or leave during the hours of darkness; berthing is carried out at any state of the tide.

CentrePort New Zealand

http://www.centreport.co.nz/

Tides—Currents

Outside of the harbor entrance, on the range line from abeam Baring Head till abeam Pencarrow Head, a W set on both the flood and ebb will frequently be experienced, which may set a vessel to the W of the entrance, or on the wrong side of a vessel leaving the harbor which may be blocking the range on the way out of the harbor. In the narrows at the entrance the rate of the tidal currents can attain 1.1 knots and within the port it is less. After heavy rain a considerable freshet sets out of the Hutt River, in the NE part of the harbor. The level of the water is influenced by winds, with strong S winds raising it and N winds lowering it.

The main entrance to Wellington Harbor lies between Sinclair Head and Baring Head. South winds occasionally send a heavy sea and swell into this passage which, in gales, sometimes breaks right across.

Depths—Limitations

The maximum draft permissible under conditions of moderate sea swell is 9.7m plus the height of the tide. The maximum draft permitted alongside any wharf is 11.6m, except for berthing at certain wharfs; there is no limit on length.

A reef, on the center of which lies Steeple Rock, 9.1m high and prominent, projects about 0.4 mile N of Dorset Point. A wreck, with a depth of 8.2m, stands about 0.5 mile NW of Steeple Rock Light.

The Main Port is situated on the W side of Wellington Harbor and is comprised, from N to S, of the Road-Rail Ferry Terminal, Aotea Quay, Thorndon Container Terminal, Kings Wharf, Glasgow Wharf, Inter-Island Terminal, Waterloo Quay, Queens Wharf, and Taranaki Street Terminal.

Aotea Quay is comprised of six numbered berths. General cargo is worked here. The berths average 183m in length and have no length restrictions. Berth No. 1 to Berth No. 6 can accommodate tankers from 9.2 to 10.6m draft.

The Thorndon Container Terminal, lying S of Aotea Quay breastwork, affords two container berths, each 293m long, and can accommodate vessels with no length restrictions and maximum drafts from 10.7 to 11.6m.

Lambton Harbor, which fronts the city of Wellington, has general depths of 11 to 18.3m. The harbor lies just S of the container terminal.

Kings Wharf has a length of 226m and a depth of 9.4m alongside. It houses one of the largest cold storage areas on North Island.

Glasgow Wharf has three berths. Berth No. 1 has a length of 84m and a depth of 4.7m alongside. Berth No. 2 has a length of 205m and a depth of 9.3m alongside. Berth No. 3 has a length of 223m and a depth of 9.3m alongside. Ro-ro vessels are worked at Glasgow Wharf.

Inter-Island Wharf has two berths. Berth No. 2 is 150m in length and has a depth 7.8m of alongside. The berth is dedicated to ro-ro service. Berth No. 3 has a length of 213m and a depth of 9.3m alongside.

Waterloo Quay is used for a high speed ferry that carries both passengers and cars. The quay has a length of 99m and has a depth of 7.0m alongside.

Queens Wharf can handle vessels 200m in length and 7.4m draft. An area of reclaimed land fronts Custom House Quay N of the inner T-head of Queens Wharf.

The Taranaki Street Terminal, for ro-ro vessels, can accommodate vessels with a maximum length of 152m and a maximum draft of 7.4m. At the S end of the wharf, there is a 35-ton ro-ro link span. Taranaki Street Breastwork Quay, extending E from the root of the wharf, is 233m in length and can accommodate a ship of 220m in length, drawing 7.5m. Between Taranaki Street Wharf and Queens Wharf is an area of reclaimed land.

The Overseas Passenger Terminal (OPT) lies about 0.8 mile WSW of Jerningham Point. A boat harbor stands E of the wharf. The OPT Berth No. 3 has a length of 259m and a depth of 9.5m alongside.

Evans Bay is entered between Halswell Point and Jerningham Point, 1 mile West. North gales send a choppy sea into the bay. Halswell Point, the N tip of the peninsula forming the W side of Wellington Harbor, is distinguished by a prominent white monument lying close within it.

The Burnham Oil Facility, situated at the S end of Evans Bay, about 0.5 mile from its head, is comprised of three berthing areas. These areas are the Burnham Wharf, Miramar Wharf and the Incinerator Jetty.

Burnham Wharf, situated near Wellington International Airport, has a total length of 257m and can accommodate tankers with unlimited lengths and a maximum draft of 8.2m.

Miramar Wharf offers two berths. The W wharf, 170m in length, will accommodate tank vessels of unlimited length and drafts of 8.7m. The E face handles vessels with a maximum length of 150m and a maximum draft of 5.0m.

Point Howard Wharf, 163m long, is joined to Point Howard, the N entrance to Lowry Bay. The wharf is used for recreation; the wharf is exposed and can only be used in good weather.

The Seaview Wharf, with a T-head 250m long, extends 0.3 mile SSW from Point Howard. There is a depth of 11.1m alongside the W side of the T-head. Petroleum products are worked at the Seaview Wharf.

The Hutt River discharges into the NE portion of Wellington Harbor. The towns of Hutt and Petone lie on its E and W sides, respectively. There is a wharf at Petone, about 1.5 miles WNW of the Hutt River entrance.

Aspect

West side of Wellington Harbor.—Owhiro Bay (41°20'S.,

174°46'E.) lies about 2 miles ENE of Sinclair Head, and sunken rocks and rocks that dry project 0.2 mile S from its W entrance point. There is a sandy beach at the head of the bay. Taputeranga Islet, fringed with rock, lies in the entrance to Island Bay, 0.7 mile E of Owhiro Bay. There is a jetty on the W side of the head of Island Bay.

Lyall Bay, which is unfit as an anchorage because of reefs projecting off its entrance point and the abandoned submarine cables which exist in the bay, and of its being open to S gales, lies about 1.2 miles E of Taputeranga Island. Luhrs Rock, awash, lies 0.3 mile SSE of the W entrance of Lyall Bay, and reefs and a rock lie between. The sea breaks on Luhrs Rock in moderate weather, and also on some of the patches on the W side of Lyall Bay.

Palmer Head (41°20'S., 174°49'E.) forms the W entrance point of Wellington Harbor. West Ledge is a reef comprised of large boulders, some of which are above water, that project about 0.5 mile SSW of Palmer Head. The W side of Wellington Harbor is formed by a moderately high peninsula of which Palmer Head is the S tip. A conspicuous monument, which consists of a white, cylindrical tower, 8m high, stands close N of Palmer Head. Beacon Hill is the highest point of the S part and Mount Crawford, 2 miles N, is the highest point of the N part. A prominent prison building stands on Mount Crawford. The peninsula appears as an island from sea.

Dorset Point lies about 1 mile NE of Palmer Head, and a rocky reef extends SE from it. Barrett Reef, mostly steep-to, is comprised chiefly of above-water rocks, and lies about 0.7 mile E of Palmer Head. Outer Rock, 3.4 high, lies near the S end of Barrett Reef. A rock, with a depth of 4.3m, lies near the N end of Barrett Rock. A depth of 9.1m lies about 0.2 mile E of the rock. A heavy sea rolls over Barrett Reef in S weather. A depth of 4.7m lies at the N tip of Barrett Reef.

Chaffers Passage, which leads W and N of Barrett Reef, has a least depth of about 9.8m in the fairway. A wreck, with a depth of 9.8m, lies in Chaffers Passage, about 0.7 mile ENE of Palmer Head.

Worser Bay is entered between a point lying about 0.5 mile N of Dorset Point and a point 1 mile further NNW. This bay affords excellent anchorage with good holding ground of stiff mud, however, a swell sets into the bay. There is a small wharf, with a depth alongside of 4.9m, in the SW corner of the bay called Seatoun Wharf. Falcon Shoals, with a least depth of 7.9m, lie 1 mile N of Steeple Rock. A lighted buoy marks their NE extremity.

East side of Wellington Harbor.—Turakirae Head (41°26'S., 174°55'E.) is a bold promontory that forms the W entrance point of Palliser Bay. The Rimutaka Mountains project NE from the head. When seen from quite a distance E, Turakirae Head looks to end in a bold, abrupt convexity, however, on close approach a low sandy point projects from its base.

Palliser Bay is entered between Turakirae Head and **Te Hamenga** (41°32'S., 175°11'E.), about 13.5 miles ESE. Due to poor holding ground and S exposure, this bay is unsuitable for shelter. From Te Hamenga, the shore projects about 6.5 miles SE to Cape Palliser, which is described in paragraph 10.84.

Baring Head lies 3 miles NW of Turakirae Head and is a flat table point, 166m high. Drying rocks and above-water rocks extend up to 0.5 mile offshore off this part of coast necessitating giving Baring Head a wide berth. Arabella Rock, a steep-to pinnacle with depths of 4.4m, on which the sea breaks, lies near the N end of a rocky ledge, about 0.6 mile NW of Baring Head.

Baring Head, bearing less than 102°, leads S, and Pencarrow Head, bearing more than 000°, leads W of Arabella Rock. At night, Pencarrow Light leads W of Arabella Rock.

An 8m shoal lies about 0.3 mile SW of Pencarrow Head.

Pencarrow Head represents the E entrance point of Wellington Harbor, and submerged and drying rocks project 0.2 mile from it. This E side of the entrance is mostly high and lacking any notable features. Rocks project about 0.1 mile off the points and a boulder reef fronts the shore about 3.5 miles to Point Arthur. From this point the shoreline changes to a sandy beach backed by low sandhills around Robinson Bay.

Ward Island, 28m high and yellow, lies near the N edge of a bank extending NW from Point Arthur. Hope Shoal lies on the W edge of this bank.

Somes Island lies with its S end about 2 miles N of Hope Shoal Light. Mokopuna Island, a wildlife sanctuary, lies on a reef N of Somes Island. There is a pier on the SE side of the island.

Pilotage

Pilotage in Wellington harbor is compulsory N of Point Gordon for all vessels exceeding 500 gt.

The pilot vessel is not usually on station outside the entrance. All vessels requiring a pilot are required to give 24 hours notice by radio of expected ETA, confirming or amending 4 hours before arrival. All communications should be addressed to Harbormaster, Wellington.

If it is not be possible to give prior notice of ETA, it may be up to 1.5 hours after a vessel is sighted by the signal station on Beacon Hill before a pilot can board the vessel.

Pilots are transferred by either launch or helicopter, which transfers pilots by winching. A 1 hour confirmation to Wellington Harbor Radio is required to establish whether a helicopter or pilot vessel will be used. Pilots usually board at Point Alpha, Point Bravo, or Point Charlie, but in the event of heavy S weather, it may be necessary to board or disembark the pilot at Area Delta. The pilot boat is equipped with radiotelephone. Vessels are notified of their berths by the outer signal station.

Regulations

The quarantine anchorage is situated about 0.75 mile N of Point Jerningham. The vessel will be boarded within the charted area off Lambton Harbor.

Signals

Wellington Harbor Control may be contacted on VHF channel 14 or 16. Vessels are also required to maintain a listening watch on channels 14 and 16 if practicable, while within the waters of the port.

The outer signal station is situated on Beacon Hill on the W side of Main Entrance, about 1 mile NNE of Palmer Point. A continuous visual watch is maintained and vessels can communicate via the International Code of Signals by blinker light or

radiotelephone.

If a vessel sighted by the Beacon Hill Signal Station is standing into danger and whose attention cannot be attracted by radiotelephone, the Morse letter "U" will be flashed at the vessel and sustained until action is taken.

Anchorage

Good anchorage may be found in the harbor sheltered from the prevailing winds from the NNW and SSE; the bottom being blue clay, silt, sand, and shells.

The inner, outer, quarantine, and explosives anchorage grounds are all best shown on the chart.

New Zealand authorities advise that when anchoring, especially in a light condition, to drop two anchors in an E and W direction, veering from 75 to 90 shots of cable, as it frequently blows hard with heavy gusts of wind off the high land that surrounds the harbor, causing a vessel to sheer about. In very strong winds a vessel will lie much easier by having both anchors down.

Anchorage is prohibited within 150m of the jetty lying on the NE side of Somes Island.

Directions

With Pencarrow Head Light bearing 022°, and about 1.7 miles distant, bring the main entrance range lights into alignment. Continue on this range, or slightly to the E of it if there is outbound traffic, until Steeple Rock Light is abeam to port. Then steer 005° with Somes Island Light on the starboard bow until Point Jerningham opens clear of Point Halswell. When in this position, steer 310° until Point Halswell is abeam, then change course for the wharves or anchorages.

Masters are warned that they must keep on their starboard hand of the channel, inbound and outbound. Vessels entering the harbor should give Point Halswell a wide berth to allow vessels leaving Lambton Harbor sufficient sea room. All vessels may enter or depart during the hours of darkness.

Cook Strait—West Side

11.26 Cape Farewell (40°30'S., 172°41'E.) is the N extremity of South Island and appears on SW bearings as an isolated cliff, which ends in steps W. The land behind the cape rises to a brush-covered summit, 318m high, about 2.7 miles SSW. The Archway Islands is comprised of four islets, the highest being 63m high. These islands front Whararikі Beach close SW of the cape.

Farewell Spit, which projects about 20 miles ESE from Cape Farewell and is marked by a light, is steep-to on its S side and a large part of its E end is covered at HW. The section of the spit that is always above water extends roughly 15 miles from Cape Farewell and is comprised of drifting sand dunes with patches of manuka scrub, marram grass, interspersed with many fresh water lagoons. The S side of Farewell Spit is comprised of Steep-to Shoal, which dries 1.8m.

Caution.—Shoaling has been reported up to 6 miles SE of the light on Farewell Spit.

Golden Bay is entered between Bush End Point, at the E end of Farewell Point, and Separation Point, 14 miles S. The W and S sides of the bay are backed by high land covered with bush. General depths of 7 to 36.6m exist in Golden Bay; it affords shelter during winds in the W semi-circle over its whole expanse.

Golden Bay

11.27 Northwest shore.—Tasman Corner, lying about 4 miles S of Abel Head, affords good anchorage, in depths of 12.8 to 14.6m, sheltered from E winds by Steep-to Shoal. The islet of Able Head, 43.3m high, is joined to the shore by a drying sand bank, and lies on the S side of the inner end of Farewell Spit.

Vessels with local knowledge can obtain anchorage, in depths of 9.1 to 14.6m, mud, good holding ground, off the mouth of the Aorere River, which enters the SW corner of Ruataniwha Inlet.

Mount Burnett, 637m high, with a double rounded peak, is the most prominent mountain on the W side of the bay.

11.28 Southeast side.—Separation Point is a small, cliffy promontory joined by a neck to the high land rising close behind it.

Wainui Inlet is entered about 3 miles W of Separation Point; there is a sandy beach at its head and dries a short distance inside the heads. The Tata Islands lie close W of the W entrance point of the inlet. Small vessels with local knowledge can obtain confined anchorage under the lee of the of the S island.

Abel Tasman Memorial stands about 1.5 miles SW of the W entrance point of Wainui Islet.

Port Golden Bay (Tarakohe Harbor) (40°51'S., 172°54'E.) is located 1.5 miles SSW of Abel Tasman Point. The harbor is formed between two breakwaters which extend about 0.3 mile NW from the coast. Moles extend from the middle of the inner sides of both breakwaters, dividing the harbor into outer and inner parts.

A wharf is situated in the NE corner of the inner part. At the root of the wharf is Golden Bay Cement Company's works, with a chimney.

Vessels bound for Tarakohe directly from overseas ports should give as much notice as possible of their arrival to enable port officials to be made available from Nelson.

Permission to berth in Tarakohe should be requested of the harbormaster at least 12 hours in advance of arrival. Vessels berth bows out, whenever practicable, a harbor service craft equipped with radiotelephone is available to assist.

Depths—Limitations.—The wharf is 120m in length. Two bulk cement loading towers stand on the wharf. The harbormaster's office is in the base of the outer tower. There is a minimum charted depth of 4.3m in the approach to the wharf.

The Motupipi River empties out into Golden Bay midway between the town of Tarakohe, lying about 0.5 mile SW of the wharf, and the entrance to the Takaka River, about 3.5 miles W. Vessels with local knowledge can obtain good anchorage, during S and E winds off the mouth of the Motupipi River, in a depth of 7.3m, about 1.5 miles offshore. The sands dry almost 1 mile from the river's mouth.

The Takaka River empties into the bay through a delta of low scrub and rush-covered islands. The E entrance point is bush-covered. Rangihaieta Head, the NW entrance point, is of limestone

formation, 50.3m high, and bare on the W side. A radio mast, 16.2m high, stands about 1 mile S of Rangihaieta Head.

Vessels with local knowledge can obtain anchorage off the mouth of the river, in depths of 7.3 to 12.8m, with the outer beacons in range.

The entrance of the Onekaka River lies about 5 miles NW of Rangihaieta Head.

Parapara Inlet is entered about 2.2 miles NNW of the entrance of the Onekaka River. The S entrance is a low, narrow isthmus. The inlet can only be used by small vessels with local knowledge. There is good anchorage, in depths of 9.1 to 14.6m, off the entrance to Parapara Inlet.

Pilotage.—Pilotage is not compulsory. A 12 hour notice is required for a pilot; at least 7 days notice is required for large vessels. The pilot boards 2 miles from the harbor on the entrance leading line.

Directions.—A vessel should bring the main range lights in line bearing 139° and steer on that line between the breakwater until the wharf approach range lights are in line bearing 123.5°, which alignment leads to the wharf.

Tasman Bay

11.29 Tasman Bay is entered between Separation Point and the NW end of D'Urville Island, 40 miles E. The land at the head of the bay is low with some conspicuous white cliffs. However, both sides of the bay are mountainous.

Tides—Currents.—The tidal currents along the shores of Tasman Bay attain rates of 0.2 knot to 1 knot. A S current of almost 1 knot generally prevails during strong N winds.

Tasman Bay—West Side

11.30 Awaroa Bay is a shallow indentation that is entered between a point about 2.5 miles SSE of Separation Point and a point about 2.5 miles further SSE. A 4.3m rocky patch lies in the center of the bay, about 1 mile SSE of the N entrance point. The bay affords anchorage, in a depth of 18.3m, in moderate weather with offshore winds.

The shore between Awaroa Head, the S entrance point of Awaroa Bay, and Abel Head, about 0.7 miles ESE and then for 1.7 miles S to Reef Point, is rocky, steep, and bush-covered. Abel Head is notable for a white patch on its NE side.

Tonga Roadstead lies between Reef Point and Foul Point, about 1.2 miles S. In the NW corner of the roadstead is a sandy beach. Tonga Island, 76.8m high, steep and rock-fringed, lies about 0.5 mile SE of Reef Point. Whale Rock, awash, marked by a beacon, lies 0.5 mile SE of Foul Point.

Anchorage, in a depth of 13m, may be obtained during offshore winds, about 0.4 mile W of Tonga Island.

Several rocks lie about 0.5 mile offshore between Foul Point and North Head, about 2 miles S. Bark Bay Reef (Big Reef), which dries at 1.2m, lies about 0.7 mile SSE of Foul Point, with Pinnacle Islet about 0.7 mile SSW of the reef. A rock, awash, stands close NE of Pinnacle Islet. Due to the many dangers lying off this section of coast, vessels should not approach within 2 miles of it.

Torrent Bay is entered between North Head and Pitt Head, 0.6 mile SSE. An islet lies close NE of Pitt Head. Vessels with local knowledge can obtain good anchorage in the outer part of Torrent Bay, in depths of 11 to 12.8m, during offshore winds. The S part of Torrent Bay affords good shelter for small vessels, in depths of 5.5 to 6.4m, except during NE winds.

11.31 Astrolabe Roadstead affords snug anchorage with offshore winds and lies between Adele Island and the shore W.

Hapuka Reef, which dries 1.2m and is comprised of several pinnacles, lies about 0.5 mile E of Te Karitu Point. A narrow channel, with a depth of 11m, lies between the reef and the mainland.

Fisherman Island, 40.8m high and rocky, lies about 0.4 mile S of the SW end of Adele Island. A rock, awash, lies close SE of Fisherman Island.

Anchorage.—Vessels with local knowledge can obtain anchorage, in a depth of 11m, about 0.4 mile SW of Te Karitu Point. Within the N approach to Astrolabe Roadstead, between Hapuka Reef and Six Foot Rock, there is a depth of 14.6m. The narrow channel between Six Foot Rock and Jules Point, 0.2 mile SSW, has a similar depth.

The S approach to Astrolabe Roadstead, between the S tip of Adele Island and Fisherman Island, has a least depth of about 4.3m. This passage is narrowed by a sandspit, that dries, extending from the W side of Adele Islet. Small vessels with local knowledge can obtain sheltered anchorage off the NW shore of Adele Island.

The Motueka River empties out into the bay through a delta about 6.2 miles SSW of Adele Islet, and it is not navigable.

Caution.—The entrance to the Motueka River has been mistaken several times for the entrance to Port Motueka and mariners should exercise caution.

11.32 Port Motueka (41°08'S., 173°01'E.), which should only be used by vessels with local knowledge, is a fishing port entered through a channel between the N end of Jacketts Island and the mainland N. A training wall projects 0.3 mile ENE from the N end of Jacketts Island. In 1983, the wall was in poor condition. A sand bar, that dries, which is subject to change, lies parallel with and off the entrance to the port. A wharf lies on the N shore, close within the entrance of Port Motueka.

Moutere Bluff (41°13.5'S., 173°05'E.), about 64m high, lies about 5 miles SSE of the entrance to Port Motueka and is notable for prominent white cliffs.

Mapua Harbor, entered about 2.5 miles SSE of Moutere Bluff, can only be used by small vessels with local knowledge.

Tasman Bay—East Side

11.33 Nile Head (40°44'S., 173°52'E.) represents the NW tip of D'Urville Island, whose W side comprises the E side of Tasman Bay.

Two Bay Point lies about 6 miles SSW of Nile Head and the shore between is rocky and steep.

Greville Harbor, entered between Two Bay Point and Ragged Point, does not provide protection from NW gales to large vessels. Araiawa Rock, 21.3m high, lies about 0.2 mile NW of Ragged Point. A rock, with a depth of 0.6m, lies about 0.2 mile ENE of Araiawa Rock. Within Greville Harbor there are depths of 10 to 17m. The ESE arm of the harbor, which is almost closed by boulder spits on either side of the entrance, has general depths of 12.8 to 27.4m. The boulder spit on the N

side of the entrance to this arm is marked by a beacon. An overhead power cable, with a vertical clearance of 37.5m, spans the harbor near the boulder spits.

The shore between Ragged Point and Okarewa, about 4 miles S, is precipitous. Rahonui, an islet 19.2m high, lies about 0.7 mile NNW of Okarewa Point. Hapuka Islet lies close S of Okarewa.

Manawakupakupa Bay, which is unsurveyed, is entered between Hapuka Islet and the northernmost of Paddock Rocks, which lie on a spit of foul ground extending 1.2 miles NNW from a position about 1 mile N of **Sauvage Point** (40°57'S., 173°46'E.).

Current Basin lies between the S end of D'Urville Island and Okuri Point, 1 mile S on the mainland. The entrance is obstructed by several rocks and dangers including Hope Rock and the Beef Barrels, which are all best shown on the appropriate chart.

The channel through Current Basin is available to vessels with local knowledge only.

11.34 French Pass (Te Aumiti) (40°55'S., 173°50'E.) joins Current Basin with Admiralty Bay and local knowledge is essential for its use.

An overhead power cable, with a vertical clearance of 80m, spans the channel from Reef Point to Channel Point.

A reef, that dries, projects about 0.2 mile S from **Reef Point** (40°55'S., 173°50'E.), and Fisherman Pass, a narrow boat channel, leads through the reef close S of the Point. A channel, 100m wide, leads between the S end of the above reef and Channel Point on the mainland. There are general depths of 18.3 to 27.4m in French Pass, and apparently depths of at least 11m in the fairway into Admiralty Bay.

Middle Bank, with a least depth that is liable to change, broken white shells, lies 0.3 mile SW of Channel Point. A bank, with a least depth 3.7m, stones, lies about 0.3 mile ENE of Reef Point. There is a least depth of 11m between the bank and Collinet Point and a similar depth in the channel between it and Reef Point.

Masters of vessels are cautioned against taking a vessel through the pass against the current, as not only does a vessel sometimes not answer its helm, owing to the eddies acting on her bow, but there is danger of meeting a vessel coming from the opposite direction, which is not visible in sufficient time to prevent collision. Powered vessels of moderate size can, with prudence, pass through at slack water or with the tidal current and so save some 15 miles of distance and avoid the heavy cross sea that is frequently met N of D'Urvilles Island and Stephens Island. Local knowledge is highly desirable.

These currents attain rates of from 5 to 7 knots and do not set directly through the narrow channel, but rather across, with the flood current setting in a SW direction as far as the narrows and then along the shore between Channel Point and Rock Cod Point. The ebb current sets in the opposite direction. Slack water lasts about 20 minutes. The extraordinary irregularity of the bottom, together with the narrowness of the channel, accounts for the many eddies.

Care must be taken to prevent a vessel being swung round onto Collinet Point by the eddies.

Caution.—All vessels intending to transit French Pass are to give warning 10 minutes before reaching the narrows on VHF channels 16 and 65.

11.35 The shore between Okuri Point and Kakaho, about 5.5 miles SW, is rocky and precipitous. The summits of the peaks in this vicinity are scrub-covered.

Croisilles Harbor (41°03'S., 173°37'E.) is entered between Kakaho and Cape Soucis, 3.5 miles WSW. Croisilles Harbor is relatively easy to enter and offers good shelter in all weathers. Additionally, it is the best harbor of refuge on the E side of Tasman Bay for large vessels in NW gales.

Caution.—Motuanauru Islet, 112m high, lies close within the W limit of foul ground projecting nearly 2 miles W and 1.5 miles SW of Kakaho. Otuhaereroa Islet, 99m high, lies midway between it and Kakaho. The SW limit of the foul ground is marked by Moukirikiri Islet, 28.6m high and conical. All of the above islets are brush-covered. The above foul grounds W end should be given a berth of about 0.7 mile.

Squally Cove lies at the head of Croisilles Harbor and affords excellent anchorage for vessels with local knowledge in bad NW weather, in a depth of 12.8m.

The shore SW from Cape Soucis, about 9.5 miles to Pepin Island, has no known off-lying dangers. Stuart Hill rises to 400m in the central part of Pepin Island; the island is steep, rocky, and conspicuous.

The W portion of Delaware Bay is formed by the E coast of Pepin Island. Ataata point is the W entrance point of Delaware Bay and the shore, about 2.5 miles SW to Glenduan, is rocky and steep. Two prominent land slips, which are light-colored, lie about 2 miles SW of Pepin Island.

Nelson Harbor (41°16'S., 173°17'E.)

World Port Index No. 55290

11.36 Port Nelson lies in the SE part of Tasman Bay. The harbor is formed on the NE by Boulder Bank, a narrow bank which almost covers at HW, and by Haulashore Island on the SW.

Port Nelson

http://portnelson.co.nz

Tides—Currents.—In the entrance channel approaches to berths and alongside wharves, the tidal rate at neaps is 3 to 4 knots and 5 to 6 knots at springs. The neap range was 1.8m and the spring range was 3.4m.

In 1976, it was reported that in the Main Channel entrance, the current attained a rate of 2 knots at springs; no current was experienced for a 30 minute period, 15 minutes either side of HW and LW. At McGlashen Quay and in the basin, the current experienced was less than 1 knot.

The incoming current sets onto the W end of McKellar Quay; the outgoing current sets off the quay and also sets onto the N end of Brunt Quay and the whole of Main Wharf.

Depths—Limitations.—It was reported (2012) the Main Channel entrance to Port Nelson has a controlling depth of 8.1m. When arriving from sea and after passing Haulashore Island's N side, the channel is reported to be dredged and maintained to a depth of 7.6m as the channel transitions NE towards

the berths. The inner channel and the approaches to the berths have a dredged depth of 7.6m. The NW and NE limits of the dredged area are marked by piles, from which lights are shown.

Although the harbor is dredged, shoaling occurs along the edges of Main Entrance Channel, in dredged areas within the harbor, and alongside the wharfs; mariners should obtain the latest depths from the Harbormaster.

Entering and leaving is governed by draft and stage of the tide. Vessels are berthed and unberthed at all stages of the flood, depending on draft. Vessels may enter, berth, unberth, or leave during the hours of darkness.

Vessels wishing to enter Port Nelson are not berthed in a strong wind. The maximum dimensions for entering Port Nelson are a length of 200m, a beam of 32.5m, a draft for cargo vessels of 9.2m, and a draft for tanker vessels of 8.7m. The above length and drafts may be exceeded only at the discretion of the harbormaster.

The main entrance is formed by South Mole, which projects about 0.1 mile NW from the N end of Haulashore Island, and a wall, about the same length on the NE side, parallel to and 0.2 mile NE of South Mole.

Main Wharf lies almost midway along the SE part of the dredged area. At Berth No. 4 and Berth No. 5, tankers up to 174m long, with drafts up to 8.7m, can be accommodated. Main Wharf, which is T-shaped, has three berths on its outer face and two berths on its inner face. Berth No. 3, Berth No. 4, and Berth No. 5, which lie on the outer face of the NE and SW arms, have a total berthage length of 1,618m and depths ranging from 7.6 to 9.8m alongside. Berth No. 6 and Berth No. 7, which lie on the inner face of the SW arm, have a total berthage length of 140m, with a depth 5.5m alongside.

Brestwork Wharf, lying SW of Main Wharf, is comprised of Berth No. 8, Berth No. 9, Berth No. 10, and Berth No. 11, having a total berthage length of 180m, with alongside depths ranging from 1.5 to 4.3m

McGlashen Quay, lying NE of Main Wharf, has two available berths, North Berth and South Berth, with a total berthing length of 335m and a depth of 9.2 m (2006) alongside.

Kingsford Quay, lying NE of McGlashen Quay, is comprised of an outer and inner berth and has a total berthing length of 174m, with depths ranging from 6.5 to 9.5m (2006) alongside.

Brunt Quay, lying opposite McGlashen Quay, has a total berthing length of 196m and a dredged depth of 10m (2006) alongside.

Aspect.—The main entrance to the harbor lies between the S end of a bank and the N edge of the island. A rubble mole projects about 0.1 mile NW from the NW end of Haulashore Island. Local magnetic anomalies may be experienced in the vicinity of Nelson.

Boulder Bank, which forms the NE side of the harbor, is narrow and nearly covered at HW. There are five patches on this bank, called islands. The Old Lighthouse, a white cement silo just E of Breastwork Wharf, and the Cathedral, standing on a hill about 1.5 miles SE of Main Entrance, are all conspicuous.

Range lights are shown for the approach to the main entrance. Two red obstruction lights are shown from a mast, 6.7m high, which stands on the mainland 0.7 mile SW of the rear range light. Range lights are also shown for main entrance. Additional range lights are shown near the N end of Haulashore Island. These lights indicate the turning point for vessels leaving the harbor.

Courtesy of Port Nelson

Nelson Harbor

Pilotage.—Pilotage is compulsory for vessels of 100 gt or over. Vessels should radio their ETA to the Harbormaster, Nelson at least 24 hours in advance, confirming 4 hours prior to arrival. If the vessel is to arrive on a weekend, pilotage should be ordered by 1500 on Friday. The pilot boat, painted orange, will meet vessels about 2 miles off the channel entrance.

Pilots board vessels about 3 miles seaward of the main entrance by high speed launch, 12m in length.

Regulations.—Vessels up to 130m in length with a maximum draft of 5.8m can berth or unberth at any time. Larger vessels berth and unberth on a rising tide, day or night, the time depending on draft, and are usually berthed bow out. Such vessels should arrive as early on a rising tide as possible. Vessels are not berthed in a strong wind.

Signals.—There is a radiotelephone at the harbor board office situated near the wharves. The call sign is Nelson Harbor Radio, frequency 2162 kHz, as well as VHF channels 12 and 16. A red flag by day or a red light at night, shown at the berth allocated, indicates the position abeam where the vessel's bridge should be placed.

Anchorage.—Vessels are not permitted to anchor inside the harbor without the authority of the harbormaster.

Offshore anchorage is available with Boulder Bank Disused Lighthouse bearing 157°, distant 2.5 miles; quarantine anchorage may be taken with the lighthouse bearing 159° at the same distance. There is a depth of 11m at each of the anchorages.

Bolton Hole, about 0.4 mile W of the SE end of Haulashore Island, affords anchorage sheltered by the bar and can be approached in a least depth of 3.2m.

In 1982, shoaling had occurred on the bank NW and W of Bolton Hole, and some parts of the bank dry.

There is anchorage, in a depth of about 12m, mud, with Port Nelson Landfall Light bearing 144°, distant 2.5 miles. Deep-draft vessels can anchor farther to seaward.

The quarantine anchorage lies about 0.1 mile SE of the above anchorage.

Directions.—Mariners should be advised that the Boulder Bank blocks the lights of Port Nelson from small vessels.

Vessels approaching Port Nelson should steer for the anchorage, avoiding the SW side of Tasman Bay, off which banks project some 4 miles. A vessel should not head for Nelson Harbor in strong NW winds, but should instead seek shelter in Croisilles Harbor until it moderates.

Vessels should bring the outer range beacons in line bearing 164.7°; at night, keep in the white fixed sector of the front light. This above course should be maintained until the main entrance range lights are in line bearing 135.5°, which alignment leads through the main entrance. This alignment should be maintained until the inner range lights are in line bearing about 269°, astern. When Main Entrance front range light bears 221°, alter course NE towards the wharves.

Vessels of moderate size should enter the harbor at the end of the flood and let go an anchor under foot to assist in swing, weighing it before going alongside.

Caution.—Great care should be exercised when berthing due to the uncertainty of the tidal currents, particularly at Main Wharf and off the N end of Brunt Quay. Vessels usually berth at Main Wharf stemming the tide, i.e. port side-to when the tide is flooding or starboard side-to when the tide is ebbing.

Trees on Haulashore Island partially obscure the rear leading light from the N.

D'Urville Island—North Shore

11.37 D'Urville Island's W coast forms part of the E shore of Tasman Bay, which is described in paragraph 11.33. D'Urville Island projects boldly from the coast and it is mountainous and wooded. The island is separated from the coast by French Pass (Te Aumiti), described in paragraph 11.34, and Current Basin, described in paragraph 11.33.

Port Hardy (40°45'S., 173°54'E.) is entered between Nile Head and Victory Islet, about 2 miles E. Fleet Rocks project S from Victory Islet almost to D'Urville Island. Nelson Monument stands nearly in the center of the entrance to Port Hardy; this high rock has deep passages on either side. Roughly 2.5 miles within the entrance the port separates into a East Arm and South Arm. Vessels with local knowledge can obtain anchorage, in a depth of 25.6m, in South Arm. In bad weather, a confused sea sets up at the entrance. The tidal currents set directly across the entrance, setting W with flood and E with the ebb. An abandoned submarine cable lies across the entrance to South Arm, extending about 1.2 miles SW from Castlehead, a promontory that lies about 2.5 miles S of Nelson monument. A submarine cable, marked at each end by a beacon, is laid between Castlehead and the shore SE.

Cape Stephens (40°42'S., 173°57'E.) is the N end of D'Urville Island and it is 184.4m high. Stephens Island lies about 2 miles NE of Cape Stephens and the W side of it is formed by a cliff, 244m high. In the vicinity N of Stephens Island, the tidal currents attain a rate of from 0.5 to 2.5 knots.

Stephens Island Passage lies between Cape Stephens and Stephens Island, and the area between is encumbered by rocks and dangers best shown on the chart. This area is extremely turbulent and liable to strong tide rips, eddies, and overfalls. During the E ebb tide current, turbulence occurs east of a line joining Cape Stephens and Stephens Island, while on the W flood tide current, turbulence occurs west of the line.

Stephens Island Passage should not be used except by small vessels with extensive local knowledge, as the area has not been closely surveyed and tidal currents are strong.

Directions.—Vessels bound into Cook Strait from the W side of South Island make landfall S of Cape Farewell, remaining about 3 miles offshore. From a location about 3 miles N of Cape Farewell, vessels should head for a position about 6 miles N of Bush End Light, allowing for tidal currents, then steer to pass a suitable distance N of Stephens Island. D'Urville Island and Stephens Island are visible from off the end of Farewell Spit and usually from a greater distance in clear weather.

Vessels bound for Tasman Corner should proceed as directed above and round Farewell Spit at a distance of about 3 miles. Then vessels should steer for Separation Point, bearing 219; when Mount Burnett bears 271°, steer for it on that bearing. When the islet off Puponga Point bears 354°, vessels should change course N and steer for it which leads to the anchorage.

11.38 The **Rangitoto Islands** (40°46'S., 173°59'E.) is comprised of three islands lying close together. The N of this group, Whakaterepapnui, is 224m high and bare. Tinui, the S island, is 151m high and is notable for scrub on its E side. Tinui Island's NE corner is almost joined to Puangiangi Island, close NE, by foul ground. A rock, which does not cover, lies close off the NE end of Tinui Island.

Mount Ears (40°48'S., 173°55'E.), 460m high, is a remarkable double-peaked mountain.

Rangitoto Road lies between Tinui Island and D'Urville Island; it affords a convenient anchorage during winds from the N through W to S. The anchorage is in the S part of the road, about 0.3 mile offshore. However, the depths here are rather great, from 21.9 to 25.6m close inshore. The anchorage is approached S of Tinui Island.

The tidal currents between D'Urville Island and Rangitoto Island attain rates of from 1 to 3 knots, setting N with the flood and S with the ebb.

Whareata Bay (40°49'S., 173°56'E.), with a shingle beach at its head, lies between Simpson Point and Halfway Point, which is 207.9m high. Small vessels with local knowledge can obtain excellent sheltered anchorage, in a depth of 18.3m.

Admiralty Bay (40°52'S., 173°57'E.) is entered between Bonne Point, the N tip of the D'Urville Peninsula, and Clay Point, about 3.5 miles ESE. A reef extends 0.2 mile ENE from Bonne Point.

Caution.— Nga Kiore (Jag Rocks) are a group of rocks which lie about 4 miles E of Tinui, S of the Rangitoto Islands. The Trio Islets, a wildlife sanctuary, lie about 4.5 miles SW of Nga Kiore (Jag Rocks).

11.39 Stewart Island, 29.6m high, lies on a bank of foul ground about 3.5 miles W of Clay Point. A submerged rock lies about 0.2 mile N, and a 10.1m patch, 0.2 mile W of Stewart Island. Rabbit Island (Anatakupu Island), 26m high, lies about 3 miles SW of Stewart Island.

Catherine Cove, with steep-to shores, is entered between the S end of the D'Urville Peninsula and a point roughly 1 mile W. A remarkable bare cone, 174m high, lies midway along the peninsula. The D'Urville Peninsula is joined to D'Urville Is-

land by a low isthmus. Catherine Cove affords excellent anchorage for those vessels with local knowledge. The cove has depths of 16 to 40m; the holding ground being mud and shells.

Kapowai Harbor (Woodman's Homestead Cove), is located 1.2 miles WSW of Rabbit Island. A light is shown from a tower on the SW entrance point of the harbor. A wharf in the harbor affords the main transport link between D'Urville Island and the mainland.

Ngamuka Bay (Morrisons Cove), about 2 miles SW of Rabbit Island, affords good temporary anchorage to vessels with local knowledge N of the 3.2m bank lying E of Reef Point.

Elmslie Bay lies close SE of **Collinet Point** (40°55'S., 173°51'E.). There is a wharf, with a depth of 2.5m alongside, at the head of the bay.

The inner section of Admiralty Bay is entered between **Clayface Point** (40°56'S., 173°51'E.) and Whangapoto Point, about 2.2 miles E. This part of Admiralty Bay has not been completely surveyed. There are general charted depths of 33 to 51m in this section.

A submarine telephone cable crosses the NW corner of Catherine Cove.

Pelorus Sound

11.40 Pelorus Sound (40°56'S., 174°04'E.) is entered between Paparoa and Culdaff Point, the NE end of Forsyth Island, about 3.2 miles SE. For the most part, except at the head of the main branch, the general aspect of the land surrounding Pelorus Sound is mountainous, rising to heights of 610 to 915m, and is covered with dense forests.

Pilotage is compulsory for vessels over 500 gross tons in Pelorus Sound; pilotage is arranged with the Harbormaster via the Port Operator.

There are general depths in Pelorus Sound of 18.3 to 91.4m, decreasing at the heads of the various arms.

Winds—Weather.—The prevailing winds blow up the reaches from sea. Southeast winds, accompanied by heavy rains and violent gusts, are common and have been observed to last about 2 days.

Tides—Currents.—The tidal currents attain rates of 3 knots in the main reaches of Pelorus Sound, but they are hardly felt in the anchorages. There are strong tide rips around the Chetwode Islands and Sentinel Rock.

11.41 The **Chetwode Islands** (40°54'S., 174°05'E.) are comprised of two steep rugged islands joined by a reef. These islands lie on the E side of Te Kakaho Channel, on the N side of entrance to Peloris Sound.

Nukuwaita, the SW island, has two remarkable sharp peaks, 231 and 234m high. The N side of the island is bare; the S side is scrub-covered. A rock, with a depth of less than 1.8m, is reported to lie 0.2 mile NE of the W extremity of the island.

Ninepin Rock lies close within the outer end of a reef, which projects about 1.5 mile SSW from the SW end of the island. The Haystack, 35.4m high, lies on the outer end of a spit of foul ground, about 1.7 miles ENE of Ninepin Rock, with Pelorus Rock, below-water, halfway between The Haystack and Nukuwaita. Hinemoa Rocks, with a least depth of 0.6m, lie about 1 mile W of the N end of Nukuwaita.

Te Kakaho (40°54'S., 174°06'E.), the NE island, steep, bare, and rugged has two summits, the N and higher of the two is 178.6m high. A drying reef extends 0.4 mile NE from the N end of the island. Sentinel Rock, 35m high, lies about 1.7 miles E of Te Kakaho Island.

Witts Rocks, with a swept depth of 9.1m, lies 8.5 miles ENE of the N end of Te Kakaho Island. McManaway Rock, with a swept depth of 9.1m, lies about 4 miles S of Witts Rock.

11.42 Outer part of Pelorus Sound.—Waitata Reach represents the outer part of Pelorus Sound between its entrance and Maud Island, 9.5 miles SW.

West Entry Point, located on the N side of Pelorus Sound, is long and narrow and comprised of clay.

Forsyth Island, 352m high in its S part, lies on the E side of the entrance to Pelorus Sound. The shores of the island are formed of low cliffs. Allen Strait separates the S end of the island from the mainland and it is unexamined. An overhead cable, with a vertical clearance of 54m, spans the channel, and a submarine cable is laid across the channel. Duffers Reef projects 0.7 mile WSW of the NW end of Forsyth Island. Several rocks lie on the reef; the outermost being 21m high.

Forsyth Bay, largely unexamined, is entered between Duffers Reef and East Entry Point. The NE corner of Forsyth Bay is known as Orchard Bay, and it has depths of 29 to 33m. Sunday Bay, which lies close S, has a small wharf.

Bird Island, 30m high, lies 1.2 miles WNW of Allen Strait. A depth of 8.8m exists 0.4 mile E of Bird Island. Sugar loaf Islet is 17.4m high, and it lies about 0.7 mile SE of Bird Island.

Ketu Bay, entered about 1.7 miles WSW of East Entry Point, has general depths of 11 to 33m.

Richmond Bay, the next indentation SW, is entered between Tapipi and The Reef, about 1.5 miles SSW. Vessels with local knowledge can obtain anchorage at the head of the bay, in a depth of 26m.

Port Ligar, situated on the NW side of Waitata Reach, is entered between West Entry Point and Danger Point, 1.2 miles W. Cape Horn, located at the head of the bay, divides Te Kopi, a bay, E from Homestead Bay, SW.

Waihinau Bay is entered between Danger Point and Keep Clear Rock (Kainoki). Foul ground projects about 0.4 mile S from Danger Point. Keep Clear Rock (Kainoki), awash and steep-to, lies about 0.2 mile S of the outer limit of foul ground. Waihinau Bay affords good anchorage for these vessels with local knowledge; the squalls in it are not as strongly felt as in those bays on either side.

Waitata Bay lies between Boat Rock, which is white, and Kaiaua, a yellow point, about 1 mile further SW. This bay is clear of dangers and has depths of 20 to 27m.

Hallam Cove and Fitzroy Bay, located at the NW end of Tawhitinui Reach, are entered between Sheep Point and Camel Point, 1 mile S. In the past, small vessels have found shelter here.

Tawhitinui Reach is entered on either side of Maud Island from Waitata Reach. Tennyson Inlet forms the SW arm of the reach, entered between Camel Point and Cregoe Point, 1.5 miles SE. A village, with a T-headed wharf, lies at the head of Brighton Bay, about 1.2 miles E of Cregoe Point.

Tawhitinui and Kauauroa Bays lie on the N side of Tawhitinui Reach, between Tapapa Point and **Whakamawahi Point** (41°03'S., 173°59'E.), about 2 miles SE. The former bay

affords good anchorage.

Clova Bay lies in the S part of Pelorus Sound and is entered about 3 miles SE of Whakamawahi Point. Clova Bay is surrounded by land which is relatively bare. Manaroa, a village with a wharf close W, lies at its head. A vessel, 49m long, has anchored in Clova Bay, in a depth of 12.8m, with ample swinging room.

Crail Bay, the S branch of the inlet of which Clova Bay is the SE branch, affords excellent anchorage.

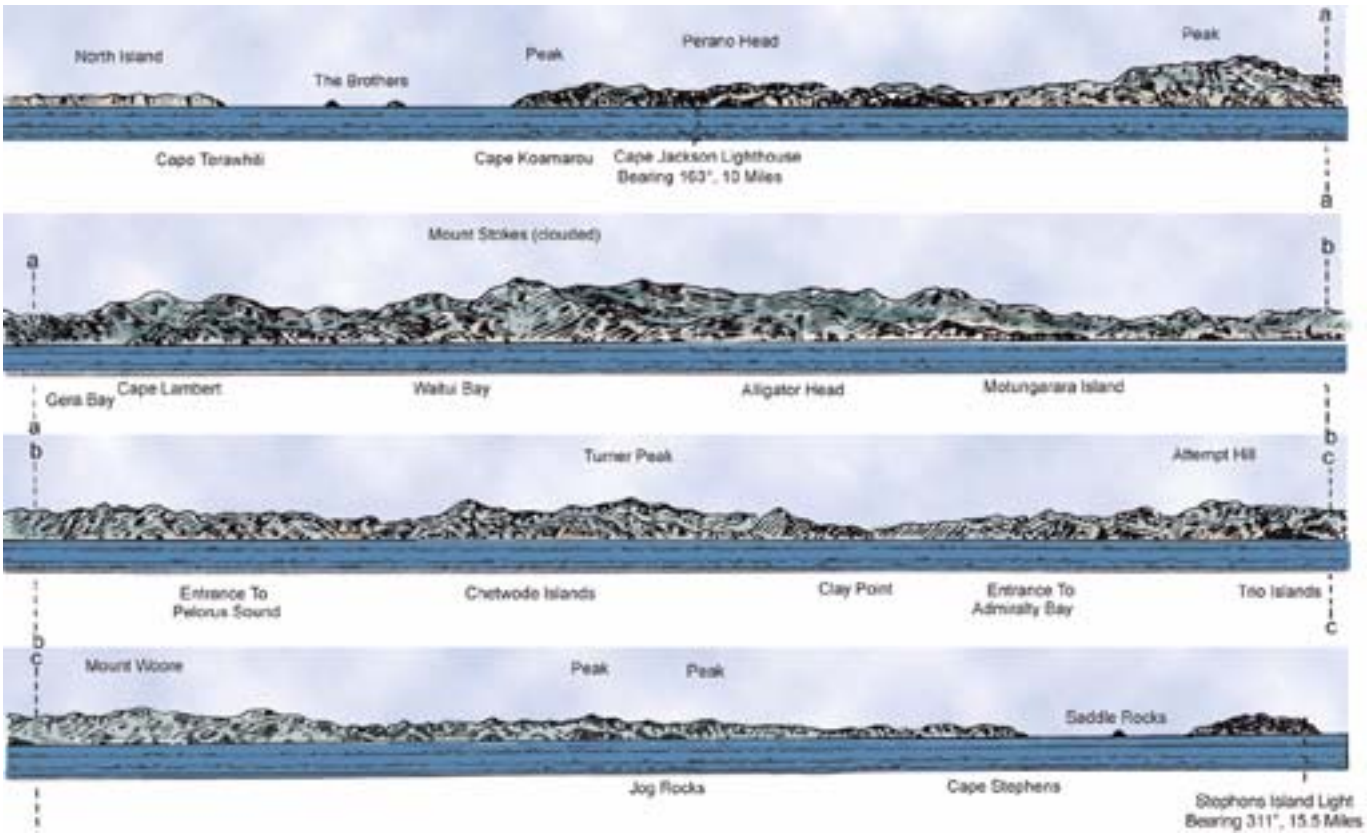
Popoure Reach is entered between Tawero Point and **Opaniaputa Point** (41°05'S., 174°00'E.), about 1.5 miles SE. The Bays on the W side of Popoure Reach afford better anchorage than those on the E side. Popoure Reach extends about 7 miles SW. Hikapu Reach projects about 5 miles S from the S end of Popoure Reach.

Kenepuru Sound projects 12 miles ENE from the SE side of Hikapu Reach. The central part of the Sound is known as Conniston Water. Public wharfs, with road access, are situated in Te Mahia and Portage Bays, on the S side of Kenepuru Sound and in Waitaria Bay, on the N side. There is a boat channel, with a depth of 1.5m at HW, between the mainland and an island, 158m high N of Portage Bay.

Guards Bay

11.43 Guards Bay (40°57'S., 174°08'E.) is entered between Culdaff Point and Alligator Head, about 4 miles ESE; the bay affords shelter in all but NW winds. Close within the entrance the bay is a bank, with depths of 12.8 to 18.3m.

Forsyth Island forms the W side of Guards Bay. Lord Ashley Bay is the first indentation SSE of Culdaff Point. Yellow Point, 1.5 miles S of Culdaff Point, divides Lord Ashley Bay N from Annie Bay. Tawaroa Point, a cliffy projection, extends from the S part of Guards Bay forming the E entrance of Anakoha Bay and the W entrance point of Titirangi Bay. A submarine cable is laid across Anakoha Bay, 0.5 mile from the head. Titirangi Bay has a sandy beach at its head, with a rocky outcrop in the center of the beach.



West side of Cook Strait, in four parts

Motungarara Island (Titi Island)(40°57'S., 174°10'E.), 105m high, lies in the entrance to Guards Bay, about 1.2 miles NNW of Alligator Head. A reef of rocks, which dries 1.8m, projects 0.3 mile ESE from its E end.

Anchorage.—Anakoha Bay and Titirangi Bay afford good anchorage, in depths of 13.7 to 27.4m. There is anchorage on the W part of the 13.7 to 18.3m bank, under the E side of Forsyth Island. During SE winds, anchorage may be found on the S end of the above bank, off the E entrance point of Titirangi Bay, in a depth of 16.5m.

11.44 Port Gore (41°02'S., 174°14'E.) is entered between Cape Lambert and Cape Jackson, about 3.5 miles E. The land surrounding Port Gore is mostly high, covered with scattered scrub. There are general depths in Port Gore ranging from 15.6 to 33m.

Jackson Head Rock lies about 0.3 mile and Walker Rock about 0.9 mile, NE of Cape Jackson. McManaway Rock, a pinnacle with a swept depth of 9.1m, lies about 3.5 miles N of Cape Jackson.

Tides—Currents.—Tidal currents around Cape Jackson are rapid and there is little slack water. A strong eddy is formed during the flood on the W side of the Cape.

Anchorage.—There is anchorage, in a depth of 20.1m, gray mud, about 0.5 mile offshore on the E side of Port Gore. Good shelter may be found in the SE corner of Port Gore, in a depth of 27.4m, good holding ground. Melville Cove, in the SW portion of Port Gore, affords anchorage, in a depth of 22m, about 0.2 mile from its head. Melville Cove affords better shelter.

Caution.—A dangerous wreck, with a depth of 11.2m, lies about 0.6 mile SE of the E entrance point of Melville Cove.

The area of Port Gore, bounded by **Cape Lambert** (40°59.5'S., 174°13.5'E.) to Cape Jackson (40°59.5'S., 174°19.0'E.), is prohibited to all navigation. Vessels intending to navigate within the waters of Port Gore should apply to the Marlborough Harbor Board for a permit.

11.45 Queen Charlotte Sound, known locally as Totaranui, lies between Cape Jackson and Cape Koamaru, 6.5 miles SSE. This extensive sound is pocked with many coves and bays, many of which afford secure anchorage.

The aspect of the land on either side of the sound is high and mostly covered with isolated scrub, rising on the N side to heights from 457 to 610m. On the S side of the Sound, Arapawa Island rises to 559m near its SE end.

The town and harbor of Picton, which are described paragraph 11.50, lie about 4 miles E of the head of Queen Charlotte Sound.

Caution.—Mariners are advised that Queen Charlotte Sound is subject to heavy gusts off the high land and from the mountain gullies during strong winds in Cook Strait. These squalls give little or no warning and caution is necessary.

11.46 Cook Rock (41°03'S., 174°26'E.) lies about 5.2 miles SE by E of Cape Jackson, and it is awash. There are usually tide rips on and around Cook Rock; in strong winds it breaks before LW. When visible, Cook Rock resembles a whales back. A rocky patch, with depths of 11.8 to 17.7m, lies about 0.7 mile SSW of Cook Rock.

The Brothers are comprised of two scrub-covered islands lying about 2.7 miles ESE of Cape Koamaru, and they should be given a berth of about 1 mile. There is no passage between The Brothers. The channel between the S island of this group and the shore S of Cape Koamaru, while deep, is not recommended.

Awash Rock, which is steep-to, lies about 3.2 miles SSW of The Brothers.

Tides—Currents.—Currents in the general locale of The Brothers are strong with heavy tide rips. Off the entrance to Queen Charlotte Sound, the tidal currents set across the entrance with considerable strength on both entrance points. Within the sound, currents attain rates from 0.5 knot to 1 knot, except at the W entrance to Tory Channel, where they attain rates of from 1 to 3 knots.

The flood current, which enters Queen Charlotte Sound via Tory Channel, flows out towards Long Island, about 4.5 miles within the entrance, until it joins the main flood or N current of the Sound. The rate of the current between Motuara Island and Long Island is 0.5 to 1.5 knots. In the sound W of the W entrance to Tory Channel, tidal currents are weak.

Queen Charlotte Sound

11.47 North side.—Kempe Point (41°02'S., 174°19'E.) lies about 2.5 miles SSW of Cape Jackson and represents the N entrance point of Anakatata Bay. At the head of this bay is a wharf. Kaikanohi, the S entrance of this bay, is formed by yellow cliffs, 18.3m high.

Ships Cove (Meretoto) is entered about 4.2 miles SSW of Kempes Point, between Te Ahitaore and Ekiera. Cooks Monument stands near a public wharf at the head of Ships Cove. The shores of this cove are rocky and steep-to.

Bare Ridge, on the S side of Ships Cove, has a bare yellow summit, 403m high.

While Ships Cove has more attractive depths than other locations in the sound, it is not as sheltered as other places further in and it is more prone to heavy squalls and gusts during strong winds from the high land.

Anchorage may be found in Ships Cove, subject to the above, in a depth of 17m, about 0.4 mile E of Cooks Monument.

Motuara Island, which fronts Ships Cove, has two summits and it is bush-covered. Cooks Cairn stands on the S summit. A submerged rock lies about 0.5 mile N of the N end of the island. The pilot ground lies about 0.5 mile E of the S tip of Motuara Island.

During SE gales, good anchorage may be found, in a depth of 13.7m, mud, 0.7 mile E of the S end of Motuara.

Endeavour Inlet is entered between Scott Point and Edgecombe Point, 1.2 miles SW. The NW arm of Endeavour Inlet is known as Big Bay.

Anchorage has been obtained in Big Bay, by a vessel 49m long, in a depth of 22m, but the vessels stern swung into a depth of 5.2m.

Dryden Bay (41°10'S., 174°12'E.) lies midway between Edgecombe Point and Kurakura Point, 1.7 miles S.

The Bay of Many Coves (Miritu) lies between Snake Point, which is located about 2 miles SW of Kurakura Point, and Bull Head, 0.7 mile SW. Snake Point is the end of a pine-covered isthmus.

Ruakaka Bay lies between West Head, lying 0.7 mile WSW of Bull Head, and Ngatakore Point, 1 mile W, and is deep except for a dangerous reef which extends 90m from the W shore, 1 mile within the entrance. Luke Rock, with a depth of 0.6m, lies in the entrance to Ruakaka Bay.

Tahuahua Bay (Blackwood Bay) is the next indentation W of Ruakaka Bay. Perano Shoal, with a depth of 4.6m, lies in the entrance to this bay and is marked by lighted bouy.

The remainder of the N shore of the sound is indented by six main bays; these are best seen on the chart.

11.48 South side.—Cape Koamaru (41°05'S., 174°23'E.), which rises to 146m, is the N end of Arapawa Island and the E entrance point of Queen Charlotte Sound. White Rocks, lying 1.2 miles NW by W of the Cape, consist of a ridge of peaked rocks with a channel on either side. Stella Rock, with a depth

of 1.8m, lies 0.5 mile W of Cape Koamaru. A steep-to rock, with a depth of 11m, lies 0.3 mile N of Stella Rock.

The Twins are comprised of two rocks, 17.7m, surrounded by kelp.

Caution.—The channel between White Rocks and Cape Koamaru should not be used without local knowledge.

Motungarara Island, 41m high, lies 0.5 mile S of The Twins. Submerged rocks extend NE and SE from the SE end of the island. A depth of 4m lies close off the NW end of the island, and the island is surrounded by kelp.

Long Island, 151m high in its central part, is steep and bush-covered. Kokomohua Island lies close NE of the NE end of Long Island and it is almost connected to it by rocks. A spit extends 0.3 mile NE from the N end of Kokomohua Island. A 13.4m patch lies 0.3 mile ENE from the end of the spit. The passage between the E shore of Long Island and the NW shore of Arapawa Island is nearly 1 mile wide, with depths ranging from 21.9 to 51.2m over a mud bottom.

East Bay, which indents the NW shore of Arapawa Island, lies between Clark Point and the NW end of Pickersgill Island, which is scrub-covered and 185.6m high. A reef projects 0.2 mile NW from the NW end of the island.

Blumine Island (Oruawairua), 289m high at its center, lies with it NE end about 1.2 miles W of the NW end of Pickersgill Island. Patten Passage separates the island from the shore SE; it has a depth of 27.4m in the fairway.

11.49 Hawes Rock (41°12'S., 174°13'E.), with a depth of 3.3m, lies about 0.3 mile SW from the SW end of Blumine Island, with foul ground between. A dangerous rock lies close NE of Hawes Rock.

Directions.— Queen Charlotte Sound may be approached from N or E, on either side of Cook Rock (41°03.2'S., 174°8.3'E.) which lies 3 miles NNE of Cape Koamaru. Hazards extend SSW of Cooke Rock as depicted upon the chart and should be avoided. The main channel passes W of Long Island (41°07'S., 174°17'E.) and W of Blumine Island (Oruawairua) (41°10'S., 174°14'E.), 2miles SSW. Other channels that pass either E of Long Island or W of Motuara Island, require local knowledge.

From a position NE of The Brothers Light (41°06'S., 174°26.5'E.) the track to enter to the main channel from NE is made about 4 miles E of Cape Jackson (41°00'S., 174°19'E.), on a track leading 7.5 miles SW, passing the following:

1. NW of Cook Rock (5.75 miles ESE from Cape Jackson)
2. SE of Kempe Point (2.5 miles SSW from Cape Jackson)
3. NW of White Rocks (5.25 miles SSE from Cape Jackson)

NW of Kokomohua Islands and Long Island (6.5 miles S

4. To a position 2 miles NE of Motuara Island Light (41°06.0'S., 174°16.5'E.) in the vicinity of Alpha pilot boarding position (41°04.6'S., 174°18.9'E.).

Dieffenbach Point lies on the W side of the W entrance to Tory Channel, about 3.5 miles SW of Hawes Rock.

Approaching from the SE of Kempe Point, the Brothers Light, bearing more than 180°, leads E and White Rocks, well open E of Long Island, bearing 229°, leads 0.5 mile NW of Cook Rock. The main channel is about 2 miles wide and lies S of the 12m rock. A vessel proceeding by this passage, if from the S, should keep The Brothers Light bearing less than 354° until she has passed Awash Rock. Vessels should pass at least 1 mile E of The Brothers Light (41°06.2'S., 174°26.5'E.), then N of Cape Koamaru, N and W of White Rocks.

From the vicinity of Alpha pilot boarding position (41°04.6'S., 174°12.0'E.), the track for the main channel leads, as follows:

1. SW for approximately 10 miles, passing NW of Long Island.
2. SE of Scott Point,.
3. SE of Edgecombe Point.
4. W of Blumine Island (Oruawairua).
5. SE of Farnham Point (41°10.4'S., 174°12.0'E.).
6. SE of Jurakura Point (1.25 miles S),
7. NW of Hawes Rock (41°12'S., 174°13.0'E.).
8. SE of Snake Point (3.25 miles SSW).
9. The track then leads to a position about 0.8 mile NE of Dieffebhack Point (41°14.0'S., 174°08.8'E.), at the W entrance to Tory Channel.

Picton Harbor (41°17'S., 174°00'E.)

World Port Index No. 55300

11.50 Picton Harbor lies at the head of Queen Charlotte Sound; it is the chief port of the Marlborough District. There are two approaches to Picton Harbor, one by entering Queen Charlotte Sound and the other via Tory Channel.

Port Marlborough

http://www.portmarlborough.co.nz

Tides—Currents.—The neap rise is 0.6m; the spring rise 1.4m.

Off the NE entrance to Queen Charlotte Sound the tidal currents set across the entrance with considerable strength. In the sound, tidal currents attain rates of from 0.5 to 1 knot, except at the W entrance of Tory Channel, where they attain rates of from 1 to 3 knots. The flood current, which enters the sound by Tory Channel, flows out towards Long Island, where it joins the main N flood current through Cook Strait. The rate of currents between Motuara and Long Island is 0.5 to 1.5 knots. In the Sound W of the W entrance to Tory Channel, the tidal currents are weak.

At the E entrance to Tory Channel, the tidal currents attain rates from 5 to 7 knots; about 1.5 miles within the entrance the tidal currents attain rates from 2 to 4 knots; and in the remainder of Tory Channel the tidal currents attain rates from 1 to 3 knots.

During periods of spring tides, low-powered vessels without local knowledge should avoid using the Tory Channel entrance.

During strong winds in Cook Strait, Queen Charlotte Sound is subject to heavy gusts of wind which sweep off the high land and out of the mountain gullies; giving little or no warning of their approach.

Depths—Limitations.—Vessels up to a maximum draft of 18.3m can enter Queen Charlotte Sound; there are no length or

beam restrictions.

Vessels up to a maximum length of 214m, depending on the vessel's draft, can enter Picton. The maximum draft restrictions are 11m aft and 15m forward, depending on the vessel's length. There are no beam restrictions.

All vessels may enter, berth, unberth, or leave at anytime, subject to prior arrangement with the harbormaster.

Waitohi Wharf, a ferro-concrete wharf, lies at the SW side of the port; it is 213m long. There are reported depths alongside from 6.8 to 10.1m.

Ferry Berth No. 1 and Ferry Berth No. 2 lie just S of Waitohi Wharf. Ferry Berth No. 1 can accommodate vessels with a maximum length of 120m and a maximum draft of 7.5m. Ferry Berth No. 2 can accommodate vessels with a maximum length of 160m and a maximum draft of 7.5m. These berths serve both road and rail traffic and make up the Inter-island Ferry Terminal, both of these berths have ro-ro capabilities.

The Waimahara Wharf is situated adjacent to Picton on the W shore of Shakespeare Bay. The wharf is 200m in length and has a depth of 16m alongside. Lumber and bulk products are worked here.

Picton Ferry Berth

Aspect.—Picton Harbor lies on the E side of a double bay divided by wooded steep-sided promontory whose N end is Kaipupu Point. The W indentation is known as Shakespeare Bay. The W shore of the bay is formed by steep cliffs rising to a wooded ridge, 184m high. Situated at the neck of the promontory, dividing the bay, is a chimney and freezing works.

Mabel Island, 30m high, fronts the wooded promontory and is marked by a light on its S end.

Pilotage.—Pilotage is compulsory for all vessels over 500 gt within the entire Queen Charlotte Sound, subject to exemption by law.

Requests for pilot services should be sent to the Port Operator at Picton at least 4 hours prior to ETA at the pilot boarding location. Vessels arriving at night or during the weekend should apply for a pilot no later than 1530 on the last previous working day.

Pilot normally boards at Alpha pilot boarding position (41°04.6'S., 174°18.9'E.), approximately 5 miles S of Cape Jackson. In heavy weather conditions the pilot boards in the Bravo pilot boarding position (41°03.65'S., 174°19.85'E.), approximately 1.2 miles seaward of Alpha pilot boarding position.

Regulations.—The following regulations apply to vessels greater than 500 gt.

1. During the hours of darkness vessels should not pass each other S of 41°16'S.
2. Vessels entering or leaving Picton Harbor are to proceed at a speed not exceeding 12 knots while the vessel is S of Mabel Island Light.
3. Vessels may not berth or unberth at Waitohi Wharf when wind speeds in excess of 30 knots are being experienced without the permission of the harbormaster.

Due to the heavy ferry traffic in Tory Channel, all foreign vessels are advised to use the N entrance to Queen Charlotte Sound.

Security Areas have been established enclosing the Waimahara and Picton wharves. All vessels entering these security areas must contact Picton Harbor Radio on VHF channel 19 and identify themselves.

Signals.—All vessels entering or departing the port are required to advise Picton Harbor Radio of their movements. In addition, all vessels are required to transmit a message on VHF addressed to "All Ships" advising their ETA for entering Tory Channel Controlled Navigation Zone from the following reporting points:

Inbound Vessels: when crossing the arc of a circle, radius 3.8 miles, centered on position

A blue flashing light is shown from Waitohi Wharf when large vessels are maneuvering at Picton wharves. Due to colored background lights, vessels approaching at night from the N will encounter difficulty in distinguishing vessels moving in the wharf area.

Anchorage.—Except during strong NW winds, there is good anchorage N of Mabel Island, in 27m, mud, for vessels of all sizes. The quarantine anchorage lies W of Mabel Island.

Tory Channel and Approaches

11.51 Perano Head (41°12'S., 174°22'E.) represents the SE end of Arapawa Island and it is a remarkable, bold, rugged cliff that rises about 0.7 mile N to a bush-covered mountain, 559m high. Ruakawa Rock, steep-to and bush-covered, is 61m high and connected to the head N by a reef.

The shore N of Perano Head is cliff-faced and steep-to. Between Perano Head and East Head, the E entrance point of the E entrance to Tory Strait, about 2.2 miles WSW, the shore forms a cliff-faced bay.

Tory Channel is entered between East Head and West Head through an entrance about 0.2 mile wide at its narrowest part. Tory Channel, from its entrance, runs about 3.5 miles SW then 4.5 miles W to its junction with Queen Charlotte Sound.

Regulations.—The use of a pilot in Tory Channel is compulsory and requests should be made at least 4 hours in advance. Vessels arriving at night or over a weekend should request a pilot before 1530 on the previous workday.

Pilots board vessels off the SE entrance to Tory Channel in position 41°15.2'S, 174°22.1'E by special arrangement with the Harbor Authority. In view of the heavy ferry traffic in Tory Channel, however, all foreign vessels bound for locations in

Queen Charlotte Sound should use Alpha pilot boarding position (41°04.6'S., 174°18.9'E.) at the N entrance to the sound. However, in heavy weather pilot boards at Bravo pilot position (1°03.6'S., 174°19.8'E.).

In addition to the requirements of the above, the navigational instructions described below apply to vessels of more than 500 gt within the waters of Queen Charlotte Sound and Tory Channel.

Vessels may only use Tory Channel with the permission of the harbormaster. This permission is dependent on traffic in the channel and weather conditions.

New Zealand Railways operates a regular rail ferry service between Wellington and Picton, and rail ferry vessels may be encountered in Tory Channel, at any time. Caution should be exercised at all times and in particular while navigating Tory Channel and Tory Channel E entrance.

Vessels operating at speeds less than 15 knots and intending to transit Tory Channel shall make an "All Ships" broadcast, as follows:

1. Inbound vessels:
   a. When on an arc with a radius of 3 miles, centered on East Head Light (41°12.6'S, 174°19.4'E), transmit on VHF channel 19 advising all vessels of intentions to transit inbound and provide an ETA at the Controlled Navigation Zone boundary, as well as at East Head using the vessel's anticipated speed.
   b. Any confirmation or amendment to the ETA should be made at intervals not to exceed 10 minutes.
2. Outbound vessels:
   a. When abeam of Clay Point East Light (41°14.2'S, 174°15.2'E), transmit on VHF channel 19 advising all vessels of intentions to transit outbound and provide an ETA at the Controlled Navigation Zone boundary, as well as at East Head, using the vessel's anticipated speed.
   b. Any confirmation or amendment to the ETA should be made at intervals not to exceed 10 minutes.

Vessels operating at speeds of 15 knots or greater and intending to transit Tory Channel shall make an "All Ships" broadcast not less than 10 minutes before reaching the following:

1. Inbound vessels—The point formed by the intersection of the line of the leading lights and the seaward arc of a circle, with radius of 0.6 mile, centered on West Head Light (41°12.8'S, 174°18.9'E).
2. Outbound vessels—A line drawn in the direction of 320° from Scraggy Point Light (41°12.9'S, 174°18.3'E).

The local repeater station operated on VHF channel 63 and is most likely to be monitored by small craft.

Picton Harbor Radio will keep all vessels advised of any known movements of other vessels.

All vessels entering or leaving Tory Channel, whether in sight of one another or not, are required to establish radio contact with any other vessel which is likely to be approaching the E entrance at approximately the same time.

Where it is established that two vessels are likely to pass each other in the vicinity of Tory Channel E entrance, the outbound vessel shall have priority and the inbound vessel shall wait clear of the entrance until the outbound vessel is clear. This requirement shall not apply where the master of the outbound vessel has advised the inbound vessel to proceed inward. Under such conditions, the outbound vessel shall not proceed seaward of a line drawn in a 320° direction from Scraggy Point Light, until the inbound vessel has cleared the entrance.

Under normal operating circumstances, the following are the minimum distances which vessels are required to maintain off the points of land designated:

Point of land	Inbound	Outbound
Te Uira-Kapapa Point	0.1 mile	0.2 mile
Arrowsmith Point	0.2 mile	0.1 mile
Ruaomoko Point	0.1 mile	0.2 mile
Dieffenbach Point	0.4 mile	0.2 mile
Double Point	0.4 mile	0.2 mile
The Snout.	0.3 mile	0.1 mile
Picton Point	0.3 mile	0.1 mile

Caution.—Failure to receive any radio communication should not be construed by any vessel as confirmation that the E entrance to Tory Channel is clear and the entrance should be approached with due caution at all times.

At the E entrance to Tory Channel, the tidal currents attain a rate of 5 to 7 knots; at about 1.5 miles within the entrance, the tidal currents attain a rate of 2 to 4 knots; in the remainder of the channel, the tidal currents attain a rate of 1 to 3 knots. Vessels without local knowledge which are low-powered should not use the E entrance of Tory Channel at springs.

11.52 Okukari Bay (41°12'S., 174°19'E.) is entered about 0.7 mile WNW of East Head, and it is too open for adequate anchorage. An old whaling station stands 0.4 mile WSW of the W entrance point of the Bay.

White Rocks (41°13'S., 174°17'E.), which lie above water, lie about 0.7 mile WSW of the W entrance of Okukari Bay. White Rocks separate Te Awaiti Bay from Jacksons Bay.

Vessels with local knowledge can obtain anchorage, in a depth of 12.8m, E of White Rocks in Te Awaiti Bay.

Oyster Bay (41°15'S., 174°15'E.) is entered between Motukina Point and Tiu Point, 0.4 mile W. Vessels with local knowledge can find sheltered anchorage well within this bay, in a depth of 10.1m, mud bottom, although space is restricted by marine farms.

An unnamed bay lies on the N side of Tory Channel; it is the largest indentation on the N side. A shoal, with a depth of 2.7m, blocks most of the center of this bay. Ngaruru Bay indents the W side of this bay.

An overhead power cable, with a vertical clearance of 89m, spans Tory Channel just E of Arrowsmith Point. Reports are that the cable generates a false radar target which can be taken for a vessel underway.

Anapua Bay, the largest indentation of the S side of Tory Channel, lies between Katoa Point and a point nearly 0.5 mile W. Opua Bay and Missionary Bay lie at the head of Anapua Bay. A shoal, comprised of mud and shells, with a depth 9.4m, lies centered close within the entrance.

Directions.—From the SE side of Cook Strait, vessels

bound for the E entrance of Tory Channel should head for the 485m high summit of Arapawa Island. The aspect of the land off this approach, S of the entrance, appears as a chalky cliff, gradually sloping down to West Head. The land N of the entrance is higher, but less steep.

Vessels with local knowledge, bound for Picton through Tory Channel with the W current, should head for the range lights shown from the W shore of Okukari Bay. However, against the E current, vessels should keep to the S side to avoid its strength, until abeam Jackson Bay. After passing Jackson Bay, the full force of the current will be on the port bow, unless a course change is made so as to meet it end on.

A vessel outbound through Tory Channel, should when N of Scraggy Point, steer for the directional light on East Head, bearing 093°, at night, keeping within the white sector. The vessel should then bring the leading lights in Okukari Bay into line and steer SE through the entrance, between West Head and East Head on the alignment of the lights, astern, bearing 311.7°.

Caution.—Low-powered vessels without local knowledge should not use the E entrance of Troy Channel at spring tides.

Seaplanes operate in Picton Harbor.

11.53 Cloudy Bay is entered between Rununder Point and White Bluffs, 14.5 miles SSW. The shore N from Rununder Point is bare, rugged, cliffy and indented; rocks lie up to 0.5 mile off the points.

Fighting Bay is entered about 1.5 miles WSW of Rununder Point. A village lies behind a small beach in a break in the cliffs at the head of the bay. The shore between West Head and Robertson Point, the E entrance point of Port Underwood, should not be approached closer than 1 mile.

A cable area where anchoring and fishing are prohibited lies off Fighting Bay; it is best seen on the chart.

Cloudy Bay affords good anchorage out of the tidal currents about 2 miles offshore, in general depths of 12.5 to 16.5m.

The land, with its adjacent mountain ranges, gives such protection that light winds, smooth water, and clear weather are usual in the bay, while heavy gales from NW to S are blowing in the middle and on the E shores of the strait.

This anchorage is of great benefit to vessels unable in S gales or thick weather to make Pencarrow Head, for Wellington, or for those being in ballast and light, who consider it imprudent to run down on a lee shore.

Generally, the weather improves W of the line joining Cape Campbell and Tory Channel and as the anchorage is approached.

Cape Campbell Light is rarely obscured by thick weather at night; White Bluffs can nearly always be seen some miles off.

Caution.—Mariners are advised that deviations of the compass may be experienced in shallow waters in close proximity to the submarine power cables.

11.54 Port Underwood (41°20'S., 174°08'E.), an inlet entered between Robertson Point and an unnamed point about 1.5 miles WSW, is a good and spacious harbor usable in any weather. This inlet is separated into two arms by an peninsula, with each arm forming a separate and well-sheltered harbor. The inlet is indented by several coves affording sheltered anchorage. The land around the port is mountainous.

Coombe Rocks, above water, project about 0.2 mile off a point 1.7 miles E of Robertson Point. Tomikoko Rocks lie about 0.7 mile E from Robertson Point.

Pipi Bay is entered about 1 mile NE of Robertson Point and Horahora-Kakahu Islet lies close off the N entrance point of this bay to which it is connected to by a reef of above-water rocks.

Anchorage.—Anchorage, in a depth of 11.6m, may be found in Pipi Bay.

The Knobbys, a group of above-water rocks, lie about 3.2 miles NE of Robertson Point and they extend about 0.3 mile W from the N entrance of Tumbledown Bay.

Tumbledown Bay affords anchorage, in depths of 14.6 to 16.8m.

Hakana Bay lies in the NE pocket of the inlet; it affords anchorage, in a depth of about 13m, mud.

Oyster Bay is the largest indentation on the W side of the inlet; it affords anchorage, in depths of 7 to 9.1m.

11.55 White Bluffs (41°33'S., 174°09'E.), which are remarkable and white-faced, rise boldly from the sea and are 267m high and bush-covered. Reefs project from White Bluffs. The town of Blenheim, where there is a radio mast and several aero lights, is situated about 9.5 miles WNW of White Bluffs.

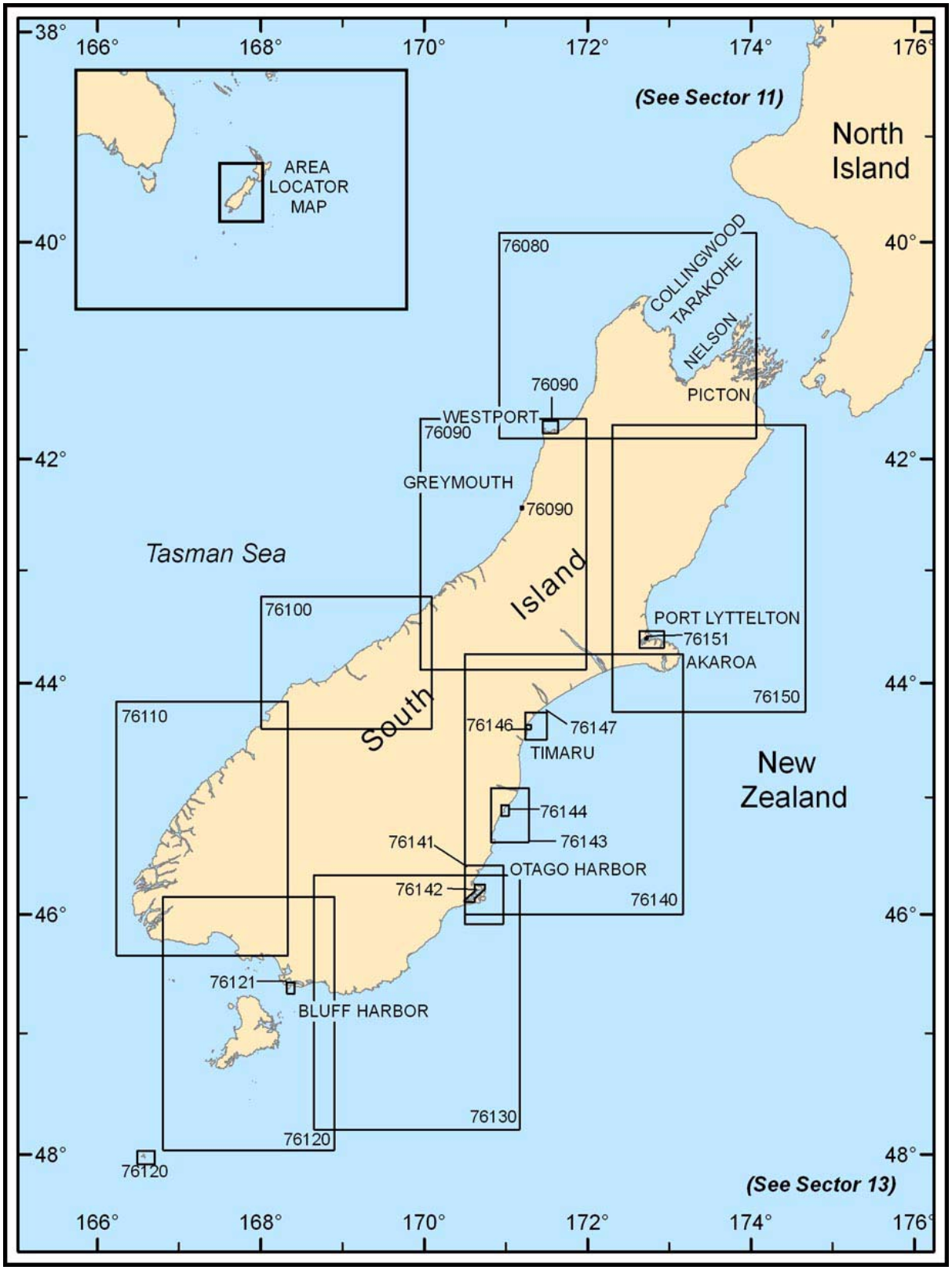
A good anchorage may be found, in about 27m, with White Bluffs bearing 155°, at a distance of 5 miles.

The Awatere River empties out into the sea about 3 miles SSE of White Bluffs; it has a depth of 1.5m at high water over the bar.

Clifford Bay lies between the entrance to the Awatere River and Cape Campbell, 9 miles SE. The shore of the N part of the bay is faced with cliffs. Abandoned submarine cables exist in the N part of Clifford Bay.

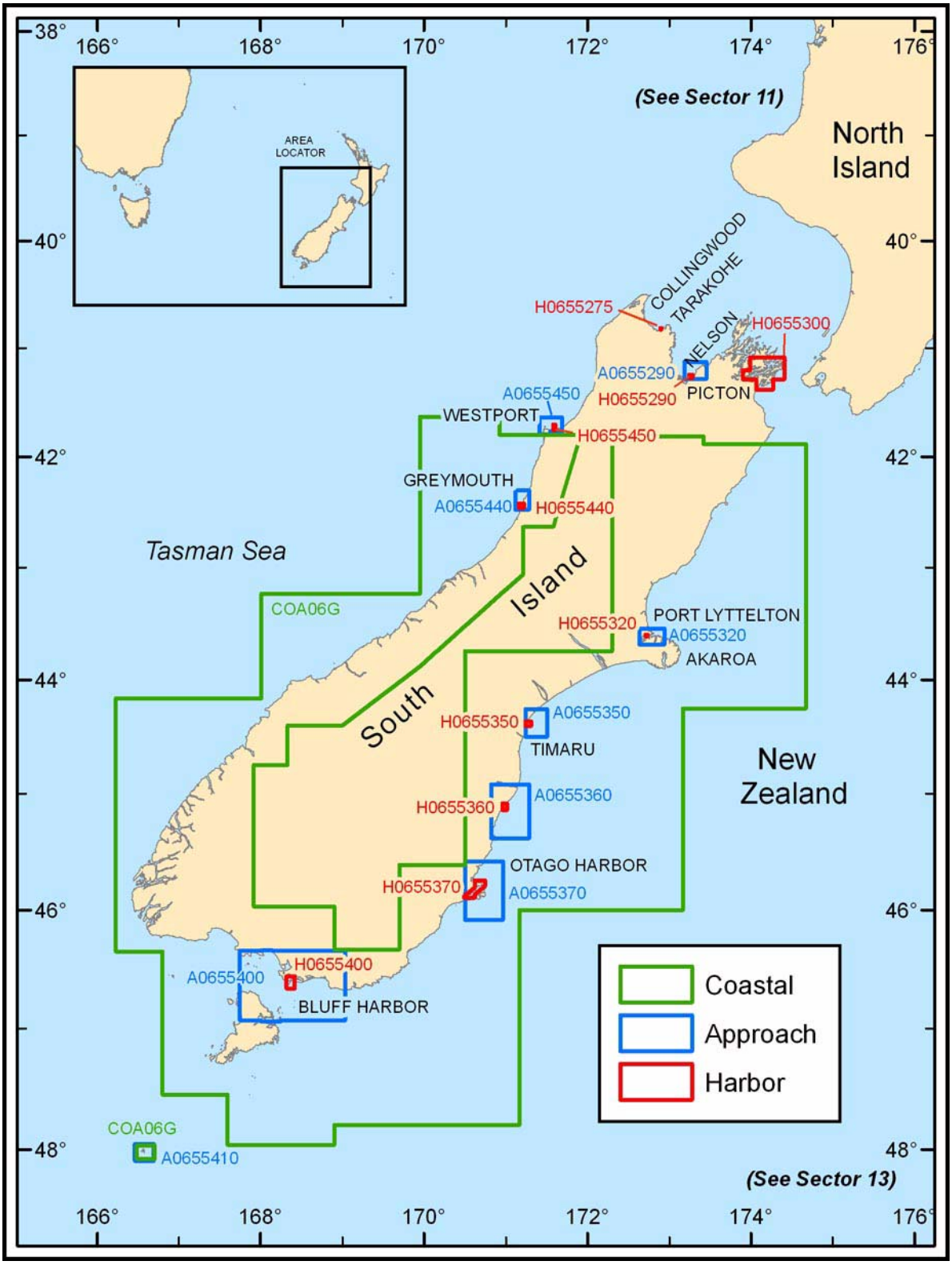
Anchorage may be found in the S part of Clifford Bay during S winds in two locations lying 1 mile and 30 miles WNW of Cape Campbell, sand, in depths of 7.3m and 6.7m, respectively.

Cape Campbell (41°44'S., 174°16'E.) represents the SW entrance point of Cook Strait; it lies about 47 miles WSW of Cape Palliser. Cape Campbell and the shore in its proximity should not be approached closer than 3 miles, as it is encumbered by numerous reefs and rocks, many of which dry, lying up to 2 miles offshore. From the N, two yellowish peaked cliffs rise steeply to Mount Tako, a rounded summit 195.1m high, lying about 1.2 miles SW of the cape. Vessels bound for Wellington from the S should take departure from Cape Campbell.



Additional chart coverage may be found in NGA/DLIS Catalog of Maps, Charts, and Related Products (Unlimited Distribution).

SECTOR **12** — CHART INFORMATION



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SECTOR 12 — DNC LIBRARY INFORMATION

SECTOR 12

NEW ZEALAND—WEST AND EAST COASTS OF SOUTH ISLAND

Plan.—This sector describes the W and E coasts of South Island, excluding Cook Strait, which is described beginning in paragraph 11.19. The narrative begins with a description of the W shore of South Island from Cape Farewell SW to Foveaux Strait. The E shore is the described from Cape Campbell, the NE extremity of South Island, to the E entrance of Foveaux Strait.

General Remarks

12.1 The W shore of South Island from Cape Farewell, which is described in paragraph 11.26, SSW to the entrance of **Milford Sound** (44°34'S., 167°47'E.), is largely unfriendly and unremarkable affording little shelter. The only harbors along this stretch of coast, Westport and Greymouth, become impassable during heavy W weather.

The generally featureless aspect of this coast changes somewhat between Cape Foulwind, about 94 miles SW of Cape Farewell, and Cascade Point, about 196 miles further SW. However, two readily identifiable marks are the gorge of the Grey River and Mount Cook. The gorge of the Grey River, from the S, appears as a well-defined cut in a steep coast. Mount Cook, the highest peak in New Zealand, lies 80 miles SW of the river's mouth. Mount Cook is a remarkable snow-clad summit of the Great Southern Alps, and it will be seen, from the W, in two separate peaks, the higher, Mount Cook, the lower, Mount Tasman. The bases of these mountains are usually enveloped in clouds.

A prominent bare ridge, 237m high, lies about 3.7 miles SW of Cape Farewell; there is a landslip at its N end.

Except for the approaches to Westport and Greymouth, charts of the W coast of South Island, from the Karamea River to Charles Sound, are based on old and imperfect surveys. Mariners without local knowledge should exercise caution when navigating in sparsely sounded areas, particularly when approaching the coast in depths less than 37m.

Winds—Weather.—The SW winds on this part of the coast generally shift to the W and draw into Cook Strait after passing Cape Farewell.

Tides—Currents.—The tide rises highest with E winds and lowest with W winds. The flood current begins 3 hours before HW and runs to the SW, parallel with the coast, as far as West Haven Inlet, at a rate of 0.5 to 2 knots. The ebb current begins 3 hours before LW. South of Cascade Point, between September and November, a SW set which attains a rate of 1 knot predominates.

Caution.—A voluntary code of shipping routes around the New Zealand coast, to reduce the potential for pollution of the marine environment, has been introduced. For further information, see Pub. 120, Sailing Directions (Planning Guide) Pacific Ocean and Southeast Asia.

South Island—West Coast

12.2 Whanganui Inlet is entered between Bar Point and South Cone Head; the entrance is easily recognized as both entrance points are conspicuous. South Cone Head shows up as a yellow, cliffy, and cone-shaped summit, 203m high. A bar, with a depth of 1.8m, which has not been thoroughly investigated, fronts the entrance.

Anchorage.—Anchorage for small vessels with local knowledge, but which is accessible only in moderate to good weather, is available, in a depth of 7.3m, about 1 mile above the entrance.

Grey Cliffs, with a prominent landslide scar in the middle, lies about 12 miles SW of the entrance to Whanganui Inlet; the shore between is rocky with sandy beaches backed by high, rough, broken ground covered with bush.

Kahurangi Point (40°46'S., 172°13'E.) is scrub-covered, with a remarkable white patch on its N face. A submerged rock lies about 0.5 mile WNW of the point and depths of less than 11m extend about 1 mile N from the point.

Caution.—Paturau Bank, comprised of patches with depths of 34.7 to 36.6m, lies about 11 miles W of the entrance to Whangerai Inlet. Paturau Shoal, with a depth of 9.7m, lies about 5.5 miles ESE of Paturau Bank.

Kahurangi Shoals, with a least depth of about 7.6m and Stewart Rock at its center, lies about 5.5 miles NNW of Kahurangi Point. In rough weather, this shoal breaks heavily.

12.3 Rocks Point stands about 6 miles SW of Kahurangi Point; it forms the N entrance of Big Bay (Seal Bay). Big Bay is entered between Rocks Point and Steep Point, 2.2 miles SW.

Small vessels with local knowledge can obtain anchorage, in a depth of about 7.3m, about 1 mile S of Rocks Point. A reef extends about 0.4 mile NW from Rocks Point.

Wekakura Point lies about 10 miles SW of Kahurangi Point; the shore between is reef-fringed with shingle beaches in spots, backed by high ground with many gorges covered with vegetation.

Karamea Bight lies between Wekakura Point and Cape Foulwind, 59 miles SSW.

The **Karamea River** (41°15'S., 172°06'E.) empties out into the bight about 20.5 miles S of Wekakura Point. A conspicuous clearing stands about 3 miles NE of the river's mouth. The Karamea River is exposed to heavy seas from the W which break a considerable distance offshore. Vessels should not attempt to enter the river without extensive local knowledge. The bar is subject to changes in depths and direction. Because of shoaling in the entrance, the port was shut down.

Anchorage.—Anchorage may be found in good weather, in a depth of 11m, about 1 miles off the entrance to the river.

Little Wanganui Head lies about 9 miles SW of the entrance to the Karamea River; it forms the S entrance of the Little Wanganui River. From the head, a prominent line of cliffs rise to

heights of almost 457m, extending about 9.5 miles SW to the entrance of the Mokihinui River.

12.4 Old Man Rock, 29m high, stands nearly 5 miles SW of Little Wanganui Head. The sandy beach fronting this stretch of shore is covered with rocks from land slips.

The Mokihinui River empties out into the sea about 5 miles SW of Old Man Rock; it has a depth of 3 to 3.7m over the bar at HWS; 2.4 to 3m at neaps. Depths within the bar range from 1.8 to 2.1m at LW and local knowledge is essential for entry.

The Waimangaroa River empties out into Karamea Bight about 13 miles SW of the Mokihinui River. The town of Denniston, from which powerful lights are shown, lies about 3.5 miles SE of the river's entrance. A prominent TV mast, marked by red lights, stands on the summit of Mount Rochfort, 3.5 miles SW of Denniston.

Buller Bay (41°45'S., 171°32'E.) lies between the entrance of the Buller River and Cape Foulwind, about 5.5 miles WSW. From the entrance to the river, the shore for about 4 miles is fronted by a beach backed by low, swampy ground, with patches of gorge and scrub; then to Cape Foulwind it is comprised of sandy cliffs. Three conspicuous white chimneys, each 60m high, and two white silos of a cement works, at which powerful lights are shown, stand about 1.5 miles E of Cape Foulwind.

Westport Harbor (41°44'S., 171°36'E.)

World Port Index No. 55450

12.5 Westport Harbor lies at the mouth of the Buller River and has a bar at its entrance. The entrance is formed by two breakwaters about 179m apart; farther in are three training walls. Vessels must not enter the port until clearance is given.

Dredging at the entrance bars can be expected day and night. Care must be taken to avoid fouling the dredge moorings. Masters should exercise caution in using anchors in the vicinity of the cement silos, as permanent moorings of heavy chains may be laid across the river bed at any point.

Passage over the bar is considered impracticable when the river is in flood or during a NW gale. In bad weather, the sea breaks heavily over the outer part of the bar.

Westport Harbor

http://www.westportharbour.co.nz

Tides—Currents.—A N or E set may be experienced up to 1 mile offshore and attains a rate of 1 to 3 knots, while off the bar the flood sets W and the ebb sets E. The rate of the current is least about the time of HW and during 1 to 2 hours before and after HW. Meteorological effects may cause the above rates to be increased by as much as 2 knots. During river freshets, which may occur any time of the year, the river current in the harbor attains a rate of 8to 10 knots. The tides rise highest with E winds and lowest with W winds.

Currents set across the bar according to the direction and force of the wind. Strong winds from the W and SW cause E sets with rates of up to 6 knots; E winds cause sets to the W with less effect.

There is a constant outflow from the Buller River of up to 1 knot. During overfalls, which may occur at any time of the year but generally after NW winds, the rate mayreach12 knots or higher.

Courtesy of David Barnes, Port Manager, Westport Harbor

Westport Harbor Entrance

Courtesy of David Barnes, Port Manager, Westport Harbor

Westport Harbor—Crane Wharf

The rise and fall of tide can be 3.6m.

Depths—Limitations.—Information regarding bar conditions and tides is communicated via blinker light, VHF radiotelephone, cell phone, or facsimile upon request from the harbormaster.

Depths over the sand and shingle bar at the harbor entrance vary between 3.6m after heavy freshets, and 1.8m during extended spells of dry weather. It is dangerous for mariners without recent local knowledge to attempt to cross the bar. When weather conditions permit, dredging may take place on the bar as required. The harbor tide gauge shows automatically the depth over the bar and also records the scend.

The bar is only impracticable with a heavy NW gale or with

a freshet in the river. With W winds a strong E set is experienced across the entrance, which, with the beam sea, make it difficult to keep on the range line. With NE winds, there is occasionally a W set across the entrance, but of less strength than the above. In bad weather, the sea breaks heavily over the bar.

There are sufficient depths in the river for all vessels that can cross the bar. Vessels up to 120m in length can turn in the harbor at HWN provided they do not draw more than 5.4m forward. Vessels up to 130m in length can use the port, but there is only swinging room if drawing not more than 4.9m forward.

All vessels may, depending on the weather, bar, and draft conditions, enter, berth, or depart during hours of darkness. Vessels berth or unberth at or near HW.

Crane Wharf is a wooden structure with a total berthing space of 244m and depths of 5.3 to 6.7m alongside. The six berths are numbered sequentially from the N.

Merchandise Wharf, also wooden, lies 0.1 mile S of Crane Wharf; it is 213m long, with depths of 4.3 to 5.2m alongside. The bottom at both wharves is sand and shingle.

Vessels berthing at Crane Wharf should be prepared for an upriver set during the flood, and a set onto the wharf at the seaward end and off the wharf at the upriver end.

All vessels lie at the wharves with their heads upriver. Docking and undocking is scheduled around HW, but not if the current exceeds 3 knots.

Aspect.—The Westport Harbor entrance faces N. Westport Airfield lies behind the E end of Carters Beach. The control tower and three radio masts stand on the W side of the airfield. Three conspicuous white chimneys, each 61m high, and two white silos of a cement works, at which powerful lights are shown, stand about 1.5 miles E of Cape Foulwind, which is described in paragraph 12.6, about 4 miles W of Westport.

The hospital chimney, 22m high, which is prominent, lies 1.5 miles SSE of the entrance to the Buller River. A clock tower stands nearly 0.5 mile SW of the chimney.

Pilotage.—Pilotage is compulsory for vessels greater than 100 gt and/or with a draft of 3m or more.

Pilots board vessels in position 41°42.1'S, 171°33.1'E. In the event of a pilot being unable to board, a vessel will be led through the bar.

Regulations.—Mariners are advised they must keep at least 1 mile off the entrance until making their approach to cross the bar. New Zealand authorities advise that the master of any vessel which touches the bar when outbound shall inform the harbormaster by radiotelephone, VHF channel 14, or blinker light, after the vessel is clear of the bar. This signal will be acknowledged by the harbormaster.

All vessels should notify the harbormaster of their intention to enter 12 hours before arrival. No vessel must attempt to enter the port until authority to do so is received from the signal station.

Advice from the harbormaster on bar conditions, depth of water, and the recommended route across the bar is available 24 hours by telephone (3-788-8086) or mobile (21-959-279).

Signals.—A signal station, comprising a square concrete building fitted with a white signal mast, lies about 0.1 mile within the head of the W breakwater. Vessels can communicate with the station by blinker light, radiotelephone, or cell phone. The call sign is Westport Harbor.

There is a radar surveillance service at Westport and masters of vessels equipped with radiotelephone may request from the harbormaster's office, during conditions of restricted visibility, particulars of their bearing and range, as shown on the radar screen.

Anchorage.—Vessels can anchor in Buller Bay, in depths from 18.3 to 23.7m. A recommended berth lies 2 miles N of the signal station. However, caution must be exercised as there is poor holding ground E of the entrance to the harbor and in the SW part of Buller Bay. Vessels should be prepared to proceed to sea directly if winds come up from the W to N quarter; the anchorage in Buller Bay is unsafe during NW gales. A falling barometer and lightning W and SW of Westport are good indications of deteriorating weather.

The Quarantine Anchorage is bound by the arc of a circle, radius 2 miles, centered on the signal station or in such position as directed by the harbormaster.

Directions.—When within about 2.2 miles of the harbor entrance or on the harbormaster's advice, bring the main range lights into alignment. At night, wharf working lights, close to the line of the range lights, will be extinguished when the vessel has notified intention to enter.

After passing between the breakwater heads, vessels should then head for the inner range lights. By day, the wharves may be steered for when about 0.9 mile within the entrance, and at night, when the inner light on the E training wall changes from white to green. The directional light shown below the Main Harbor Light is directed so that its white sector indicates the best water over the bar.

12.6 Cape Foulwind (41°45'S., 171°28'E.), a conspicuous promontory, lies about 5.7 miles WSW of the entrance to the Buller River. The cape is faced by cliffs 40 to 52m high, and it is a salient promontory, off which several reefs and rocks lie. Cape Foulwind Light is prominent. A radio mast showing red lights stands close S of the light. Three Steeples, a group of rocks, the highest being 91m high, lie 1.7 miles N by E of Cape Foulwind Light; the area between is encumbered by rocks and shoals. Black Reef lies 0.5 mile S of Three Steeples. A rock, 3m high, lies about 0.6 mile SSW of Black Reef.

Bucklands Peaks, 1,309m high, rise at the N end of Paparoa Range, about 10.5 miles SE of Cape Foulwind. The higher summits of the Paparoa Range are snow-covered. From Cape Foulwind, the shore trends SSW for about 44 miles to the entrance to the Grey River, where the town and port of Greymouth are situated.

Perpendicular Point (42°06'S., 171°20'E.) lies about 21 miles SW of Cape Foulwind and is rock-fringed and bold, rising abruptly from the sea to a height of 366m. A range of mountains, with unusual jagged outlines, backs the shore, making this part of the shore very remarkable.

Caution.—Several dangers exist within an 8.5 mile radius of Perpendicular Point; caution should be exercised while navigating in this area.

Point Elizabeth (42°23'S., 171°13'E.), 35.4m high, represents the N end of the Twelve Apostles Range. From this notable limestone double bluff, 4 miles SSW, the shore is formed by a shingle beach. The shore 6.7 miles NNE from Point Elizabeth to Seventeen-Mile Bluff is formed by a shingle beach interspersed with reef-fringed stretches and backed by steep

bush-covered hills.

There are two lights shown about 0.2 mile N of Seventeen Mile Bluff, and these should not be mistaken for the lights at Greymouth.

Tides—Currents.—Between Cape Foulwind and Jacksons Bay, about 180 miles SW, the currents are affected by the prevailing winds. Northerly and NW winds raise the general level of the sea about 0.5m; while S and SW winds lower it about the same amount.

Greymouth Harbor (42°26'S., 171°13'E.)

World Port Index No. 55440

12.7 Greymouth Harbor, located on the S bank of the Grey River, has a bar at the entrance. This port is primarily used by coastal traffic. Mariners are warned not to enter Greymouth Harbor without first contacting the Greymouth Harbor Board by radio in order to ascertain the condition of depths on the bar and in the harbor. The principal exports are coal, timber, tuna, and ilmenite.

Tides—Currents.—There is a considerable set into the tidal lagoons at certain stages of the tides. As the current sets onto the wharf, where it curves, care must be taken when going alongside that the vessel is not swept on the wharves. The current attains rates of 2 knots at springs and 1.5 knots at neaps.

Vessels can experience a S set close to the harbor entrance.

Freshets, rising to a rate of more than 10 knots, are not infrequent in the Grey River, and 12 to 24 hours warning can usually be given. Vessels berth head upriver and, if alongside during a freshet, it is the practice to lay out extra lines forward and go ahead on main engines with revolutions for about 7 knots.

Depths—Limitations.—Depths over the sand bar change frequently, but vessels up to 5.5m draft, 109m in length, and 15.2m beam can enter the river under favorable conditions at MHWS.

Vessels may berth alongside or leave any wharf by day or night. The nature of bottom alongside all berths is shingle.

During dry weather, especially after SW winds, the bar is subject to silting up completely, but there is always a depth of at least 2.0m over it at LW. At such times, if there is any swell running outside, the bar quickly becomes unworkable and remains that way until the swell subsides or a freshet in the river washes the bar away.

There are dredged depths of 5.5m at the wharf which is 130m in length.

A dredge is frequently underway in the harbor; moorings may be laid out in several directions and care must be exercised when navigating in its vicinity.

Richmond Wharf, consisting of Berth No. 1 and Berth No. 2, has a length of 573m and depths of 5.2 to 6.1m alongside. The facility was disused beginning in 2010.

Pilotage.—Pilotage is not compulsory, but it is dangerous for mariners without recent local knowledge to attempt to cross the bar. If pilotage is required, vessels should forward their ETA 48 hours in advance of arrival at the port roadstead. Before attempting entry, contact must be established with the Harbor Supervisor.

The pilot boarding position is within 3 miles of the harbor entrance. Vessels wishing to enter or requiring assistance should contact Greymouth Harbor Radio on VHF channel 14.

Signals.—A disused signal station and flagstaff stand near the head of the S breakwater. Information regarding bar conditions, tides, and berths is communicated to ships by radiotelephone.

A red flag by day or a red light at night indicates the position on the wharf where a vessel's bridge should be placed alongside.

Anchorage.—There is good anchorage, in depths of 18.3 to 27.4m, about 3 miles W of the entrance of the Grey River. Vessels seldom anchor off Greymouth, as the roadstead is exposed to the prevailing wind.

The Quarantine Anchorage lies in the roadstead enclosed in a circle, with a radius of 2 miles from the signal station or where harbor authorities direct.

Directions.—The harbor should not be entered without local knowledge.

Vessels entering the harbor must guard against the general N set of the current outside. It is preferable to enter the harbor just after HW.

Vessels approach the Grey River with the range lights on Richmond Wharf in line, bearing 128.2°. The vessel should then pass between the breakwater heads, staying in the channel, which leads to the wharves.

The shore between Greymouth Harbor and Abut Head, about 58 miles SW, is mostly low, sandy, and featureless.

Caution.—Depths on the bar at the harbor entrance are subject to frequent change and it is dangerous for mariners without recent local knowledge to attempt to cross it. Mariners should contact the Grey District Council to ascertain the latest bar and harbor depths. A quick flashing blue light may be shown from the flagstaff on the S breakwater to warn that the bar is considered dangerous to cross.

Thick fog and strong winds can occur between the Grey River Gorge and the harbor entrance after a cool night. Generally, the range lights and beacons will be obscured by fog.

12.8 The **Hokitika River** (Brunner River) (42°43'S., 170°59'E.), with the town of the same name on the N side of the river's entrance, is navigable by shallow draft vessels with local knowledge for about 0.7 mile within the bar. The bar is frequently shifting its position and varying in depth. During W gales, a heavy sea rolls in on this shore. Sometimes even in good weather a heavy W swell rolls in, the effect of gales in the offing which do not reach the coast.

The harbor is no longer in use and all navigational aids have been removed. Red lights, shown from radio masts, stand on the S side of the river entrance. Two additional radio masts stand 0.2 mile SW of the above.

Ruatapu village, where there is a church, lies about 5.5 miles SSW of the entrance to the Hokitika River. The Mikonui River empties out into the sea about 2.7 miles SW of the entrance to the Totara River. Mount Greenland, 904m high, and Mount Rangitoto, 1,125m high, both heavily forested, rise 4.7 miles SE and 6.5 miles SSE, respectively, of the entrance to the Mikonui River.

Bold Head (42°56'S., 170°42'E.), a bush-covered bluff, 142.3m high, prominent from the NE or SW, lies about 3.2 miles SW of the entrance to the Mikonui River.

The Wanganui River is entered through a narrow entrance

about 12 miles SW of Bold Head and it is only used by small vessels with extensive local knowledge. A rather remarkable hill or headland close to the coast rises over the S bank of this river.

An ODAS buoy lies 22 miles NW of Wanganui Bluff.

Abut Head (43°06'S., 170°16'E.) is a strikingly bold headland, 51m high, that is fringed with rocks.

Waitahi Bluff (Waitaki Bluff), 44.5m high and white, lies about 2.7 miles SSW of Abut Head.

Okarito Harbor lies at the entrance of the Okarito Lagoon; it is only used by small craft with extensive local knowledge, as it is subject to extensive changes and it is occasionally completely closed. The tidal currents in the harbors entrance run quite strongly. The holding ground in the offing is very poor. At the village of Okarito there is a monument at the foot of a tree-covered hill on the S side of the lagoons entrance.

Kohuamarua Bluff (43°14'S., 170°10'E.) is a remarkable bush-covered promontory, 173m high, that lies about 1.7 miles SW of the entrance to the Okarito Lagoon.

12.9 The **Wekeka River** (43°26'S., 169°48'E.) is entered NE of Cooks Bluff. Cooks Bluff is very conspicuous and easily made out as it rises steeply from its inland side, ending in Malcolms Knob, a cliff, 129m high. The shore between Cooks Bluff and Karangarua Bluff, a yellow cliff, 51.2m high, about 2.5 miles SSW, is formed by sandy beaches, backed by steep forested land.

Between Karangarua Bluff and Tititira Head, 16 miles SW, the shore is indented by several bays with sandy beaches between. The projecting bluffs, which separate the indentations, have the appearance from sea of islands lying close offshore. Mount Tasman and Mount Cook, the highest peaks of the Great Southern Alps, lie about 20 miles ESE of Karangarua Bluff.

Bruce Bay is entered between Makawhio Point and Heretanewha Point, 4.2 miles WSW. Heretanewha Point is a bold, rocky promontory that is reef-fringed. Small vessels with local knowledge can obtain anchorage in Bruce Bay, in a depth of 5.5m, hard speckled sand. This anchorage, lying close in under Heretanewha Point, is sheltered from moderate S winds. However, during S or SW gales, a heavy sea comes in making it untenable. In general, Bruce Bay resembles Jacksons Bay, about 45 miles farther WSW.

The Paringa River empties out into the sea on the E side of Tititira Head (43°37'S., 169°26'E.). Small vessels with local knowledge can cross the bar of this river, over which there are depths of 1.5 to 3m, but they cannot proceed farther than 0.1 mile within the entrance.

The shore, 11.2 miles WSW from Tititira Head to Arnott Point, is cliffy and tree-covered. Several rocks, best shown on the chart, project off this section of shore.

Tauperikaka Point is located 3.2 miles SW of Arnott Point. A rocky shoal, with a depth of 6.6m, lies 5.7 miles WSW of Tauperikaka Point.

The **Haast River** (43°51'S., 169°03'E.), 7 miles SW of Tauperikaka Point, is entered about 5 miles SW of the entrance of the Waita River, and there is a depth of 1.8 to 4.3m over the bar at HW. However, the channel is ever shifting due to freshets.

Alhambra Rock, 3.4m high, lies 1.5 miles W of the Haast River entrance, the sea breaks heavily on this rock in bad weather.

12.10 The Open Bay Islands, made up of Taumaka Island and Popotai Island, lie at the N limit of foul ground that projects NE from Mussel Point. These above islands are joined at LW by a rocky ridge. Bignell Reef, which dries, lies about 0.5 mile ENE of Taumaka Island; An islet, 0.4m high, lies about 1 mile further ENE. Vessels should give the Open Bay Islands a berth of about 3 miles; passage S of these islands exists, but shoals, with a least depth of 2.7m, lie between 1 mile N and 2 miles NNW of Mussel Point, and it requires extensive local knowledge. Several dangers, best seen on the chart, lie W of the Open Bay Islands.

Tides—Currents.—With N winds, a strong current sets S between the Open Bay Islands and the mainland, attaining rates of 3 knots.

Anchorage.—Vessels with local knowledge can obtain sheltered anchorage off the Open Bay Islands. The best berth is in a depth of 9.1m, rock, E of Taumaka Island. Vessels approach this anchorage with the town of Okuru bearing about 198°; when Taumaka Island bears about 275°, course should be changed W for the anchorage.

12.11 Mount Mclean (44°01'S., 168°45'E.) is a conspicuous cone-shaped forested hill that rises from the low ground. The Waiatoto River, and the Arawata River, lying about 5.5 miles WSW of Mussel Point, can be used by small vessels with local knowledge, but they are subject to extensive changes and can only be navigated a short distance above their bars.

Jacksons Bay (43°59'S., 168°40'E.) lies between the entrance of the Arawata River and Jacksons Head, about 3.5 miles NW. Jackson Head, both bold and conspicuous, is joined to the mainland by a low narrow neck, and it is easily made out from any direction. Several islets lie off Jacksons Head; there is a dangerous rock 0.3 mile NE of the headland.

A rocky shoal, with a depth of 10m, lies 7 miles NE of Jacksons Head.

Jacksons Bay affords good protection from S or W winds and some shelter even from those from the NNW. It has been reported that even with gales from the N to NE, the anchorage, in 7.3m or 9.1m, is safe. Because the sea breaks in a depth of about 12.8m; only the swell is felt inside that depth. In heading for the anchorage, Jacksons Head should be passed at a distance of about 2 miles on a S course with the Arawata River entrance bearing 180°, and the bay then entered from the E. Small vessels can find anchorage, in a depth of about 8m, blue clay, E of a wharf situated 1 mile SSW of Jacksons Head, at the village of Jacksons Bay.

There is no difficulty in leaving Jacksons Bay at the beginning of a NW gale. North gales are usually preceded by a swell setting into the bay, and generally begin from the NNE with clear weather, shifting to NW with heavy squalls and thick rain; from this point the gale is most severe, and if disposed to last, will shift around again to the N. A shift to the SW is generally preceded by a lull with heavy rain; at the latter point it again blows hard, but the gale is then of short duration, and soon subsides into a moderate breeze, with good weather. Gales are not frequent here in summer, though their directions are much the same; SW and WSW winds then prevail.

With the exception of the roadstead under Cape Foulwind, Jacksons Bay is the N anchorage on this coast where shelter can be found for large vessels during S winds.

Depths—Limitations.—Jacksons Bay Wharf is L-shaped, 61m long, with a least depth alongside of 3.7m and a height of 4.5m. The wharf is of wooden construction and the outer face is protected by spring piling. At the root of the wharf, on the inner side, there is a landing place. The wharf has been reported to be in need of repair.

The wharf should be approached from the E. When berthing, care should be taken to avoid small craft moorings which lie off the outer face.

12.12 Cascade Point (44°01'S., 168°21'E.) is a cliffy projecting bluff which lies about 12.5 miles WSW of Jacksons Head. The bare face of Cascade Point is striped by numerous waterfalls which, after rain, are visible for quite a distance. A notable dome-shaped peak rises close S of the point.

Caution.—A heavy swell usually sets on shore between Jacksons Head and Cascade Point.

Barn Bay lies about 5 miles SW of Cascade Point; near its head it is encumbered by several rocks and islets. The land immediately over this part of the coast is steep and backed by lofty and rugged mountain ranges. Barn Bay has a well-defined peak rising over its S entrance point.

Awarua Point (44°16'S., 168°03'E.), the NE entrance point of Awarua Bay, lies about 20 miles SW of Cascade Point. Several dangers, best shown on the chart, lie off this section of coast.

Awarua Bay (Big Bay) is entered between Awarua Point and an unnamed point about 4.5 miles SSW. Long Reef extends 0.5 mile WNW from the S entrance point; the sea breaks 1.5 miles N of that point.

Martins Bay lies on the S side of the S entrance point of Awarua Bay. The Hollyford River, flowing out of Lake McKerrow, enters the sea at the N end of Martins Bay. The entrance to the lake has a depth of 1.2m and is about 46m wide, thus limiting its use to small craft with local knowledge.

Kaipo Bay lies close S of Martins Bay; there are several islets lying off its S side. A rock, 46m high, lies 5.2 miles SW of the entrance to the Kaipo River; it is a good landmark.

Yates Point, the NE entrance point of Milford Sound, lies nearly 2.7 miles SW of the above rock. Between Yates Point and Dale Point, about 6.5 miles S, the shore is made up of high wooded slopes fronted by a succession of sandy or shingle bays, with several rocks and foul ground lying off it.

The Sounds

12.13 The Sounds represent the only natural harbors along the W shore of South Island. These 13 sounds or inlets indent the SW shore of South Island between the parallels of 44°35'S and 46°10'S. To a vessel approaching this part of South Island from sea, the aspect of the shore is very similar. Therefore, unless a vessel knows its particular position accurately, it will experience difficulty distinguishing the entrance of a particular sound. Also, the smaller inlets, when seen from a distance of 4 or 5 miles, have more the look of ravines between high and rugged mountains rather than harbor entrances.

In moderately clear weather, the shore can be made with confidence as the entrances are somewhat equidistant from each other and all trend in a general E direction.

One of the more notable features of The Sounds is their great depth of water. Soundings can rarely be obtained under 146m, and frequently much greater depths are found.

Milford Sound

The prevailing winds on this coast are from the NW to SW; the former frequently bring rain and thick weather. As the shore is approached, the NW winds generally veer to the N; SW winds are fine and clear. Rain is common occurrence and often lasts for several days with no intermission. As The Sounds are enclosed by mountains of such magnitude, except for about 2 hours before and after noon, the sun is rarely visible.

Caution.—Due to the imperfect nature of the surveys of the area covered by the charts, mariners without local knowledge should exercise caution in depths less than 100m. Most of the offshore islands are wildlife sanctuaries and in many cases landing is prohibited without a permit.

12.14 Milford Sound (44°34'S., 167°47'E.) represents the northernmost of The Sounds and it is deep throughout. The mountains which encompass Milford Sound are the highest on the coast.

Aspect.—Pembroke Peak, 2,045m high and always snow-covered, rises over its N side about 3 miles inland. Llawrenny Peaks are prominent, saddle-shaped, and snow-covered mountains; they lie on The Sounds S side. Tutoko Peak, 2,756m high, is a well-defined cone lying conspicuously, 6.5 miles E of Pembroke Peak.

Mitre Peak, 1,675m high, rising abruptly over the S side of The Sounds, is one of the more notable features in this vicinity. A dome-shaped mountain lies opposite Mitre Peak; it is nearly devoid of vegetation, and due to its unique color looks like a mountain of metal.

From sea, The Sounds entrance resembles that of a bay and vessels with local knowledge should only enter it on a clear day.

Brig Rock, 2m high, and surrounded by a reef of rocks, lies about 3 miles N of St. Anne Point, the S entrance point of Milford Sound. The ground, on which there are rocks, awash, between Brig Rock and the shore E, is foul. A depth of 5.5m was reported to lie about 1 mile ENE of St. Anne Point.

A bank, with a least charted depth of 14.1m, extends 1 mile from the coast, 4 miles S of Yates Point.

Anita Bay is entered between Fox Point, with an islet lying close off it and Greenstone Point, about 0.5 mile SE.

Anchorage.—Vessels with local knowledge can obtain convenient anchorage, in depths of 21.9 to 32.9m, about 0.1 mile SW of Fox Point. At this anchorage, vessels will be sheltered from NW winds, but with N winds, a swell rolls around the point. A bank, with a least charted depth of 14.1m, extends 1 mile from the coast, 4 miles S of Yates Point.

From Anita Bay, The Sounds extends in a funnel shape to the SE for 1.5 miles to Dale Point, where it narrows and barely exceeds 0.5 mile in width, with towering perpendicular cliffs rising on either side. The depths in mid-channel are 120m. From Dale Point, The Sounds leads in an E and SE direction for 6.5 miles between cliffy walls, the breadth varying from 0.2 to 0.7 mile. At 0.1 mile from the highest cliffs on the N shore, near a large waterfall, a sounding of 428m, mud, was obtained. At 4 miles above Dale Point, on the N shore, lies Harrison Cove, a confined deep-water cove. The E bight of this cove is subject to williwaws during NW gales; the W bight is free from these squalls. In 1975, a tree and a stake set in concrete close S, and fitted with white reflectors, formed a range on which to anchor.

The head of Milford Sound ends in two basins separated by Separation Tongue, fronted by boulder bank, steep-to, and covered at HW. Fresh Water Basin, the N basin, now dries except for a shallow channel leading to a jetty in the NE corner of the basin. Deep Water Basin, at the head of Milford Sound, has a maximum depth of 53m. It is approached from the N by a channel dredged to a depth of 2.7m.

Caution.—Much of Doubtful Sound SE of Dale Point is a marine reserve.

12.15 Bligh Sound (44°46'S., 167°29'E.) is entered between Tommy Point and Chasland Head, about 2 miles SW. Foul ground is reported to extend 0.5 mile from the shore between Tommy Point and Jagged Rocks, 2.5 miles ENE.

Two conspicuous peaks, Mount Longsight, 1402m high, lying 3.2 miles E of Tommy Point, and Table Mountain, about 0.7 mile WSW of Mount Longsight, are good marks for identifying the entrance of Bligh Sound.

Bligh Sound has three reaches; the outer, which is 2 miles wide at its entrance, extends SE for 3.7 miles and narrows gradually to Turn-Round Point on the S side, where the channel is only 0.2 mile across and known as Cloudy Pass. The second reach then continues SSW for about 4 miles to Evening Point. The third reach continues for about 2.2 miles to Bounty Haven.

Anchorage.—Amazon Cove, lying 0.7 mile NE of Evening Point, affords anchorage for small craft with local knowledge. There is also good anchorage for those vessels with extensive local knowledge, off the head of Bounty Haven, in a depth of 21.9m, close to a stony flat, through which flows the Pitt River. Rugged, lofty mountains rise steeply from either shore. A vessel of 1,200 gt anchored, in a depth of 29.3m, about 0.7 mile WNW of the entrance to the Pitt River, abreast a waterfall on the N side.

Clio Rock, which is steep-to, with a depth of 2.7m, lies on the SE side of the second reach of Bligh Sound, midway between Turn-Round Point and Evening Point. Between Clio Rock and the shore S are two more steep-to submerged rocks.

12.16 George Sound (44°50'S., 167°22'E.) has its entrance about 6.5 miles SW of Bligh Sound; the shore between is steep and slightly indented. A depth of 11.9m was reported in the middle of the entrance to George Sound.

Because of this sound's width, and the tendency of the winds to generally blow with more steadiness, it is easier than most to enter or leave. George Sound is surrounded by mountains with a rugged and precipitous nature.

Anchorage.—Vessels with local knowledge can obtain good anchorage in Anchorage Cove, in a depth of 27.4m, on the E side of the sound at the head of the first reach. With NW gales a swell sets in. The head of this cove is a sandy beach.

A vessel of 4,800 gt anchored, in a depth of 53m, in George Sound's SW arm, about 0.5 mile from an islet, and 0.7 mile from the arms head, There is good anchorage in the SE arm, in about 27.4m, with the anchor being dropped as the waterfall is seen.

The shore SW from the entrance of George Sound, about 13.5 miles SW to Caswell Sound, is steep and rocky, affording no shelter, and indented only by Looking Glass and Two Thumb Bays. Looking Glass Bay is sandy with a beach of

large boulders at its head; Two Thumb Bay is blocked by rocks.

12.17 Caswell Sound is entered through a passage roughly 0.3 mile wide. Styles Islet lies close N of McKerr Point, the S entrance point of Caswell Sound. A small reef, awash, lies close off the N end of the islet, between it and a submerged rock, over which the sea breaks in heavy weather, about 0.3 mile NNE, lies the entrance. A narrow bank, with depths of 40 to 80m, stretches part way across the entrance from Styles Islet. However, close within the entrance there is no bottom at a depth of 240m. To the S of Styles Island is a boat channel.

From the entrance, the sound leads 1.5 miles SE to Hansard Point, on the N shore. As in other sounds the shores are very steep and depths are great.

Boat Rock, awash at HW, lies about 6 miles ESE of the Sounds entrance, and it is surrounded by a sandbank.

Anchorage.—Vessels with local knowledge can obtain anchorage E of Boat Rock, in a depth of 7.3m, but the bank is very steep. There are general depths above Boat Rock of 40 to 160m; the head of Caswell Sound is a shallow flat.

The shore between Caswell Sound and Charles Sound, about 3 miles SW, is very rugged. Nugget Point lies about halfway between the sounds, with a ridge of high rocks extending 0.3 mile off it. Even under good conditions, this section of coast should be given a berth of at least 1 mile.

12.18 Charles Sound is entered about 4 miles SW of Caswell Sound and there are depths in the entrance of 70 to 101m, increasing within to 186m. In the E and SE arms there are depths of 26 to 92m. Turn Peak, lying between Charles Sound and Nancy Sound, is a good mark for making out the entrance. A rock, with a depth less than 1.8m, lies close off the NE shore 0.7 mile within the entrance to the Sound.

Eleanor Islet lies at the entrance of Emelius Arm; there is a deep water channel on either side. Gold Arm, the SE arm of the sound, has Fanny Islet and Catherine Islet lying within 2 miles of its head.

Anchorage.—Vessels with extensive local knowledge can obtain anchorage, in depths of 25.6 to 36.6m, above Fanny Islet and Catherine Islet. However, this anchorage is not convenient and vessels seeking haven should not attempt to enter, as Nancy Sound and Caswell Sound are preferable.

12.19 Nancy Sound lies about 4.5 miles SW of Charles Sound; there are two boulder beaches between. Turn Peak is a conspicuous sharp-peaked mountain rising over the N side of Nancy Sound. This peak, which can be seen from sea and presents the same appearance from any direction, affords an accurate means of identifying the entrance of Nancy Sound. When within 5 or 6 miles of the sound's entrance a notable red patch, caused by a landslip, will be seen on the high land close N of the entrance. Also, a white patch, similarly caused, on the lower part of the cliffs N and S of the entrance will be seen. Two rugged islets lie 0.2 mile N of Anxiety Point, the S entrance point of the sound. A submerged rock, whose position is approximate, lies 0.5 mile W of the Anxiety Islets. Entrance Islet, 15.2m high and flat-topped, lies close W of Burnett Point, the N entrance point of the Sound.

The main entrance channel lies S of Entrance Islet; it is about 0.3 mile wide with a depth of 14.6m in mid-channel. A bar, with depths of 60 to 80m, extends across the entrance to this sound; however, it does not continue sufficiently far to allow vessels to utilize it for anchoring.

Nancy Sound projects 1.2 miles E to Sweep Point, on the S shore, and then 5 miles SE to Bend Point, on the N shore. A small islet lies close W of Bend Point.

Anchorage.—Vessels with local knowledge can obtain anchorage, in a depth of 27.4m, about 0.5 mile S of the islet, in Heel Cove, 100m from the stony beach. Additional anchorage may be found off the head of Toe Cove, in depths of 18.3 to 31.1m.

12.20 Thompson Sound is entered between Shanks Head and Colonial Head, about 3.5 miles SW of Nancy Sound. Thompson Sound projects about 10 miles SSE to its junction with Doubtful Sound and Bradshaw Sound.

The entrance to Thompson Sound is mostly free from dangers, except for a rock, with a depth of 3.7m, lying about 0.7 mile S of Shanks Head, and three rocks, close to the E shore, with depths of less than 1.8m, lying between 7 and 7.5 miles S of Shanks Head, and three rocks, close to the E shore, with depths of less than 1.8m, lying between 7 and 7.5 miles S of Shanks Head. There are depths of 120 to 160m in the entrance of Thompson Sound.

A peninsula, indented on its N and S sides by small coves, lies about 3.2 miles S of Shanks Head. Neck Cove, the N cove, is blocked by rocks and is exposed. Deas Cove, the S indentation, though small, affords sheltered anchorage, in depths ranging from 11 to 29.3m, for all but strong N or NW winds. On the W side of Deas Cove, the cliffs are steep-to, but the E side is fronted by a bank that extends offshore. There is anchorage for vessels with local knowledge, in a depth of 18.3m, about 0.1 mile off the sandy beach at the head of Deas Cove.

12.21 Bradshaw Sound is entered at the S end of Thompson Sound, between Richards Point and Evans Head, nearly 1 mile SSE. Between Sharp Head, lying 4.5 miles ENE of Richards Point, and Macdonell Island, about 1 mile further ENE, there is a bay where anchorage may be found. This anchorage lies about 0.1 mile WNW of the NW point of Macdonell Island, in a depth of 29.3m.

Precipice Cove, which lies E of Macdonell Island, is bound by high cliffs. There is a depth of 9.1m in the entrance, lying between Macdonell Island and an islet lying close N of Gardener Head.

Gaer Arm, the SE arm of Bradshaw Sound, projects about 3 miles SSE from its entrance, between Gardener Head and Glyn Point, about 1 mile SW. A rock was reported to lie about 0.5 mile WSW of Gardener Head. Vessels with local knowledge can obtain anchorage at the head of Gaer Arm in Shoal Cove. This anchorage, in depths of 11 to 25.6m, lies about 0.5 mile W of the three islets, lying about 1 mile from the arms head.

12.22 Doubtful Sound (45°16'S., 166°51'E.) is separated from Thompson Sound, to the NE, by Secretary Island. Its entrance, between Nea Island (Nee Island) and Febrero Point, 2 miles SW, with high mountains on either side, presents a wide opening from sea. This entrance is easily made out from a considerable distance. All Round Peak and Mount Grono, on Secretary Island, are prominent. Hares Ears, lying 0.3 mile N of

the Febrero Point, are two notable peaked rocks. Upon close approach, the Nea Islets (Nee Islets) will be seen projecting 1 mile S from the N entrance point. From the offing, Solitary Cone, lying nearly 14 miles SW of the entrance to Doubtful Sound, is conspicuous.

Doubtful Sound projects about 17.5 miles SE with three arms that each project SW, named, First Arm, Crooked Arm, and Hall Arm; these areas are all marine reserves.

12.23 Islands and dangers within Doubtful Sound.—The **Shelter Islands** (45°17'S., 166°53'E.) represent a rocky group that lie about 2 miles SSE of the N entrance point of Doubtful Sound and the Nea Islets (Nee Islets). A reef, awash, lies 0.2 mile SW of the N Nea Islet (Nee Islets). There is a channel, with a least depth of 24m, through the middle of the Shelter Islands. However, this channel and the channel between the Shelter Islands and Bauza Island, close S, is not recommended.

Bauza Island lies in the center of Doubtful Sound, roughly 2 miles within the entrance, and there is deep water on either side. The S channel, Gaol Passage, is the better channel, as it is wider and deeper.

Snug Cove, located at the head of First Arm, affords anchorage, in a depth of 22m, sand and mud, about 0.2 mile from the beach at its head.

Blanket Bay, which affords anchorage for small vessels with local knowledge, indents the S shore of Secretary Island.

Common Head is the SE end of Secretary Island; between it and Wood Head, 1.2 miles SE, is a channel leading to Thompson Sound. Seymour Islet, with a smaller islet off its N side, lies in this channel. Omapere Rock, with a depth of 1.5m and steep-to, lies about 0.3 mile SSW of Common Head. Tidal currents are reported strong between the rock and Seymour Islet.

Malaspina Reach represents the main part of Doubtful Sound; it is deep throughout, affording no anchorages.

Crooked Arm (45°22'S., 167°03'E.) is entered between Ransom Head and Kellard Point through an entrance nearly 0.5 mile wide. Vessels with extensive local knowledge can obtain anchorage at the head of Crooked Arm, in Haulashore Cove, in a depths of 14 to 30m, within 0.3 mile of the beach.

Deep Cove is located at the head of Malaspina Reach, about 6.5 miles SE of the entrance of Crooked Arm. Halls Arm extends about 4.5 miles SW from the entrance of Deep Cove. The N side of Deep Cove is formed by a precipice, with waterfalls on each side of the cove and at its head. No anchorage is available in Deep Cove.

A wharf, about 41m long, with a dolphin and bollard off each end, lies on the W side of the cove. There is a depth alongside the wharf of 15.4 to 17.0m.

Halls Arm is entered between Davidson Head and a small cliffy isthmus; depths within are great. A stretch of beach made of sand and shingle extends along the SE side of this arm.

Matai Island lies close to the NE shore of Malaspina Reach, about 1 mile SE of Wood Head.

Fergusson Islet lies in mid-channel about 0.7 mile W of **Solitary Cone** (45°24'S., 167°07'E.). Elizabeth Island lies close SE of Fergusson Islet; its N end is reported to extend 0.2 mile further than charted. Vessels normally pass W of Fergusson Islet and Elizabeth Island. The passage E of these islands has not been surveyed.

Rolla Islet fronts the entrance to Deep Cove, about 0.2 mile NW of its W entrance point. Tarawera Rock lies between the islet and the point, and it has a depth less than 1.8m. A reef, awash, lies in the entrance to Hall Arm, about 0.6 mile SW of Rolla Islet.

12.24 Peninsula Point (45°22'S., 166°46'E.) is a salient point that lies about 6 miles SW of the entrance to Doubtful Sound; the shore between is steep, cliffy, and overlooked by high mountains. From Peninsula Point, the shore heads 1 mile S to Castoff Point, the N entrance point of Daggs Sound.

Daggs Sound is entered between Castoff Point and Towing Head, 1.5 mile SW. The sound leads about 4.5 miles SE from its entrance, where it divides into a NW arm and a SE arm.

Anchorage Arm, the NW arm, is entered between Otago Point and Seventy Fathoms Point, 0.5 mile E. The SE arm is entered between Seventy Fathoms Point and Schooner Point, 0.1 mile S. In the entrance and for 1.2 miles within it, there are depths of 31 to 55m. However, as the channel narrows, about 2 miles within the entrance, depths increase to 100 to 184m.

Vessels with local knowledge can obtain good anchorage at the head of Anchorage Arm, in depths of 22 to 33m, mud, about 0.2 mile off a sandy beach.

The Towing Islets lie on a spit of foul ground extending about 0.3 mile NW from Towing Head. Four Fathom Bank, with a least depth of 7.3m, lies in mid-channel, about 2 miles within the entrance. A steep-to rock, with a depth of 2.7m, lies about 0.2 mile WNW of Schooner Point.

Breaksea Sound, fronted by Breaksea Island, is entered about 13 miles SW of Daggs Sound and it is joined with Dusky Sound S by Acheron Passage. The entrance to Breaksea Sound is narrow and bound by high land, making identification difficult until close upon it.

The recommended channel into the sound lies N of Breaksea Island. It is about 1 mile wide and apparently free from dangers in mid-channel, except for a 5.5m shoal reported to lie about 0.5 mile SSE of Oliver Point. The channel between Breaksea Island and the four small islets S of Breaksea Island is not recommended, as it is narrow and encumbered by dangers.

The Gilbert Islands are two distinct groups more than 0.5 mile apart projecting off the NE shore of **Resolution Island** (45°41'S., 166°39'E.). The only anchorage among these islands is in Stevens Cove, which lies on the W side of the S entrance point to Breaksea Sound. At this anchorage, a vessel of moderate size with local knowledge can find anchorage, in a depth of 7.3m, with its stern secured to trees. This anchorage is approached between the two E Gilbert Islands.

Entry Island lies about 1 mile E of the E Gilbert Islands. A submerged rock was reported to lie in the channel SW of Entry Island. From the vicinity of Entry Island, Acheron Passage leads 8.5 miles S to Dusky Sound, between the E coast of Resolution Island and the mainland. Alternately, from E of Entry Island, Breaksea Sound continues ENE for about 8 miles to Chatham Point, where it separates into a NE and E arm known, respectively, as Vancouver Arm and Broughton Arm. Foul ground was reported to extend 0.2 mile NW of the shore NE of Chatham Point.

Anchorage.—Good anchorage may be found, by vessels with local knowledge, about 3 miles E of Entry Island in Beach Harbor fronted by the Harbor Islands, which form its NW side. There is confined well-sheltered anchorage, in a depth of

21.9m, off a sandy beach between the S Harbor Island and the mainland. This anchorage may be approached either S of the S Harbor Island or around the N end of the N island, which is the better passage.

A vessel of 1,000 gt found sheltered anchorage, in a depth of 31.1m, mud, off the head of Broughton Arm, with 0.1 mile of swinging room.

12.25 Resolution Island (45°41'S., 166°39'E.) separates the entrance of Breaksea Sound from that of Dusky Sound. The Five Fingers Peninsula, joined to the NW shore of Resolution Island by a narrow neck of land, extends about 8 miles SW from the island. Five Fingers Point, the SW end of the peninsula, is easily made out from the N. Several high pointed rocks project 0.4 mile SSW from the point, and when seen from various directions, appear as the fingers of a hand. An islet, 21.3m high, lies about 1.7 miles NNW of Five Fingers Point. A reef, with above and below-water rocks, lies about 0.3 mile SW of the islet. A rock, awash, over which the sea breaks, lies about 0.7 mile SW from the islet. This rock should be given a berth of at least 1.5 miles.

Dusky Sound is entered between Five Fingers Point and South Point, about 4.5 miles S; it is encumbered with many islets and rocks, most of which are visible.

Aspect.—When approaching from the S, Chalky Island is a good guide to the entrance. West Cape, which will appear as a well-defined projecting point of moderate height, dropping a short distance within its extremity and then rising again with a gradual slope towards the high land, is a good mark.

Approaching from the N, Five Fingers Point is a good landmark.

Southwest winds roll a heavy sea into the entrance, but it is broken by the numerous islands; smooth water is found at a short distance within.

12.26 Anchor Island (45°46'S., 166°30'E.), lying in the entrance to Dusky Sound, is encompassed by many islets and dangers, many of which are best seen on the chart.

From the W to E, the Seal Islands, the Many Islands, Stop Island, and the Passage Isles are groups that lies within 1 mile of the S shore of Anchor Island. Thrum Cap and No Mans Islet lie about 1.5 miles S of the E summit of Anchor Island. An above-water rock lies 0.2 mile WNW of No Man islet. Several rocks and islets extend nearly 0.5 mile off the NE and N shores of Anchor Islet. The westernmost of these islands is the Petrel Islands. Parrot Island lies about 1.7 miles NNE of Small Petrel Island, the northernmost of the group.

A rock, with a depth of 4.6m, lies about 1 mile SW of Parrot Island. An islet lies midway between the NE end of Anchor Island and Pidgeon Island. A reef extends 0.2 mile S of the islet and a rock, which dries, lies upon a patch of foul ground extending 0.3 mile NE from the islet.

12.27 North side of Dusky Sound.—Anchor Island Harbor (45°46'S., 166°32'E.) lies almost in the center of Anchor Island; it affords good sheltered anchorage.

Directions.—Vessels with local knowledge entering via the W passage may pass on either side of Entry Islet, lying about 2.4 miles E of Five Finger Point. If entering N of Entry Islet, the SW end of Large Petrel Islet should be kept close aboard to avoid a submerged rock, with a depth of 3.7m, lying in mid-channel. Then she should pass on either side of an above-water rock lying almost in the middle of the harbor, 0.4 mile E by S of Entry Islet. Then the vessel should steer SE for the entrance and anchor, in a depth of 29.3m, about 0.1 mile offshore.

The passage from the E is wider, but it was reported that a 7.3m shoal lay about 0.1 mile E of the SE end of Large Petrel Islet.

Facile Harbor, lying on the N side of Dusky Sound, is a deep-water anchorage, formed by the W side of Resolution Island and by Parrot Islet and Pigeon Islet on the S.

The entrance to Facile Harbor lies about 4.5 miles NE of Five Fingers Point. There is safe anchorage in Facile Harbor, in depths of 27.4 to 60m.

A ledge of rocks, with a depth of 4.8m, lies in the center of the entrance to a cove in the NE corner of Facile Harbor. This cove is only available to small vessels with extensive local knowledge through a passage, 26m wide, on the W side of the ledge of rocks; the E passage is too narrow and crooked for navigation.

Cormorant Cove and Goose Cove lie in the bight N of Facile Harbor. Cormorant Cove affords snug anchorage, in moderate depths of about 18m. An islet lies 0.1 mile off the N entrance point of Cormorant Cove; a submerged rock lies 0.2 mile further NNW.

Directions.—Vessels entering Dusky Sound bound for Facile Harbor do so between Five Fingers Point and Anchor Island. The channel appears clear of dangers until within 1 mile of Parrot Island, where a 4.6m rock ledge lies about 1 mile SW of that island. To clear this ledge, keep the E summit of Anchor Island in line with the islet, about 1 mile NW of it, bearing 152°. This course leads NE of the ledge.

The NW end of the islet off **Whidbey Point** (45°42'S., 166°33'E.) in line with the SE end of the islet, 0.7 mile NE of it, bearing 045°, leads midway between the rock lying 1 mile SW of Parrot Island and the Five Fingers Peninsula.

In leaving Facile Harbor it will often be convenient, with W winds, to pass between Parrot Island and Pigeon Island. This channel is about 0.1 mile wide with depths of 9.1 to 16.5m.

12.28 Duck Cove (45°44'S., 166°40'E.) indents the S shore of Resolution Island; it lies about 2.7 miles ENE of Fixed Head. Fixed Head is the W end of an islet that lies about 1 mile ESE of Anchor Point, the E extremity of Anchor Island. The E entrance of Duck Cove, Porpoise Point, is reported to have a submerged rock and a rock, awash, lying 0.3 mile WNW and 0.1 mile SW, respectively, of it. In 1984, a 3.7m shoal was reported to lie 0.5 mile NW of Porpoise Point.

Duck Cove is easy to access and affords convenient anchorage under most circumstances. Mountains rise on either side of Duck Cove to heights of almost 914m and are separated at its head by a valley.

Bowen Channel lies between Resolution Island and Long Island, E of Porpoise Point.

Acheron Passage is the channel that joins Dusky Sound with Breaksea Sound, lying between the E shore of Resolution Island and the mainland. Acheron Passage is entered about 3 miles NE of Porpoise Point, between Passage Point and a point about 0.5 mile W. The Front Isles lie about 0.7 mile SSW of Passage Point. A submerged rock lies about 1 mile SSE of Pas-

sage Point. The Shag Isles lie about 1.7 miles SE of Passage Point. A submerged rock was reported to lie about 2.2 miles E of Passage Point.

The aspect of both sides of Acheron Passage is that of high, steep, sheer-sided, and forested mountains rising to heights of nearly 1,219m. The depths in this passage are quite great, however, there are several places where temporary anchorage can be found.

Temporary anchorage may be found in a small sandy bight close N of Passage Point, in a depth of 23.8m. However, it is exposed to SW winds and cannot be recommended when other shelter can be obtained. Anchorage may be found by vessels with local knowledge on the W side of Acheron Passage, about 2.5 miles NW of Passage Point, in depths 16.5 to 21.9m. Occasional Cove affords anchorage near the N entrance of Acheron Passage; the entrance to Breaksea Sound is just shut in from this anchorage.

Wet Jacket Arm extends ENE from about the middle of Acheron Passage, 3.5 miles N of Passage Point. Vessels with local knowledge can obtain anchorage near the head of this arm, in depths of 18.3 to 32.9m. In 1975, anchorage was found, in 38.4m, sand and mud, between Oke Island and the bay N. Oke Island lies about 5 miles within the entrance of Wet Jacket Sound.

Directions.—Vessels with local knowledge entering by the N passage, after passing Anchor Island, should steer through the channel between its E end and Resolution Island. Known dangers in this passage include the rocks on each side of the islet midway between Parrot Island and the E end of Anchor Island, Anchor Point, and the 16.5m shoal lying midway between Anchor Point and the Useless Isles. Anchor Point should be given a berth of at least 0.1 mile.

12.29 South side of Dusky Sound.—South Point (45°49'S., 166°28'E.) is the S entrance point of Dusky Sound and the bay close E of the point is unsurveyed. A reef of rocks lies about 3 miles ENE of South Point.

Caution.—The inshore area between South Point and Cape Providence has not been fully surveyed. Deep draft vessels should remain seaward of the 100m curve and avoid areas which shoal to less than 100m.

Pickersgill Harbor lies 5 miles ENE of South Point; Crayfish Island (45°47.5'S., 166°34.6'E.) lies close off its W entrance point. The best channel to enter the harbor lies E of Crayfish Island, avoiding the foul ground that extends about 0.1 mile NNE from the harbor's head and the foul ground projecting 100m S from the SE end of Crayfish Islet. This entrance channel is about 100m wide and within it, about 0.1 mile offshore, there is confined anchorage for vessels with local knowledge, in a depth of 27.4m.

Cascade Cove (45°48'S., 166°36'E.) affords good anchorage, in 15 to 27m, approximately 1 mile from the head of the cove, where there is a landing place on a sandy beach. Several hazards in the approach can best be seen on the chart. Local knowledge is recommended. Cascade Cove is entered between Wales Point (45°47.7'S., 166°35.8'E.) and Heron Island, which lies approximately 0.1 mile E. The approximate mid-channel depth was reported to be approximately 12.8m. The passage E of Heron Island is deep but is obstructed by a 9.3m bank on which lies a rock, drying 1.5m,marked by Cascade Cove Beacon. Shallow patches extend close NE and SSE from Heron Island.

There are three main islands that front this S shore of Dusky Sound, namely, Indian Island, Long Island, and Cooper Island. These three islands, which extend from off Cascade Cove to nearly the head of the sound, have deep-water channels both N and S of them.

The channel S of the islands is known as Cook Channel. The channels between the islands are encumbered with many dangers. Nine Fathoms Passage, with depths of 4.6m and 100m wide, lies between the E end of Cooper Island and the shore S. Rocks line both sides of this passage.

The head of Dusky Sound ends in two coves, the N, Supper Cove, and the S, Shark Cove. Vessels with extensive local knowledge can obtain anchorage in either of these two coves.

Directions.—Vessels with local knowledge entering Dusky Sound via the S passage from the W, should enter with the S side of Anchor Island in line with the 457m summit near the center of Long Island, bearing about 089°. This course leads about 1.5 miles N of the rock, awash, lying about 2.7 miles WNW of South Point. When Five Fingers Point bears 030°, vessels should change course SE and pass midway between the Seal Islands and the shore S.

Vessels approaching from the SW should steer with the 414m summit of Anchor Island in line with Mount Clerke, bearing about 056°, which leads about 1.2 miles SE of the rock awash. Having entered the sound, vessels should keep to the S shore until reaching Thrum Cap, when course should be changed N to avoid the rock off the W side of Indian Island, when course can then be made for the entrance to Duck Cove.

12.30 Cape Providence (46°01'S., 166°28'E.) lies about 12 miles S of South Point and the intervening shore is high. This shore should be given a berth of at least 2 miles, as shoal ground is reported to lie 1 mile off it. Sugarloaf, an above-water rock, lies close off the cape. Foul ground projects SW of the Cape. A 29.3m shoal, whose position is approximate, lies about 6 miles SSW of Cape Providence.

A bank, with depths less than 183m, lies centered about 14 miles SW of the Cape. A depth of 23.7m was reported about 17.5 miles WSW of Cape Providence. A depth of 33m lies about 13 miles W of Cape Providence in approximately 46°00'S, 166°10'E. A rock was reported to lie roughly 1.2 miles SSW of Cape Providence.

Chalky Inlet (Dark Cloud Inlet) is entered between Cape Providence and Gulches Head, 6.5 miles SE.

Chalky Island, which lies in the entrance to the inlet, is notable for its white cliffs; they serve to indicate the inlets entrance. Drop Point is the NE end of Chalky Island; Pinnacle Rock, along with several other rocks, extend 0.2 mile E and N from it. Sealers Bay indents the N shore of the island, and Bay Rock lies in its entrance. There are rocks on either side of the bay and kelp in its entrance.

Finger Rocks and Zero Nugget lie close off the N end of Chalky Island. A rock, with a depth of 11m, over which the sea breaks, lies about 1 mile W of Zero Nugget. The Passage Islands lie N of Chalky Island, separated from it by Bad Passage. The larger of the two Passage Islands is rock-fringed.

Great Island, lying N of the Passage Islands and separated

from it by Return Channel, is joined to the mainland NW by a sandy bar. Return Rock, a pinnacle with a depth of 1.5m, lies off the S end of Great Island.

12.31 Table Rock (46°06'S., 166°32'E.), brown, low, box-like, and conspicuous lies about 2 miles SSW of the SE end of Chalky Island. A shoal, with a depth of 4.6m, lies about 0.7 mile ENE of Table Rock. A depth of 7.3m exists about 1 mile NNE of Table Rock; the charted position is approximate.

Balleny Reef, which breaks heavily, lies about 2.5 miles SE of Chalky Point, the SE end of Chalky Island. Broke-adrift Passage lies between the reef and Gulches Head; it has an irregular rocky bottom.

A 9.1m shoal was reported to lie 1.5 miles S of Gulches Head. A depth of 12.2m lies 0.3 mile S of this position; two 7.3m shoals were reported to lie about 1.2 miles W and 1.5 miles WNW of the same head, but their existence is doubtful. A rock, awash, lies 0.3 mile S of the head.

Chalky Island divides the entrance of Chalky Inlet into Western Passage and Eastern Passage.

Vessels with local knowledge using Western Passage should give Cape Providence a berth of about 2 miles so as to avoid the dangers S and SW of it. Care should also be taken to avoid the 11m rock lying 1 mile W of Zero Nugget. Vessels generally steer a NE course through Western Passage fairway until Return Channel opens, taking care when rounding Great Island to avoid Return Rock.

Eastern Passage, which lies between the SE point of Chalky Island and Gulches Head, about 2.5 miles SE, is the preferred channel into Chalky Inlet for vessels with local knowledge approaching from S, entering through Broke-adrift Passage or between Chalky Point and Table Rock. The E shore of Chalky Island should be given a good berth. Care must be taken to avoid the 7.3m patch that was reported to lie about 0.7 mile S of Chalky Point.

Caution.—Floats marking the positions of crayfish pots are found throughout the inlet; heavier concentrations in the bays and fjords are used as shipping stations. Crayfish pot floats can often be encountered over rocky features well offshore.

12.32 South Port (46°03'S., 166°38'E.) is entered between the Garden Islets and Reef Point through an entrance narrowed by islets and rocks to less than 0.1 mile. Outer Rock, awash, lies in the center of the entrance at the NE tip of foul ground extending E from the Garden Islets. Foul ground projects SW from Reef Point.

Anchorage Cove, lying close SE of Reef Point, affords sheltered anchorage, in depths of 16.5 to 20m, mud, about 0.1 miles offshore.

Directions.—Entering South Port to anchor via Eastern Passage, vessels should pass N of the Garden Islets and Outer Rock, then head up the bay keeping within 0.1 mile of the E shore. The submerged rock lying W of Reef Point may be passed close to, however, if it is not seen, then Reef Point must be kept within less than 0.1 mile until this rock is passed. When changing course into Anchorage Cove, Reef Point must not be rounded closely.

Those vessels entering by Western Passage, when Return Channel is open, will see Stripe Head lying 1 mile N of Reef Point; course should be shaped midway between it and the Garden Islets. As soon as the rock, awash, in the entrance is passed, vessels should proceed as directed above.

North Port (45°59'S., 166°36'E.) lies between the NE end of Great Island and Little Island. Ship Entrance, S of Little Island, is about 100m wide and steep-to on either side.

Vessels with local knowledge can obtain landlocked anchorage, in a depth 25.6m, mud, about 0.1 mile W of Little Island. Care must be taken to avoid the rock, awash, about 0.1 mile E of the anchorage.

Edwardson Sound, the NE arm of Chalky Inlet, is bound on either side by steep and rugged mountain ranges. There are depths exceeding 183m in its central part. In 1984, a dangerous rock was reported to lie about 100m off Divide Head, the E entrance point. The sound terminates in Lake Cove, where there are moderate depths for anchorage.

Cunaris Sound, the E arm of Chalky Inlet, is deep with the Small Craft Harbor Islets lying near the center of its entrance. Small vessels with local knowledge can obtain anchorage on the SW side of the Small Craft Harbor Islets in a cove, in a depth of 14.6m.

Caution.—Some shoaling is evident in the area S and E of the islands. It is in this area of shoals that a pinnacle, with a minimum depth of 2.1m, rises from surrounding depths of 30m. This shoal appears with very little warning close to deep water. Large vessels or those without local knowledge should pass N of the islands when proceeding to Cunaris Sound.

12.33 Preservation Inlet represents the southernmost of The Sounds that indent the SW shore of South Island; it is entered between Gulches Head and Puysegur Point. Gulches Head rises to a height of 85m at its E end, from which a reef projects about 0.2 mile SE. A 9.1m and a 12.2m shoal lie about 1 mile S of Gulches Head.

Vessels approaching Preservation Islet from the S should have little trouble identifying it as it is the first opening seen.

Balleny Reef lies about 1 mile SSW of Preservation Inlet. Caution should be exercised while navigating into the inlet when approaching from the SSW due to shoals, which consist of isolated rock outcrops rising from a sandy bottom, extending off the S and E sides of the reef.

Treble Mount (46°01'S., 166°43'E.) has the appearance from the W of twin peaks and provides a good mark for identifying the entrances of Chalky Inlet and Preservation Inlet.

Tides—Currents.—The flood current is barely felt in Preservation Inlet. This current runs E between Gulches Head and Balleny Reef, setting SE across the entrance. The ebb current sets SW out of the inlet. Both the flood and the ebb attain rates of about 1 knot.

Coal Island fronts the SE part of Preservation Inlet and it is joined to the mainland SE by a shallow bank. Steep-to Islet is joined to the NE end of Coal Island by a reef. A dangerous steep-to reef, over which the sea does not always break, lies nearly 1 mile NNW of Pinnacle Rock, at the N end of Coal Island.

The Spit Islets are a group of islets and rocks lying about 1.5 miles N of Pinnacle Rock. This group is joined to the mainland NNE by a drying sandspit.

Cavern Head (46°05'S., 166°40'E.) is a rugged and broken point on which a swell is always breaking. Several rocks, above-water and submerged, lie W of the head.

The Cording Islets are a chain of islets and rocks that lie in the fairway about 1.5 mile ENE of Cavern Head. The channels through this group can only be used by vessels with extensive local knowledge. An above-water rock lies on the end of a reef that extends about 0.3 mile S from the SE Cording Islet. Whale Rock, lying about 1 mile SE of Cavern Head, is awash and steep-to.

12.34 North side of Preservation Inlet.—The shore E between Gulches Head and Cavern Head, about 5 miles NE, forms a bay with a sandy beach at its head.

Welcome Road, which fronts Prices Beach, affords temporary shelter during NW winds in depths of 11 to 16m.

Cuttle Cove (46°04'S., 166°41'E.) lies about 1 mile NNE of Cavern Cove; it affords sheltered anchorage for small vessels with local knowledge, in depths of 9 to 16m, between the shore and Single Tree Islet. A 5.5m patch lies between Single Tree Islet and the S entrance point of Cuttle Cove. Brokenshore Bay lies NE of Cuttle Cove separated from it by Bounding Point. A crescent-shaped islet lies off its E entrance point. A submerged rock lies midway between this islet and the largest of the Cording Islets.

12.35 South side of Preservation Inlet.—Otagos Retreat (46°09'S., 166°38'E.) is entered E of the S tip of Coal Island, between it and the mainland. Small vessels with extensive local knowledge can obtain anchorage in the entrance, in depths of 14.6 to 16.5m. Also, good anchorage may be found inside Otagos Retreat, in a depth of 7.3m, in calm water. About 1 mile within the entrance of Otagos Retreat, a bar of sand extends across the channel.

Fishing Bay is formed between the NE end of Coal Island and Steep-to Island, close NE and joined to it by a reef. Small vessels with extensive local knowledge can obtain anchorage in Fishing Bay, in depths of 11 to 18.3m, about 0.1 mile off the NW side of the reef, but the anchorage cannot be recommended as depths decrease rapidly as it is approached.

Revolver Bay (46°05'S., 166°45'E.) is entered about 2.7 miles ENE of the N end of Steep-to Island; it has moderate depths. Vessels with local knowledge can obtain anchorage, in depths of 21.9m, 0.2 mile from its head on the W side. A depth of 0.4m was reported to lie in the middle of the bay, about 0.25 mile from its head.

Long Sound is entered NE of Revolver Bay; it projects about 13 miles NE from its entrance at **Narrow Bend** (46°04'S., 166°46'E.). Harries Bay lies about 2 miles within the sound's entrance, close N of Sandy Point. This bay is deep, but vessels with local knowledge can obtain anchorage, in a depth of 27.4m, 0.1 mile from the beach. Shoal water projects 0.1 mile off Sandy Point. A rock, with less than 1.8m, lies 0.2 mile NW of Sandy Point.

Jane Coves lies 2 miles NNW of Sandy Point. Trevaccoon Head is a high, cliffy promontory about 2.5 miles NE of Jane Coves, with Last Cove about 0.7 mile further NE. Small vessels with extensive local knowledge might find shelter in Last Cove.

Only islands lie above 3 miles SW of the head of Long Sound. Vessels with local knowledge might find shelter inside these islands.

12.36 Marshals Rock (46°10'S., 166°38'E.), flat-topped and conspicuous, lies about halfway between Puysegur Point, the S entrance point of Preservation Inlet, and Windsor Point, 3 miles SSE. Submerged rocks lie N and S of Marshalls Rock.

Long Reef Point (46°13'S., 166°41'E.) represents the SW end of South Island, and 27 miles E to Sand Hill Point the shore is low, rocky, and unexamined. Mount Aitken, 1189m high, backs this stretch of shore about 14 miles ENE of Long Reef Point.

The Green Islets, which are green in color and rock-fringed, lie close off a point, 88m high, about 4.5 miles ESE of Long Reef Point. The Big River empties out into the sea about 0.5 mile NW of Price Point and the river may be made out by the gap in the mountains caused by its large valley. Reefs are reported to project 1 mile off the coast between Price Point and Long Point.

Sand Hill Point (46°15'S., 167°21'E.) is comprised of sand dunes backed by bush and it is 17.4m high. A detached reef, awash, lies with its seaward end about 1.2 miles SSE of Sand Hill Point.

Tewaewae Bay is entered between Sand Hill Point and Pahia Point, about 15 miles ESE. In S or heavy SW gales, the sea breaks all over this bay.

Mid Bay Reef, which breaks occasionally, lies almost in the center of the bays entrance. Tewaewae Bay is largely unsurveyed and it is unsuitable for anchorage except in its W part. A heavy swell rolls in from the S, even with E or W winds.

Mussel Beach, at the S end of which is Port Craig, lies about 3 miles NNE of Sand Hill Point. Timber is loaded in good weather conditions about 1 mile NNE of Port Craig. Vessels anchor in a depth of about 8.2m.

Foveaux Strait

12.37 Foveaux Strait separates South Island from Stewart Island; it has a navigable width of not less than 10 miles.

The N shore of the strait, from Bluff Harbor to the W entrance of Tewaewae Bay, a distance of nearly 50 miles, is fringed with islets and reefs. Ruapuke Island lies almost in the center of the strait and is almost encompassed on all sides by islets, reefs, and tide rips, making the approach from E somewhat difficult to someone not familiar with the strait.

Local magnetic anomalies.—The normal magnetic variation may be decreased by up to 3° in the W approaches to and in the W entrance of Foveaux Strait. In coastal waters of the strait, further anomalies exist. In open waters and at the E end of the strait, the normal variation may be increased or decreased by up to 1°, while in the area 5 to 10 miles S of Ruapuke Island, it may be increased by up to 2°.

Winds—Weather.—Irrespective of local influences, the prevailing winds on the S shore of New Zealand are from the NW through SW. Gales are frequent from this quadrant; however, those from NW are frequent in all seasons. There have been times when a gale will blow for many days with lulls only a few hours long.

Tides—Currents.—The flood current sets through Foveaux Strait from the W to E, and is strongest between Bluff Harbor and Ruapuke Island, attaining a velocity of 1 to 3 knots. This current influence is felt as far as Long Point, 45 miles E of Ruapuke Island. Between Stewart Island and Ruapuke Island, the flood sets SE running parallel to the shores of the former. The

ebb runs exactly opposite to the flood current.

The E current running between Pahia Point and the N extremity of Stewart Island, begins to run from 30 minutes to 2 hours after LW by the shore. The turn of the current and duration of SW is dependent upon the direction of the wind, with W winds advancing the time the tide turns. At the E entrance to the strait the E current begins to run about 3 hours after LW by the shore. Both currents run for about 6 hours.

Along the NE coast of Stewart Island, the SE current runs for 1 hour 20 minutes after HW at Port William, which is situated about 13 miles SE of Black Rock Point, the N extremity of this island.

The strength of the tidal current varies from 0.5 to 2.5 knots; in the narrowest part of the strait, between Ruapuke Island and Bluff Harbor, they sometimes attain a rate of 3 knots.

With the flood, the current coming from S strikes the S end of Stewart Island and divides. One part runs N along its W side and then E through Foveaux Strait; the other sets NE along the S side of the island, as far as Port Adventure, at its SE end, where the currents meet again and flow E. With the ebb, the current takes a contrary direction, splitting near Port Adventure; it sets NW through Foveaux Strait, down the W side of the island, and SW along the S side as far as Southwest Cape, the SW extremity of the island.

The strength of the currents off the coast is from 0.5 to 1.5 knots, except in the narrow passages; thus, inside the group of islands off **Port William** (46°51'S., 168°05'E.) and Paterson Inlet, about 3.5 miles S of Port William, they attain a rate of 1 to 3 knots, and in the passage between Southwest Cape and Big South Cape, about 2.7 miles NW, 4 knots during springs.

Directions.—The directions for both the E and W approaches to Foveaux Strait will be found at the end of the narrative of the strait. The descriptive sequence is divided into two parts, the N side and the S side. The description of the N side begins with Centre Islet, SE to Waipapa Point, including Ruapuke Island. The description of the S side begins with Solander Island, then Stewart Island, and other off-lying islands that comprise the S side of Foveaux Strait.

Caution.—Because of the unique pinnacle formation of underwater features in these waters, other dangers may exist, in addition to those shown on the chart. Mariners without local knowledge should exercise caution in depths less than 100m W of 167°48'E. To the E of this longitude, deep-draft vessels off the recommended tracks are advised to remain in depths greater than 30 fathoms. Vessels navigating in unfrequented waters of less depth should keep a good lookout for surface disturbances or unusual soundings which might indicate possible danger.

12.38 North side of Foveaux Strait—Centre Island (46°27'S., 167°51'E.) lies about 10.5 miles SE from Pahia Point; it lies close to the S limit of islets and reefs projecting off the N shore of the Strait. Centre Island is a good mark for avoiding these dangers. Midway between the island and shore N are two reefs. Hapuka Rock, 0.3m high, lies about 1 mile SW of the W end of Centre Island. Fish Reef, over which the sea breaks, lies about 6 miles WNW of Centre Island; it is steep-to on its S side.

Escape Reefs lie on a bank about 4 miles ESE of Centre Island. Rocks surround the bank. A foul area, best shown on the chart, lies NNW of Escape Reefs.

Howells Point, the E entrance point of Colac Bay, is cliffy with sand hills, 35m high, on its S side.

Pig Island, 8.2m high, lies about 2.5 miles SW of Howells Point, the shore between being foul. Pig Island is surrounded by rocks.

Local magnetic anomalies.—The normal magnetic variation is increased by up to 6° or decreased by up to 8° NE of Centre Island.

Caution.—It is recommended that vessels not pass within the 37m curve off this section of coast as the dangers are numerous. Fish Reef should be given a berth of at least 2 miles. Centre Island and Escape Reefs should be given a berth of at least 3 miles.

New River Harbor is entered between Entrance Point and Steep Head, about 2 miles SW. A shifting bar, with a depth of 2.7m, lies between a sand spit, on which there are heavy breakers, and Steep Head. Inside the bar there are depths of 3.7 to 4.3m. New River Harbor can only be used by small vessels with extensive local knowledge as there are rapid tidal currents and a shifting bar and channel. The town of Invercargill lies on the E shore of New River Harbor, about 7 miles above the entrance.

Bluff Harbor (46°36'S., 168°21'E.)

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12.39 Bluff Harbor lies on the NE side of Bluff Hill in Foveaux Strait; Bluff is the only deep-water port S of Port Chalmers. The harbor is sheltered from prevailing W winds. Bluff is the harbor for the town of Invercargill.

The safest time to enter the harbor is at high water. Strict attention should be paid to information from the signal station on Stirling Point. No vessel should attempt to enter without a pilot unless in possession of local knowledge.

The available space for anchorage is narrow and confined; for vessels of moderate size, it does not extend much above 1 mile NW of the entrance.

South Port NZ

http://www.southport.co.nz

Winds—Weather.—Fogs are not frequent but may be expected during spring and autumn.

Tides—Currents.—The port of Bluff is a tidal port; major shipping movements occur only at slack water. Off Stirling Point, in South Channel, the ebb current attains a rate of 5 to 6 knots; the flood current attains a rate of 3 to 4 knots. Between Tiwai Point and Burial Point, both the ebb and flood currents attain a rate from 5 to 7 knots. Both currents are weak off Main Wharf, but the ebb attains a rate of 1 knot. In deep waters NE of Middle Bank, the flood attains a rate of 5 to 6 knots, the ebb 4 to 5 knots. The currents run evenly in the direction of the channel, with heavy tide rips off Stirling Point and Channel Rocks.

Depths—Limitations.—Two channels are used for approaching Bluff Harbor. The S channel has a minimum depth of 12.5m. The N channel has a minimum depth of 7.2m. The

maximum dimensions for vessels entering the port are a length of 225m and an overall beam of 32m.

The maximum permissible draft in the entrance channel is 9.7m at HW and 8.0m at LW; the HW draft may be increased to 10m, depending on the height of tide. Vessels drawing 9.7m can be accommodated at the E end of the Town Wharf and Island Harbor; vessels of maximum draft can berth at Smelter Wharf. Vessels may enter, berth, or depart during hours of darkness in good weather only.

The Main Wharf, sometimes called Town Wharf, is 552m long. Berths are numbered 11, 12, and 14 from the E. Oil tankers berth at No. 11; bitumen tankers berth at No. 12. Bulk fertilizer is also discharged at the Main Wharf. On the S side of the wharf, the W part is used for berthing by the fishing fleet.

At Island Harbor there are nine berths, numbered as shown on the chart, except for No. 7 and No. 8, which are situated on the NE side of reclaimed land N of No. 5. The maximum size of vessel that can be accommodated and normal use of each berth is given in the accompanying table.

Bluff Harbor—Berth Information

Berth	Length	Draft	Use
1	160m	7.0m	Fishing industry
2	190m	7.7m	Bulk grain
2X	70m	6.0m	—
3	213m	9.7m	Ro-ro and breakbulk
3A	153m	9.2m	Sulfuric acid
4	213m	9.7m	Timber
5	213m	9.7m	General cargo
6	135m	7.7m	Supply and fishing
7	100m	8.0m	—
8	230m	9.7m	Wood chips, coal, and grain
11	210m	9.7m	Petroleum products
12	183m	8.0m	Bitumen
14	183m	8.0m	—

The height of all the berths is 4.4m above MLWS, except No. 8 Berth, which has a height of 3.8m.

Tiawa Wharf lies cross channel from Main Wharf and Island Harbor. Vessels up to 11m draft and lengths to 225m may enter to berth, depending on tide. An aluminum smelter is situated at the berth. The road access to the wharf is 1200m from the shoreline.

Dog Island, which lies in the SE approach to Bluff Harbor, is fringed by a reef of rocks outside which are thick beds of kelp. The sea breaks heavily on its N and E sides. When passing to the E of Dog Island it should be given a berth of 3.5 miles; when passing to the S and W a berth of more than 1 mile.

A depth of 14.6m lies about 1.5 miles W of Dog Island.

Old Man Rock, over which the sea breaks, lies on the edge of kelp extending N of Dog Island. The Dogs Tongue is a rocky ridge that extends ENE from Dogs Island. A spit, with depths of 6.1m near the outer end, extends about 3.2 miles E from the E end of Dog Island.

Aspect.—There are two ways to enter Bluff Harbor, via South Channel or North Channel. South Channel is preferred, as North Channel is not buoyed and depths within it are less.

The Bluff, a headland with a height of 261m at Bluff Hill, about 3 miles SE of Shag Rock, forms a prominent feature in contrast to the level land in its vicinity and for vessels making Foveaux Strait from E. The headland is covered with scattered scrub and rocky outcrops on its W side and is bush-covered on its E side; it is connected to the mainland at its NW end by a low, narrow isthmus.

From **Stirling Point** (46°37'S., 168°22'E.), the shore surrounding The Bluff projects about 0.6 mile NNW to Burial Point, where the War Memorial lies. The wharfs front the town of Bluff; the Island Harbor wharves lie close NW.

A bank, with a least charted depth of 12.2m, lies about 0.5 mile off the entrance to South Channel in the white sector of the Entrance Light, between the bearings of 342° and 077.5°.

Entrance Shoal lies about 0.5 mile ESE of Stirling Point; it forms the E side of South Channel. With a heavy sea running, the shoals in the vicinity of Stirling Point form a mass of broken water with heavy breakers. Therefore, vessels should keep outside of the 10m curve.

Davey Shoal, with a least depth of 4.6m, lies on the E side of South Channel, about 0.4 mile S of Tiwai Point.

Channel Rocks, with a least depth of 3.7m, lie on the S side of the fairway, about 0.2 mile SW of Tiwai Point. Tiwai Point and its vicinity are fringed by foul ground, as best seen on the chart.

Pilotage.—Pilotage is compulsory for all vessels over 500 gt. Pilots board vessels from a launch equipped with VHF, 2.5 miles SSW of the Entrance Light, within its white sector. Vessels, other than those exempt from pilotage, must not proceed beyond Entrance Light without a pilot. Vessels should send their ETA 24 hours prior to arrival, confirming 4 hours in advance.

Pilots usually board vessels, except in bad weather, between 30 minutes and 1 hour before slack water, day or night. Tankers are generally berthed during daylight hours only. Arrangements regarding boarding will be made via radio or visual signal from the signal station or pilot launch.

In heavy W weather, a safe boarding area for the pilot, lying nearly 5.5 miles ENE of Dog Island Light, is sometimes used. Arrangements for the use of this anchorage will be made by radiotelephone or blinker light.

Coastal pilots, licensed to pilot vessels between the entrance to Otago Harbor and Milford Sound, including the sounds and coasts and harbors of Stewart Island, can be obtained with 24 hours notice.

Vessels stopping to pick up a pilot are warned not to approach the 10m curve too closely nor enter the red sector of the Entrance Light when within 1 mile of the light, especially during the flood as the current sets strongly onto Entrance Shoal.

Signals.—The signal station at Stirling Point is no longer manned; vessels about to enter the harbor should ascertain whether an outbound vessel is in the entrance channel by contacting Bluff Harbor Radio. A continuous listening watch on VHF channel 16 is maintained by Bluff Harbor Radio.

Anchorage.—In good weather, vessels waiting for the tide

to enter Bluff Harbor may obtain anchorage, in a depth of about 21.9m, about 2 miles WNW of Dog Island. A good anchorage for vessels delayed longer than 6 hours awaiting to enter Bluff Harbor lies about 5 miles E of Dog Island, in depths of 14.6 to 18.5m.

Shelter from severe weather may be obtained off Otaku Point under the lee of Stewart Island, less than 20 miles from the Bluff in 26m, with Saddle Point beacon bearing 324° or off Half Moon Bay in 12.8 to 16.5m. Anchorage can be found anywhere offshore between these points, with the quietest anchorage being found off the long beach adjacent to the Murray River.

The quarantine anchorage is an area enclosed by an arc of a circle, radius 3 miles, centered on Stirling Point, or other such area as indicated by the harbor authorities.

The explosives anchorage, as charted, for vessels carrying more than 5 tons of explosives, lies about 1 mile NNE of Dog Island. The recommended approach route is NW of the island. Reports have it that the harbormaster may designate explosives anchorages other than those charted and should be consulted on the matter.

An abandoned submarine telegraph cable lies between Dog island and the shore N.

Directions.—South Channel has a least depth of 8.8m on the leading line, but depths of 5.5m or less lie close NE of the line between Lighted Beacon No. 2 and Lighted Beacon No. 3; in addition, a vessel's draft is restricted owing to the strong tidal current off Channel Rocks. North Channel has a least depth of 6.1m in the fairway.

Vessels normally enter the channels so as to berth at SW, bows W. Vessels drawing 6.7m or more should enter South Channel at HW. If entering with a strong flood tidal current, great care must be exercised, especially when rounding the lighted beacon 0.2 mile N of Burial Point, as, if the bow gets into SW with the stern in the full strength of the tide, a vessel may be turned right around.

Caution.—Vessels should make due allowance for the strong currents present in the approach channels to the harbor.

An abnormal magnetic variation exists in the area between Island Harbor and Smelter Wharf.

Toetoes Bay (46°38'S., 168°41'E.) lies between Bushy Point and Waipapa Point, 14 miles ESE. Bushy Point, from which a light is shown, is low and has a conspicuous patch of scrub upon it.

12.40 East and south shores of Ruapuke Island.—Ruapuke Island (46°46'S., 168°31'E.) lies almost in the center of the E entrance to Foveaux Strait and, except for its NW side, dangers almost surround it. The center of the island is flat with a height of 41m, and there are hummocks on its N, S, and W ends. Also, the island is covered with stunted trees.

North Head (46°44'S., 168°32'E.), the N end of Ruapuke Island, is a cliffy promontory rising to a hummock, 62m high. There is a heavy tide race around North Head. Seal Rocks, the highest being 7.3m, with submerged rocks N and S of them, lie near the outer end of a sandy ridge, with depths less than 9.1m, which extends about 3 miles E from North Head. In heavy weather the sea sometimes breaks over the E part of the sandy ridge.

Foul ground extends up to 0.7 mile offshore between North Head and Observation Bluff, the E extremity of Ruapuke Island. Green Island, with a flat top, lies near the outer edge of a spit which extends about 1.7 miles E from Observation Bluff, Two islets lie between Green Island and the Bluff. A submerged rock lies about 0.7 mile NNW of Green Island. There is a depth of 2.7m between the above islets and Green Island.

Toby Rock, below-water, lies about 4 miles E of North Head; it is the most dangerous rock in this vicinity, due to it not being marked by kelp as are many of the other dangers. Fairchild Rock, with a depth of 4.6m, lies about 5.5 miles E of North Head, and a 4.9m patch lies about 1 mile ENE of it. These dangers, off the E shore of Ruapuke Island, should be approached with great caution.

The Breaksea Isles, comprised of two islets, are located over 1 mile SW of Green Island; they lie upon a reef surrounded by rocks.

The South Islets lie on a reef that projects about 0.5 mile S from South Point, the S end of Ruapuke Island. Depths of less than 9.1m project about 1 mile SSE of the end of the spit. Rocks project about 0.5 mile W from the W side of South Point. Kelly Rock, with a depth of 11m, lies about 1.7 miles SSW of South Point.

Henrietta Bay indents the SW shore of Ruapuke Island; foul ground projects 0.4 mile from its head.

The Hazelburgh Group lies on the S side of a bank with depth less than 11m. A 10.7m patch lies 0.7 mile S of the W end of the group.

Half Passage Rock, 16.2m high, with two drying rocks SE, lies about 1.2 miles W of the W end of the Hazelburgh Group. Two submerged rocks lie between the Group and Half Passage Rock.

Fife Rock lies about 1.7 miles NNW of Half Passage Rock. Lachlan Shoals, two separate groups, lie at the W limits of the shoals lying off the W side of Ruapuke Island. A 14.6m patch lies about 2.7 miles SW of Half Passage Rock. Several rocks, best seen on the chart, lie in the N approaches to Henrietta Bay.

Caution.—Vessels navigating in the vicinity of Ruapuke Island should maintain a good lookout. Unless a vessel is intending to anchor, Rupapuke Island should be given a wide berth. The passages between the many small islets and rocks should be left to small vessels with extensive local knowledge.

12.41 Northwest shore of Ruapuke Island.—Caroline Bay lies in the S part of the bight formed by North Head and a point about 2.2 miles SW. White Islet lies on a spit, with depths less than 11m, off the S entrance point of the bight. A 9.4m patch lies about 0.5 mile NW of White Islet. A bank, with a depth of 12.5m near its S end, lies about 1 mile W of White Islet.

Lagoon Bay is entered between White Island and the W point of Ruapuke Island. Tupis Island, 18.3m high, lies close off the S entrance point of the bay. Shoal water extends 0.3 mile NW from the islet.

Anchorage.—Vessels with local knowledge, approaching from the E and intending to anchor off Ruapuke Island, should pass from 5 to 6 miles S of Waipapa Point and when S of it the island will be generally seen. Green Island and Seal Rocks become visible from 6 or 7 miles. When about 0.5 mile from Green Island, vessels should pass around its N end, passing midway between it and the submerged rock about 0.5 mile NW, anchoring, in a depth of about 11m, sand, 0.4 mile W of

the N end of Green Island. Vessels should not proceed closer inshore, due to the foul ground that projects off the E shore of Ruapuke Island. Additionally, vessels should not attempt to reach the anchorage via S and W of Green Island, as depths are shoal SW of the island. With W or SW winds this anchorage is relatively secure, but with S winds a swell rolls in which may break over the islets that shelter it from that direction. Vessels should not lie here in E winds.

12.42 South side of Foveaux Strait.—The S side of Foveaux Strait is formed, from the W to E, by the Solander Islands, Stewart Island, and Ruapuke Island.

The **Solander Islands** (46°34'S., 166°53'E.) lie upon a bank with depths less than 100m. The E and larger of the islands rises almost sheer from the sea and has a notable peaked summit, 335m high. In clear weather this peak can be seen about 40 miles. It is wooded with the exception of its NE end which is a bare, white rocky face. There is a deep cave on the E side of the island and a large arch on its S end. Three rocks lie close off the N side of the E island, the easternmost being 7.6m high. Several large rocks lie off the S side. It was reported that there were signs of submerged rocks lying farther S.

The W Solander Island, lying about 1.2 miles W of the E island, has a barren appearance, attaining a height of about 152m. This island is guano covered.

Stewart Island (47°00'S., 168°00'E.), whose NE shore forms a major part of the S side of Foveaux Strait, is partly mountainous and thickly wooded. The shores of this island are fringed with many islets and rocks over which seas break.

An irregular mountain ridge, of which Mount Anglem is the highest peak, extends along Stewart Island's NE shore. The S end of Stewart Island is very mountainous though it doesn't attain the heights in the N part. Frazer Peaks, 427m high, and Smiths Lookout, 536m high, are prominent, bare granite peaks, lying 7.5 and 3 miles NE, respectively, of Southwest Cape.

12.43 West side of Stewart Island.—Rugged Point (46°43'S., 167°44'E.) is the NW end of Stewart Island. The Rugged Islets, a group of high, black, craggy rocks, worn by the sea, extend 1.5 miles NW from the point. Heavy tide rips extend from a distance seaward of the islets and depths of 44 to 55m have been found rounding them at a distance of 0.5 to 1 mile.

North Red Head is located 2 miles SSW of Putatara Point. About midway between the headland and a point 2.5 miles S, a reef, with rocks above and below water, extends about 0.8 mile from the coast.

Red Head Peak, a conspicuous bold and rocky peak, rises close behind the coast about 3 miles S of Rugged Point.

Codfish Island lies with its NW end about 4 miles W of Red Head and it is moderately high and flat-topped. High Rock, with submerged rocks close N and S of it, lies midway between Codfish Island and the shore E.

Sealers Bay, lying in the NE part of Codfish Island, affords confined anchorage, sheltered from W winds, in depths of 11 to 14.6m. The entrance points to this bay are rock-fringed.

Mason Bay is entered about 8.5 miles SE of Codfish Island between Mason Head and the Ernest Islands, about 5 miles SW. The NE end was reported to dry 1 mile. Look-Out-For-Reef, nearly awash, lies about 3.5 miles WSW of Mason Head. A dangerous rock, over which the sea seldom breaks, lies about 3 miles W of Richards Point. Shoaling was reported between the point and the rock.

The Ernest Islands are two red cliffy islands that lie close together and are almost joined to the mainland by a sandy neck.

Mason Bay affords anchorage, in depths of 5.5 to 7.3m, in its S part, sheltered from W and NW winds. A heavy sea rolls into this bay from the N.

The Mutton Bird Islands front the SW part of Stewart Island. There are clear passages among the Mutton Bird Islands, but the tidal currents run at a great speed making these unsurveyed passages hazardous. There are heavy tide rips at the N end. The Boat Group is the northeasternmost of these islands and is made up of three islets. The Brothers, two islets with a submerged rock about 0.5 mile N of them, lie about 1.7 miles S of the S islet of the Boat Group.

Mokinui Island (Moggy Island), the westernmost of the Mutton Bird Islands, is rock-fringed. A submerged rock, whose position is approximate, was reported to lie about 1 mile SW of the S end of the island. Wedge Island is the SW of the Mutton Bird Island, lying about 7 miles WNW of Southwest Cape, with Hidden Island, Long Island, and Evening Island between. A reef, on which there are above-water rocks, projects about 1.5 miles SW from the S end of Hidden Island. A patch of foul ground was reported to lie about 1 mile WNW and a 14.6m patch, the position of which is approximate, lies about 1 mile NNE of the N end of Hidden Island. Foul ground projects SW, about 1.5 miles, from the S end of Hidden Island.

Long Island, the largest island off this section of shore, is rock-fringed. An islet lies close off its N end. Evening Island lies close S of Long Island. A submerged rock lies about 0.5 mile SE of Evening Rock. There are strong tide rips in this vicinity.

12.44 South coast of Stewart Island.—Southwest Cape (47°17'S., 167°29'E.) is the promontory that forms the SW end of Stewart Island and the land in close proximity is high and bold, with a steep, rugged shore. There are strong tide rips close E of the cape.

Wilson Bay is entered about 5.5 miles E of Southwest Cape and it is exposed with tide rips in its entrance. Small vessels with local knowledge can obtain shelter in Burial Cove on the W side of the bay, about 1.5 miles NNE of its W entrance point.

Port Pegasus (47°12'S., 167°42'E.), which presents a broken appearance from sea, is fronted by three islands, Noble Island, Anchorage Island, and Pearl Island. Port Pegasus has several entrances requiring local knowledge for use. Acheron Passage, off the NW shores of Noble Island and Anchorage Island, joins the North Arm to the South Arm.

The main entrance channel, known as Broad Passage (Big Ship Passage), lies between Anchorage Island and Pearl Island and leads into North Arm. It has a least width of about 0.4 mile, with depths ranging from 32 to 47m in the fairway, and is free from dangers. Several rocks lie off the NE end of Anchorage Island.

Narrow Passage (South Passage) lies between the SW side of Noble Island and the mainland W. Pigeon House Hill, on the SW side of the passage, is notable. Rocks fringe the S side of Noble Island. Narrow Passage has depths ranging from 22 to

31m in the fairway and a least width of 125m.

Whale Passage is the NE passage leading between the NE shore of Pearl Island and the mainland. It has a least depth of 9.1m in the fairway and a least width of 135m. Orphans Rock lies 0.2 mile E of the entrance, with a submerged rock about 0.1 mile further S.

The NW shore of South Arm is indented by Sylvan Cove, Shipbuilders Cove, and Islet Cove. The SE side of South Arm is indented by Fright Cove. An islet, 15m high, lies in the entrance to South Arm. Micrometer Rock, above-water and surrounded by kelp, lies about 0.1 mile W of the islet. A shoal, with a depth of 3.7m, lies about 0.2 mile NW, and a submerged rock, marked by kelp, lies about 0.3 mile SW, respectively, of Micrometer Rock.

Anchorage may be found, in depths of 21.9 to 25.6m, midway between Micrometer Rock and Noble Island. The entrance to Shipbuilders Cove is encumbered with foul ground and rocks. A submerged rock, marked by kelp, lies about 0.3 mile E of the S entrance point of Shipbuilders Cove.

Acheron Anchorage (47°11'S., 167°41'E.), lying between the NW shores of Anchorage Island and Noble Island, and the mainland, is about 0.2 mile wide. The NE end of this anchorage is partially blocked by Tremulous Island and several islets and dangers NE to the mainland. Steamer Pass leads S of Tremulous Island; it is about 100m wide, with a depth of 12.8m in the fairway. Vessels with local knowledge can obtain sheltered anchorage, the best in Port Pegasus, in Acheron Anchorage, in depths of 16.5 to 20.1m, mud.

North Arm is fronted by Pearl Island; it has depths 21.9 to 47m. An islet, surrounded by kelp, lies near the head of this arm. Vessels with local knowledge can obtain anchorage, in a depth of 21.9m, close W of the above islet.

12.45 The **Lords River** (47°07'S., 168°08'E.) is entered between Surf Head and John Point, about 0.4 mile E. It is navigable by vessels with local knowledge for about 1 mile within its entrance, in depths 7.3 to 37m.

Owen Island is the largest of a group of rocky islands extending SE from John Point that aid in identifying the entrance of the Lords River. A 3.5m patch and a 0.9m patch, both marked by kelp, lie in the middle of the fairway about 0.4 mile and 0.5 mile NW of the NE end of Surf Head. Small vessels with local knowledge can obtain anchorage about 0.4 mile within the entrance, in a depth of 11m. The Lords River has not been extensively surveyed.

North Trap (47°22'S., 167°55'E.) fronts the S shore of Stewart Island, lying about 17.5 miles SW by S of the entrance to the Lords River, and is comprised of a reef of above and below-water rocks. A rock, 1.5m high, stands near the W end of the reef, and a rock, 0.9m high, near its E end, give North Trap the look of an overturned boat. Boomerang Breaker was reported to lie about 7 miles SSW of North Trap.

South Trap, a reef of above-water rocks, 1.2 to 1.8m high, and below-water rocks, lies about 10.5 miles S by W of North Trap. There are heavy breakers over this reef. Breakers have been reported E of North Trap and South Trap in bad weather. Due to the unsurveyed nature of the area in the vicinity of these reefs and of strong tidal currents, they should be given a wide berth.

The **Snares Islands** (48°00'S., 166°34'E.) are a bold group of bird-covered islands lying about 57 miles SW of Southwest Cape. The Snares Islands are an excellent landmark when approaching from the W. Also, these islands should be made the point of departure when passing S of Stewart Island. The Snares were reported to lie 1.7 miles ESE of their charted position.

Northeast Island, 189m high on its S side, is covered with scrub and is mostly steep, except on its NE side. The island is made up of rough, coarse granite showing, in places, a pink or red tint covered with dark peat. Broughton Island lies close S of Northeast Island. A group of rocks lies midway between Broughton Island and Alert Stack.

The Snares are surrounded by deep water and there is no anchorage, except for vessels with local knowledge, close under and E of Northeast Island.

The Snares have been designated as a nature reserve. Landing is by permit only.

Vancouver Rock, over which the sea breaks, lies nearly 2 miles SW of Northeast Island. Four islets, forming a rugged ridge of barren rocks, extend up to 1 mile SW of Vancouver Rock.

12.46 Northeast coast of Stewart Island.—Black Rock Point (46°41'S., 167°52'E.) is the N end of Stewart Island, and close W of it is a remarkable white sandy patch. Foul ground extends NW from the point. The Bishop and Clerk Islets lie nearly 3 miles WNW of Black Rock Point, with a shoal area lying between them. Strong tide rips exist over the E side of Bishop and Clerk Islets as well as over the shoal. An above-water rock lies between the shoal area and Black Rock Point.

Between **Saddle Point** (46°43'S., 167°59'E.) and Gull Rock, a white rock, 4.6m high, lying close offshore about 5.2 miles SE, sheltered anchorage may be found. A 14.6m patch lies 0.7 mile NNE of Gull Rock. A notable sandy patch lies about 0.8 mile S of Gull Rock. Newton Rock, with a depth of 1.8m, lies about 1.2 miles E of Gull Rock and it is steep-to, and seldom breaks. Banks extend NW and SE from Newton Rock.

Local magnetic anomaly.—Off Saddle Point, the normal magnetic variation is decreased by 4°.

In moderate weather, vessels can obtain anchorage between Gull Rock and Port William, about 1 mile offshore, taking care to avoid the charted dangers.

West Head is the N entrance point of Port William. A rocky shoal, with a depth of 7.3m, lies about 1.2 miles N and a 16.5m patch lies about 0.6 mile NE, respectively, of West Head.

Port William (46°51'S., 168°05'E.) is entered between the S end of West Head and Cultivation Head, about 0.7 mile S. Wooding Bay, in the S part of Port William, lies between Cultivation Head and Dark Head, about 0.5 mile WNW. Port William is a well-sheltered harbor.

The entrance to Port William is narrowed by foul ground projecting from each entrance point. Pender Rock, submerged and marked by kelp, lies on the outer end of a spit of foul ground that extends about 0.3 mile SE from West Head. Depths less than 5.5m project about 0.3 mile N from Cultivation Point.

Small vessels with local knowledge can obtain anchorage in the N part of Port William, while larger vessels can lie about 0.2 mile S of West Head, in depths of 9.1 to 11m.

East Head (46°51'S., 168°08'E.) lies about 1.2 miles E of Cultivation Head and the shore between is indented by Lee Bay. Garden Mound, 179m high, stands about 0.7 mile SSW of East Head. A bank, with depths less than 5.2m, lies in the center of Lee Bay. A rock, with a depth of 4.6m, and marked by kelp, lies about 0.2 mile WNW, and a bank, with depths from 8 to 10.7m, lies over 0.5 mile NNW, respectively, of East Head.

12.47 Off-lying islands and dangers.—There are three groups of islands that lie within 6.5 miles of Port William, the North Isles, the Mutton Bird Islands, and the Fancy Group. These groups form a chain of barren islands and craggy rocks, with strong tidal currents and rips among them. Therefore, this chain should not be approached closely.

The North Isles, the northernmost group, lie about 5 miles ENE of East Head. North Islet, 43m high, and Pikomamaku Islet, 36m high, 0.3 mile SSE, are connected by a reef of above and below-water rocks. Zero Rock, above-water, lies 0.1 mile ENE of the N end of North Islet. Rocks, with depths of 8.8m and 5.2m, lie about 1 mile ESE and 0.7 mile NE, respectively, of Pikomamaku Islet. Wairau Shoal, with a depth of 9.1m, lies about 1.7 miles E by S of North Islet.

The Mutton Bird Islands are made up of three islands and some islets and rocks lying SW of the North Isles. Motunui Islet, the N islet of the group, is 55m high. Pukeokaoka Island, 57m high, lies 0.3 mile S of Motunui Island and Herekopare Island, 54.2m high, lies 1 mile SSE of Pukeokaoka Island. A reef connects the islands. Mary Higgins Rock, 1.8m high, lies nearly 1 mile NNE of Herekopare Island. Polybank Shoal, with a depth of 6.1m, lies 1.2 miles W and Fish Rock lies nearly 1.7 miles WSW, respectively, of Pukeokaoka Island. A shoal, with a depth of 12.8m, lies 0.2 mile SW of Fish Rock. Fast Rock lies 1.2 miles SSW of Herekopare Island. Several rocky patches lie about 1.5 miles ENE of Fast Rock.

The Fancy Group, the southernmost of the islands lying off Port William, is made up of two separate groups with a narrow channel between. The N group is made up of Bunker Islet and three islets NW of it; the S group contains Kanetoi Islet, 14 high. A 17.7m patch lies about 1 mile NNE of Kanetoi Island.

Abbot Passage separates the Fancy Group from Bench Island, 96m high, about 2.5 miles SW. Flat Rock, 24m high, lies about 0.3 mile ENE of the NE end of Bench Island. The Twins are two notable rocks, 34m high, that lie 0.2 mile E of the SE end of Bench Island, with rocks between. Passage Islet, 20m high, lies about 1 mile W of the SW end of Bench Island in Carter Passage, upon a bank with depths less than 11m. An 18.3m patch lies about 1 mile SSE of Passage Islet.

12.48 Horseshoe Bay (46°52'S., 168°09'E.), with a sandy beach at its head, is entered about 1.5 miles NNW of Ackers Point. Rocks fringe the shore on either side, with submerged rocks off the N side of the head of this bay, where there is a jetty. A bank, with a depth of about 6.5m, lies close outside the entrance of the bay. Except during E winds, smaller coastal vessels can find good holding ground in approximately with local knowledge can obtain anchorage, in depths of 7 to 8m, during offshore winds.

Half Moon Bay (46°53'S., 168°09'E.) is the next indentation S from Horseshoe Bay and is separated from it by a peninsula, 102m high. This bay is encumbered with several rocks; foul ground projects up to 0.2 mile from its head. The town of Oban stands at the head of the bay.

A submerged rock lies about 0.1 mile SSW of the N entrance point of the bay, and a rock, 3m high, from which foul ground projects about 0.1 mile WNW, lies about 0.3 mile further SSW. Submerged rocks lie up to 0.4 mile SW of the 3m high rock.

Vessels with local knowledge can obtain anchorage in Half Moon Bay during offshore winds, in depths of 12.8 to 16.5m.

Oban (46°53'S., 168°08'E.), the only port and principal town of Stewart Island, is situated at the head of Half Moon Bay.

Depths—Limitations.—At the N end of Oban there is a ferry wharf, with a depth of about 5m alongside the S face. Vessels can berth on this face, at the outer end, but are required to move for ferries. A scend may be experienced at the wharf, which is untenable in heavy E weather.

Pilotage.—Pilotage is compulsory. Pilots may be obtained from Bluff Harbor.

The signal station maintains listening watch at 0900, 1200, and 1500. The call sign is Half Moon Bay (ZLRZ), 2045 kHz.

Directions.—A vessel bound for Oban should keep about 0.1 mile off the S shore of Half Moon Bay, until 0.7 mile within the entrance; then it should pass about 50m S of the 3m high rock, not less than 40m N of the lighted beacon, and N of the beacon; then to the wharf.

12.49 Paterson Inlet is entered between **Ackers Point** (46°55'S., 168°12'E.) and Anglem Point, nearly 2 miles SE. The N and S shores of the inlet are formed by high irregular land.

Rakeahua (46°57'S., 167°53'E.) is a conspicuous dome-shaped mountain, 676m high, whose summit may be seen from just about all directions in clear weather.

There is a least depth of 12.2m in the fairway on the range line E of Native Island, which lies about 1.2 miles SSW of Ackers Point. Further within the entrance, there are depths of 7.1m to 23.7m in the channel that leads N of **Ulva Island** (46°56'S., 168°08'E.). The channel S of Ulva Island has a least depth of 14.9m in the fairway.

Native Island (46°55'S., 168°09'E.), 75m high, lies in the entrance to Paterson Inlet and it is almost connected to the shore NW by reefs and foul ground. A 7.6m patch, over which during E winds the sea occasionally breaks, lies near the limit of the coastal bank, about 0.5 mile NE of the E end of Native Island. Ulva Island, rock-fringed, lies about 1.5 miles SW of Native Island and it is about 88.1m high.

An islet, 19m high, lies about 0.5 mile SW of the W end of Ulva Island and the shore between is encumbered with rocks. Sydney Cove lies in the center of the N side of Ulva Island and it is sandy with a rock close off its W entrance point. A bank, with a least depth of 8.2m, lies between Ulva Island and Native Island.

12.50 North shore.—Iona Islet (46°54'S., 168°07'E.), 49m high, lies about 1 mile WNW of Native Island and fronts Golden Bay, where there is a wharf. An islet, 11m high, lies about 1.7 miles W of Iona Islet.

Kaipipi Bay is entered between Prices Point and the mainland N. The peninsula, of which Prices Point is the E tip, is fringed with rock on its N side. Foul ground extends about 0.5 mile from the bays head. West of Kaipipi Bay the inlet narrows

and depths decrease.

Vessels with local knowledge can obtain anchorage in Sydney Cove, but not during E winds. Anchorage may be found by vessels with local knowledge, in depths of 20 to 22m, mud and sand, about 1.2 miles E of Prices Point.

12.51 South shore.—Anglem (46°55'S., 168°12'E.), the SE entrance point of Paterson Inlet and the N end of the Bradshaw Peninsula, is marked by a prominent clump of trees. A reef, upon which there is a rock, 1.5m high, extends about 0.1 mile N from Anglem Point. Another reef, which dries 1.8m, lies almost 0.7 mile WSW of Anglem Point (Bullers Point). A 3.7m patch lies about 0.7 mile SW of the drying reef, with another reef close SW.

Glory Cove (46°58'S., 168°10'E.), located at the root of the Bradshaw Peninsula, is entered between Little Glory and Isle Point, an islet forming the SW entrance point.

Vessels with local knowledge can obtain anchorage off the W side of the Bradshaw Peninsula, in depths of 18 to 22m, off Old Neck. Glory Cove is the best anchorage in Paterson Inlet, in depths of 7.3 to 11m, stiff mud, good holding ground.

Southwest Bay, known locally as Glory Harbor, is entered between the Boat Passage Islets, a group of islets and rocks lying 0.2 mile WNW of Islet Point, and Bravo Islet, 1 mile W. Bravo Islet is joined to the mainland by a thin strip of land. Five islets lie on the coastal bank N of Bravo Islet.

Vessels with local knowledge can obtain anchorage, in depths of 23 to 25m, in Southwest Bay, about 1.5 miles from its head or, in 9.1 to 11m, mud, 0.5 mile from its head. Swinging room is limited in Southwest Bay.

Abraham Bay is entered about 4 miles SW of Ulva Island. It has a depth of 7.3m in its entrance gradually shoaling to a sandy beach at its head. Pryse Peak rises to a height of 350m along the W side of Abrahams Bay.

Directions.—Vessels with local knowledge entering Paterson Inlet from N should remain W of the off-lying islands, and when off Port William head for Ackers Point Light, bearing 174.5°. This course passes about 2.5 miles W of Motunui Island and about 0.5 mile W of Fish Rock. When Herekopare Island is abeam to port, distance 2.7 miles, change course to 132°, heading for the W end of Bench Island. Remain on this course until the E end of Ulva Island comes into range with the NW end of Groper Island, bearing 212.2°, when course should be changed to enter the fairway passing about 4 mile E of Native Island. When a tangent of the N shore of Ulva Island bears 100°, steer for it passing S of the bank S of Native Island, then steering about WNW remaining in the fairway midway between Ulva Island and Iona Island, passing about 0.5 mile S of the latter. Then shape course for the anchorages situated about 1.2 miles E or 1 mile SW of Prices Point. Vessels with local knowledge approaching Paterson Inlet from the S proceed either through Carter Passage or Abbot Passage.

Local magnetic anomaly.—The normal magnetic variation is decreased by about 6° in the channel between Anglem Point and Passage Islet.

The shore between Anglem Point and East Cape, about 5.5 miles S, is formed by bold headlands fringed by rock affording no shelter.

A rock, with less than 1.8m, lies 0.4 mile offshore 3.2 miles S of Anglem Point.

12.52 Port Adventure (47°04'S., 168°11'E.) indents the SE shore of Stewart Island and is entered between Stirling Head and Shelter Point, about 1.7 miles SSE.

Stirling Head is steep and cliffy rising to a height of 126.8m about 2.5 miles WNW. A reef extends about 0.5 mile S from the point.

Weka Islet lies near the center of a reef which projects about 0.6 mile E from Stirling Head. Weka Reef, covered but always breaks, lies about 1.5 miles E of Stirling Head. Theresa Rock, submerged, lies about 0.5 mile E of Weka Reef. A 13.7m patch lies about 0.5 mile WNW of Weka Reef.

Wreck Reef lies just above water about 2 miles E of Shelter Point, and the sea usually breaks heavily over it. A shoal, with a depth of 7.9m, lies almost 1 mile NNE of Wreck Reef.

Entrance Island (Tia Island) (47°05'S., 168°13'E.) lies in the middle of the entrance to Port Adventure. Its W extremity is known as Memory Point. Dangerous Rocks lie within 0.2 mile E and SE of the E end of Entrance Island; a reef extends about 0.4 mile N from Memory Point.

Passage Rock, surrounded by kelp, lies about 0.4 mile NNE of East Point, the S entrance point of Port Adventure. A depth of 9.1m was reported to lie close E by N of Passage Rock.

The Breaksea Islands are a chain of barren craggy islets and rocks lying within about 1.5 miles SW of Shelter Point. These rocks form a barrier to the heavy swell which rolls along the SE side of Stewart Island.

The S shore of Port Adventure has several rocks, marked by kelp, lying off it. A sunken rock, with a depth of 2.7m, lies nearly 1.2 miles WNW of East Point.

The NW shore of Port Adventure is indented by Oyster Cove in the NW part and North Arm in the N part, with Redsand Cove and White Beach and an unsurveyed cove between. A rocky islet lies in the entrance to North Arm; the Redsand Coves entrance is filled with kelp.

Directions.—Port Adventure should not be entered without local knowledge. The best passage into Port Adventure lies N of Entrance Island, between it and Stirling Head. It is barely 800m wide, with depths of 28 to 40m, except for a 6m patch and reef extending NW from Memory Point. The passage S of Entrance Island is encumbered by Passage Rock, as well as a reported depth of 9.1m in the passages center.

Directions for Foveaux Strait

12.53 Vessels entering Foveaux Strait from the W should make for the **Solander Islands** (46°34'S., 166°54'E.), the largest of which is an excellent landmark. An approximate but helpful guide to determining a vessels longitude in the approach is the tongue, with depths less than 183m, projecting S from the bank about 26.5 miles SW of **Cape Providence** (46°01'S., 166°20'E.). By arranging to pass Ruapuke Island by daylight, vessels may make the passage without difficulty.

The only port on the N shore of Foveaux Strait suitable for vessels of large size is Bluff Harbor.

On the SW side of the strait there are several anchorages and harbors, which are always accessible and safe, and where vessels can wait for an opportunity to enter Bluff harbor.

Caution.—Owing to the exceptional pinnacle formation of underwater features in these waters, it cannot be certain that all dangers have been discovered. Deep-draft vessels off recom-

mended or recognized routes are advised to keep in greater depths than 55m. Vessels navigating in unfrequented waters of less depth should keep a lookout for surface disturbances or unusual soundings which may indicate potential danger.

Vessels approaching Foveaux Strait from the E have two viable choices, that is, to pass N or S of **Ruapuke Island** (46°46'S., 168°31'E.). The passage N of the island is the recommended route for deep-draft vessels.

12.54 North Passage.—Vessels passing along the S shore of South Island at a distance of 4 or 5 miles will, in clear weather when abeam of Slope Point, see The Bluff. The Bluff is a conspicuous lone hill which looks like a small islet rising from the W side of the entrance of Bluff Harbor.

When in a position about 4 miles S of **Waipapa Point** (46°40'S., 168°51'E.), vessels should head for Bushy Point Light, bearing about 298°. Vessels in this vicinity should allow for the tidal currents that attain 1 knot. When the N end of Ruapuke Island bears about 242°, vessels should bring Waipapa Light astern bearing about 083°, or steer for **Mount Anglem** (46°45'S., 167°55'E.) bearing about 263°, which leads about 2.7 miles S of Dog Island. In this area tidal currents attain rates from 0.5 to 2.2 knots. When The Bluff is on a NNW bearing, course should be changed WNW to pass about 4 miles N of Stewart Island and halfway between Solander Island and the mainland N.

12.55 South Passage.—Vessels from the E bound to any of the ports of Stewart Island would probably pass S of Ruapuke Island, giving it a berth of about 4 miles and passing 2 miles S of the Hazelburgh Group. The NE side of this S channel is bordered by the Hazelburgh Group, Half Passage Rock, and Lachlan Shoals; the SW side is formed by the Fancy Group, the Mutton Bird Islands, and the North Isles. Vessels should steer through this passage in mid-channel. Then, if proceeding through Foveaux Strait, head to pass about 4 miles N of Stewart Island and proceed as above under North Passage.

South Island—East Coast

12.56 Cape Campbell to the Kaikoura Peninsula.—From Cape Campbell, the coast trends in a SSW direction for about 30 miles to the Kaikoura Peninsula. Several rivers flow into the sea on this coast and there are a few indentations.

All dangers along the coast appear to be contained within the 37m curve, which lies 1.7 miles off Cape Campbell and up to 3 miles off the coast in other places.

Caution.—Owing to the pinnacle nature of the underwater rocks off the coast of New Zealand, it can not be certain that all dangers have been discovered. Deep-draft vessels, when off recommended routes, are advised to keep in depths greater than 55m. Vessels navigating in unfrequented waters of less depth should keep a lookout for uncharted dangers.

Shepherdess Reef (41°45'S., 174°18'E.) lies 1.5 miles SE of Cape Campbell Light on an extensive foul area; the reef dries in places.

The Flaxbourne River enters the sea 8 miles S of Cape Campbell.

A 5.5m rocky patch lies on the 30m line, about 3 miles NE of the mouth of the Flaxbourne River.

Anchorage may be taken, in depths of 14.6 to 18.3m, in Welds Anchorage, 0.4 mile E of the reef at the entrance to the Flaxbourne River.

The coast from the Flaxbourne River to the **Clarence River** (42°10'S., 173°55'E.) is formed by sand and shingle beaches, with rocky points and steep spurs descending from the mountains.

Mount Tapuaenuka (41°39'S., 173°40'E.) rises to a height of 2,884m, about 15 miles NW of the mouth of the Clarence River. The mountain ranges on this coast rise to numerous sharp and rugged peaks. A break in the mountain range formed by the Clarence River has the appearance of a harbor when seen from the offing.

Waipapa Point (42°12'S., 173°52'E.) lies about 3.7 miles SSW of the entrance to the Clarence River.

12.57 Point Kean (42°26'S., 173°43'E.), 14.5 miles SSW of Waipapa Point, is the E extremity of the Kaikoura Peninsula. The peninsula rises to a height of 106m about 1 mile W of the point.

Ingles Bay is formed on the N side of the peninsula. Davidson Rocks, awash at LWS, lie 0.7 mile offshore, a little over 1.5 miles NNW of Point Kean. Nine Pin Rocks and Saint Kilda Rocks lie 1 mile and 0.6 mile NNW, respectively, of the same point.

Anchorage in Ingles Bay may be taken, in 11 to 18m, 0.7 mile N of the light on Point Kean. Anchorage is also available about 0.2 mile NE of Saint Kilda Rocks, in 6.9 to 20.0m, dark sand.

Lynch Reef extends 0.3 mile NE from Point Kean. Fyffe Cove is formed between this reef and Observation Point 0.7 mile NW.

The **Kaikoura Peninsula** (42°25'S., 173°42'E.) is a hummocky tongue of land that is reported to give good radar returns up to 23 miles.

Caution.—The Kaikoura Peninsula should only be approached during daylight hours in good visibility, unless the vessel has recent local knowledge.

12.58 The Kaikoura Peninsula to Point Gibson.—The coast for a distance of 11 miles S of Kaikoura Peninsula forms a continuous bight, then continues SSW for about 21 miles to Point Gibson.

Atia Point (42°26'S., 173°41'E.) is the S extremity of the Kaikoura Peninsula. South Bay is formed between Atia Point and Baxter Reef, 0.6 mile WNW. Cone Rock lies 0.3 mile offshore, 0.2 mile SW of Baxter Reef.

Gooch Bay lies between the SW extremity of Baxter Reef and Pinnacle Rock, 4.5 miles WSW. Gooch Bay affords anchorages, sheltered from all winds except those from the SE to S, in 14.6 to 16.5m, good holding ground, about 1 mile WNW of Atia Point.

Haumuri Bluffs (42°34'S., 173°31'E.) lie about 7 miles S of Pinnacle Rock. The bluffs are 177m high and are bare. Rocks, 3m high, lie 1 mile offshore, close inside the 20m curve, 2 mile N of Haumuri Bluffs.

The Conway River flows into the sea about 4 miles S of Haumuri Bluffs through a narrow channel. The land on either side of the entrance is low and flat.

From the entrance of the river to the Waiau River, 10.5 miles

SSW, the coast is fronted by cliffs about 30m high. Mount Wilson, 643m high, rises 5 miles SW of the entrance to the Conway River.

Bushett Shoal, with a least depth of 3.6m, lies 3 miles offshore, 5.5 miles SSE of the Conway River entrance. **Bushett Rocks** (42°43'S., 173°30'E.), with a depth of 3.6m, marked by kelp, lie about 1 mile S of Bushett Shoal. Both dangers are steep-to and lie close inside the 50m line.

Between the entrance to the Waiau River and the town of Gore Bay, 5.5 miles SSW, the coast is steep and bare. **Shag Rock** (42°49'S., 173°21'E.), 34m high, is located close to the shore, 2.2 miles SSW of the Waiau River entrance.

Point Gibson (42°53'S., 173°19'E.) lies 1.5 miles SSE of Gore Bay. Port Robinson is situated in the bight on the NW side of the point.

12.59 Point Gibson to Steep Head.—From Point Gibson, the coast trends in a SSW direction for 14.5 miles to Motunau Island. A bight, that is indented about 15 miles, lies between Motunau Island and the Banks Peninsula, about 37 miles S. Steep Head is the E extremity of the Banks Peninsula.

The Hurunui River flows into the sea 2.2 miles SSW of Point Gibson, and **Sail Rock** (42°58'S., 173°13'E.) lies close off a projecting cliffy coast 4 miles SSW of the Hurunui River. About 8 miles farther SW Motunau Island rises to a height of 34m. A light is situated on a point 1 mile N of Motunau Island. Montunau Island lies about 0.6 mile S of the entrance to the Montunau River, and is connected to it by reefs.

Pegasus Bay is nearly 40 miles wide, N and S; its N shore from Motunau Island to Double Corner, 12 miles SW, is cliffy, with a sand and stone beach at LW. Four miles WSW of Motunau Island are two shallow patches extending 1 mile from shore which should be avoided.

Caution.—An area in which explosives are dumped is centered 42 miles ESE of Motunau Island.

From Double Corner, the coast trends in a S direction to **Godley Head** (43°35'S., 172°49'E.), about 27 miles distant. Five rivers run into the sea along this sandy beach.

The general depths of water across the mouth of Pegasus Bay is 37m, shoaling gradually to 11 to 13m, about 1 mile from the beach.

From Cape Campbell to the Banks Peninsula, a distance of 130 miles, there is no place of shelter, with the exception of temporary anchorage in good weather. Deep-draft vessels are recommended not to approach the coast nearer than 3 miles.

Tides—Currents.—Currents on this part of the coast generally set N, but occasionally after S winds it has been found to run in the opposite direction. Inshore the current sets to the NE for 20 hours and then to the SW for 5 hours, both at a rate of 1to 2 knots.

The **Banks Peninsula** (43°45'S., 173°00'E.) is formed by a mass of rugged, and in parts, densely-wooded mountains which rise to a height of 913m. It is bound by a coast which is exceedingly broken and indented with numerous bays and coves. The peninsula has been reported to give good radar returns up to 26 miles.

Godley Head, in the SW corner of Pegasus Bay, is a perpendicular cliff of dark-red color, and has been reported to give good radar returns to 19 miles.

Port Lyttelton (43°36'S., 172°43'E.)

World Port Index No. 55320

12.60 Port Lyttelton, the port of Christchurch, is entered between Godley Head and Adderly Head, about 1 mile SE. The harbor area was formed by the crater of an extinct volcano. The harbor extends about 8 miles WSW and is the principal import port for South Island. The port area has more than a half dozen finger piers, lying in a well protected basin.

The port is under the jurisdiction of Lyttelton Harbor Board.

Lyttelton Port Company Limited

http://www.lpc.co.nz

Tides—Currents.—Mean spring tides rise about 2.3m; mean neap tides rise about 1.3m. The tides are irregular, both at springs and neaps, and are greatly affected by the wind.

Currents generally attain rates between 0.2 knot and 1 knot in the approaches, anchorages, and channels of the port. A S set may be experienced off the entrance moles.

Depths—Limitations.—Port Lyttelton lies with its outer harbor about 4 miles within the entrance between Godley Head and Adderly Head. The approach channel, which is entered about 1 mile ESE of Goodley Head, is maintained at a dredged depth of 11.9m; a depth of 10.5m is maintained in the greater part of the harbor, except in the NW part where there are depths of less than 9.1m.

Vessels up to 300m in length, with a beam of 36m and a drafts of 12.2m at HW, may use the port.

Facilities for handling bulk petroleum, grain, dry bulk, containers, cattle, and ro-ro cargo, as well as breakbulk commodities, are available. A drydock and slipway are also found in the port. Depths alongside the piers range from 9.0 to 12.6m. For details of berthing facilities see the table titled **Port Lyttleton—Berth Information**.

Port Lyttleton—Berth Information

Berth	Length	Draft	Use
1	159m	9.0m	Cement
2E	270m	11.8m	General and bulk
2W	169m	10.0m	General and bulk
3E	195m	9.5m	General, bulk, and logs
3W	223m	11.0m	General, bulk, and logs
4E	148m	11.0m	Ro-ro and containers
4W	170m	9.2m	Ro-ro and containers
7E	217m	10.5m	Containers
7W	187m	10.0m	Ro-ro
Oil	202m	12.6m	LPG
Cattle	60m	9.0m	Livestock

Aspect.—The N shore of Port Lyttelton from Godley Head to Sticking Point is indented with small bays backed by cliffs

rising to a bare tableland, which rises to Mount Pleasant, 498m high, 1.2 miles NNW of Sticking Point; there is a flagstaff on the cliff top about 0.3 mile WNW of the same point.

On the S side of the harbor are Little Port Cooper, Camp Bay, and Purau Bay. Mount Evans, 702m high, rises 1.2 miles S of the head of Camp Bay.

Pilotage.—Pilotage is compulsory for all vessels over 500 gross tons and is available 24 hours. Vessels should forward their ETA and maximum draft 24 hours and 4 hours prior to arrival. Vessels should not enter before receiving instructions from the signal station.

The pilot boards in position 43°35.0' S, 172°51.2'E. Large bulk vessels may be boarded by helicopter.

Vessels awaiting a pilot may anchor 1.5 miles E of Godley Head, in 16 to 18m.

Regulations.—The quarantine anchorage is off Camp Bay.

Port Lyttelton

Signals.—Berthing signals are given by radio or signal light. No vessel is to enter and take up a berth unless signaled to do so from the signal station near the head of Gladstone Pier.

Anchorage.—In good weather, vessels awaiting pratique or the pilot may anchor, in depths of 16 to 18m, soft mud, about 1.5 miles seaward of Godley Head. Vessels drawing less than 8.5m, and with the harbormaster's permission, may anchor, in depths of 10.6m, soft mud, off Camp Bay, clear of the dredged channel. Vessels should anchor on the range shown from the SW corner of the bay, but no further W than a line drawn 345° from the rear beacon.

As the holding ground throughout the area is soft mud, local authorities recommend anchoring with a long scope of cable, with a second anchor ready.

Directions.—Herbert Peak (43°41'S., 172°47'E.), the highest peak on the Banks Peninsula, is an excellent mark for vessels approaching from the N.

A vessel approaching from the S should keep at least 1.5 miles offshore after rounding the peninsula, until Lyttelton becomes visible.

The approach channels are well-marked by ranges, lights, and buoys.

Caution.—Several Submarine Exercise Areas are charted in the waters of, and off Pegasus Bay; vessels are encouraged to exercise the appropriate discretion when approaching the area from seaward.

A submarine pipeline extends across the channel about 0.5 mile W of the Inner harbor entrance, and is best seen on the appropriate chart.

Local authorities sometimes recommend dropping an anchor off the dock and that additional lines be used to control surging along the dock.

Christchurch, the capital city of the Canterbury provincial district, is situated on the plains about 2.5 miles NW of Lyttelton.

12.61 Port Levy (43°37'S., 172°50'E.) lies on the N coast of the Banks Peninsula, and is entered between Adderly Head and Baleine Point, about 1 mile E. A reef, with Beacon Rock at its outer end, extends about 0.1 mile NE from the E extremity of

Baleine Point. The port recedes about 3.7 miles SSW from its entrance.

Pigeon Bay is entered between **Pigeon Point** (43°37'S., 172°55'E.), 2.5 miles SE of Beacon Rock, and Wakaoa Point, 0.8 mile E.

Anchorage may be taken about 1.7 miles within the entrance of Pigeon Bay, in 9.1m, good holding ground.

Between Pigeon Bay and **Steep Head** (43°44'S., 173°08'E.), 11 miles SE, the coast is indented by several small bays and bights.

Steep Head is a sheer cliff about 91 to 122m high. Le Bons Peak, 499m high, rises 2.5 miles W of the light on Steep Head. The peak is conspicuous from the E.

12.62 The Banks Peninsula to Jacks Point.—Between **East Head** (43°46'S., 173°08'E.), 1 mile S of Steep Head, and Akaroa Head, 11 miles SSW, the coast is rocky and indented with numerous narrow bays. The cliffs on the projecting points are 183m high. Pompeys Pillar, a remarkable columnar rock, lies close to the coast, 6 miles SSW of East Head. Stony Bay Peak rises to a height of 805m, 6.5 miles SSW of East Head.

Akaroa (43°48'S., 172°58'E.) (World Port Index No. 55330) stands on the E side of the harbor, 6 miles within the entrance. The harbor is entered between Te Ruahine, the W extremity of Akaroa Head, and Timutimu Head, 1 mile WSW. The Long Boat, a rock about 1.2m high, lies 0.1 mile SE of Te Ruahine, and foul ground extends 0.2 mile S of Timutimu Head.

Anchorage.—Vessels may anchor in Akaroa Harbor above Nine Fathom Point, which lies on the E shore 2.5 miles within the entrance. Anchorage may be taken, in 7.3m, mud, 0.7 mile W of the wharf situated S of the town.

Caution.—During strong SW winds, there is a heavy cross sea at the entrance to Akaroa Harbor, with violent squalls caused.

12.63 Timutimu Head (43°54'S., 172°57'E.) is a perpendicular cliff of a dark gray color, 159m high. On the W side of Timutimu Head the cliffs are about 183m high, decreasing to about 76m, about 5.5 miles W. About 4 miles W of these cliffs, the rugged and imposing coast line is succeeded by a low cliffy and shingle shore.

Ninety-miles Beach begins at the SW extremity of the Banks Peninsula and trends in a SW direction to Timaru, about 75 miles distant. The first 15 miles is a narrow strip of shingle beach about 0.5 mile wide. From this point for a distance of about 55 miles, the coast is composed of low cliffs from 12 to 18m high, fronted by shingle beach.

Several rivers flow into the sea on this coast, after traversing the plains from the hills 25 miles inland.

Tides—Currents.—An onshore current is experienced toward Ninety-miles Beach, between the Banks Peninsula and Timaru, especially after SE winds.

Caution.—Canterbury Bight is formed between the Banks Peninsula and Timaru. This bight has only been partially examined and, within a distance of 3 to 5 miles from the coast, is unsurveyed, except in the approach to Timaru Harbor.

Timaru Harbor (44°23'S., 171°16'E.)

World Port Index No. 55350

12.64 Timaru Harbor, an artificial harbor, is formed by North Mole Wharf on its W side, with Outer North Mole and Inner North Mole projecting SE from it, and on the E side by Eastern Extension Mole, with East Mole extending N from its root.

A spur breakwater has been reported to be under construction on the seaward side of the Eastern Extension Mole, extending in a 100° direction for 149m. The new spur breakwater will be of similar width to the existing Eastern Extension Mole.

The harbor is under the jurisdiction of Timaru Harbor Board. The town of Timaru is situated at the head of the harbor.

Timaru Harbor

http://www.primeport.co.nz

Tides—Currents.—The MHW interval at Timaru is 3 hours 37 minutes. Springs rise 2.0m; neaps rise 1.2m.

Tidal currents may attain rates up to 1 knot.

Depths—Limitations.—There is a least depth of 9.9m, hard sand, in the approach to the dredged channel at the entrance to the harbor. The dredged channel is maintained at a depth of 11.6m. The swinging basin in the inner harbor is maintained to a depth of 10.4m. The bottom in the dredged channel is mud and sand; the bottom at the wharves is mud.

The maximum permissible draft in the entrance channel is 8 to 10m, which may be increased to 10m at the harbormaster's discretion. Ships up to 240m in length can be accommodated. Ships of 9.2m draft are berthed at any state of the tide.

Timaru Port Facilities

Berth	Depth	Max. Length	Remarks
No. 1 Ext.	10.0m	200m	Bulk liquids and logs
No. 1 East	8.6m	100m	Fish and reefer exports
No. 1	9.0m	200m	Reefer export and bulk chemicals
No. 2 North	10.5m	190m	Grain
No. 3 South	9.5m	190m	Fish
North Mole	10.0m	240m	Containers, wood chips, and reefer exports
Fish Wharf	6.0m	90m	Fish

Six berths are available for the handling of petroleum, container, ro-ro, fish, and bulk solid cargo. Alongside depths range from 6.0 to 10.0m.

Aspect.—A silo, 37m high; a chimney; and a floodlight tower stand about 1 mile SSW of the head of Eastern Extension Mole.

The War Memorial Light is shown from a flagstaff about 0.4 mile S of the Signal Station. A tower is situated on the W side of North Mole Wharf. There is a radar station on a cliff at the head of the harbor.

Courtesy of PrimePort Timaru

Timaru Harbor—North Mole

Pilotage.—Pilotage is compulsory and should be ordered through the harbormaster, also stating the vessel's ETA and maximum arrival draft, by 1320 on the last working day prior to arrival, confirming when in radio range of the signal station. The signal station maintains a radio watch on a fixed schedule.

The pilot boarding area is in position 44°23.0'S. 171°19.5'E. Vessels should remain 2.5 miles to seaward of the Eastern Extension Mole and S of the transit of the range lights. Pilots usually disembark from departing vessels when abeam of the head of the Eastern Extension Mole.

Regulations.—The quarantine anchorage is reported to be anywhere along a line bearing 265° from Eastern Extension Molehead, 1.5 to 2.5 miles off the structure. Due to the exposed nature of the anchorage, vessels are usually boarded at the wharves.

Vessels may not enter the harbor without the permission of the signal station.

Signals.—The signal station is situated at the SW end of No. 1 Wharf in the Harbor Board Building, and communicates by radiotelephone.

The signal station monitors 2162 kHz and VHF channel 16, 15 minutes before the hour, every 4 hours commencing at 0345. Communications may be established outside the schedule by prior arrangement.

A red flag by day or a red light at night indicates the vessels assigned berth.

Anchorage.—Vessels may anchor, in 12.8m, sand, not less than 1 mile ESE of the Eastern Extension Mole.

Directions.—Vessels should approach the harbor on the outer range shown from Benvenue Cliff. When the light structure at the head of East Mole is in line with the light at the base of No. 2 Wharf, change course to pass through the middle of the harbor entrance. Take care to pass S of the alignment of lights shown from No. 3 Wharf, as it marks the limit of the dredged channel.

Caution.—Due to smoke and haze experienced in the harbor, at times the navigational lights may be obscured. Floodlights, which may be seen at a considerable distance, may make it difficult to distinguish the harbor lights on some bearings. A vessel approaching from the S will find that Eastern Extension Mole Light is clear of such interference.

12.65 Patiti Point to Cape Wandrow.—Patiti Point (44°25'S., 171°16'E.), 1.7 miles S of Timaru Harbor, sandy and 10.7m high, can be recognized by the pine trees on it. Reefs of rock and kelp extend 0.5 mile off Patiti Point and should be given a wide berth.

Tuhawaiki Point (44°27'S., 171°16'E.), a low cliff 13.4m high, is located 2 miles S of Patiti Point. Foul ground extends 0.3 mile offshore from the point.

Between Tuhawaiki Point and the entrance of the Waitaki River, about 30 miles S, the coast is fronted by a shingle beach, with several streams intervening. From the Waitaki River, the coast trends 13 miles SSW to Cape Wanbrow. This coast is low and cliffy with a shingle beach. A radio mast, 59m high, stands about 0.5 mile WSW of the entrance to the Waitaki River.

Mount Studholme, 1,082m high, located 19 miles SW of Tuhawaiki Point, is the highest summit in this area.

Cape Wanbrow (45°07'S., 170°59'E.), is faced with cliffs about 31m high and rises to a height of 142m, 0.7 mile NW.

Between Cape Wanbrow and South Head, its N extremity, 0.6 mile distant, the cliffs are 31 to 73m high.

Oamaru Harbor (45°07'S., 170°59'E.), on the N side of Cape Wanbrow, is formed by a breakwater on the E side and a mole on the N side, and is under the jurisdiction of the Oamaru Harbor Board.

Mariners are warned that Oamaru Harbor is closed to shipping and is dangerous to small craft because of extensive shoaling in the entrance.

12.66 Cape Wanbrow to Cornish Head.—From Cape Wanbrow the coast trends in a SSW direction for 32 miles to Cornish Head. This coast is indented with several bays, and the mountain ranges approach the coast in several places.

From Cape Wanbrow to **Kakanui Point** (45°09'S., 170°54'E.), about 5.5 miles S, the coast is formed by a beach backed by low cliffs. A monument stands on a hill 91m high, about 4 miles W of Cape Wanbrow.

Middle Shoal, with a least charted depth of 15.9m, lies 2.5 miles SE of Cape Wanbrow.

Lookout Bluff (45°16'S., 170°52'E.), 5 miles SSW of Kakanui Point, 111m high, forms the N point of Moeraki Bay; Moeraki Point, 5 miles S, is the S extremity.

Kelp Reef, nearly 3 miles long and covered with kelp, extends nearly across the entrance to Moeraki Bay and lies 1.5 miles off the sandy beach. Above and below-water rocks extend about 0.7 miles N of Moeraki Point.

Moeraki Point (45°21'S., 170°52'E.) is the N extremity of a peninsula which attains an elevation of 153m. The town of Moeraki is situated on the N side of the peninsula, 1 mile W of the point.

Mount Miserable rises to a height of 885m, 11 miles NW of Moeraki Point.

Katiki Point (45°24'S., 170°52'E.) is located 2.2 miles S of Moeraki Point. A bay, foul, lies between Katiki Point and Shag

Point, 5 miles SSW.

Fish Reef, which dries, and is well-marked by kelp at other times, lies with its N extremity 1.2 miles SE of the light on Katiki Point.

Danger Reef lies 1.2 miles offshore, about 2 miles S of Shag Point. The dangerous rock on the S end of the reef is marked by kelp.

Between **Shag Point** (45°28'S., 170°50'E.) and Cornish Head, 10.5 miles SSW, the coast is generally steep with patches of scrub on the hills within it.

Cornish Head (45°37'S., 170°42'E.), sheer on its S side, rises to an elevation of 164m; its E fall is tree and scrub-covered.

Ahuriri Rock lies 0.8 mile from shore, 2 miles NE of Cornish Head; the rock is sometimes marked by kelp.

Caution.—Vessels should not approach the coast between Shag Point and Cornish Head within 2.5 miles, as it has not been fully examined and is considered to be foul.

12.67 Cornish Head to Cape Saunders.—From Cornish Head, the coast recedes about 1 mile and forms Waikouaiti Bay. **Karitane Point** (45°38'S., 170°40'E.), a cliffy peninsula 41m high, about 1.5 miles SSW of Cornish Head, is the S entrance point of the bay. Anchorage may be taken in the bay, in a depth of 11 to 12.8m, sand.

Shag Rock, 9.1m high, lies close E of Karitane Point. Shoals, with depths of 6.4 and 10.7m, and rocks, awash, lie about 0.2 mile NE, 0.4 mile E, and 0.4 mile S, respectively, of Shag Rock.

Blueskin Bay lies between Karitane Point and Heyward Point, about 7 miles S. The shore of the bay from Karitane Point to Warrington, about 5.5 miles SW, is steep and scrub-covered, rising to Hammond Hill, 435m high, 1.5 miles inland. A sandy spit extends 1.5 miles S from Warrington; a mud flat is formed behind the spit. A hill, 184m high, is located 1 mile S of the sand spit. The coast from the hill to Heyward Point, 3.7 miles ESE is indented by a bay, and the coast is formed by sandy bays, separated by high rocky points.

Anderson Rocks, with a depth of 4.5m, lies 0.3 mile E of the light on Heyward Point.

Depths—Limitations.—A general description has been given of the coast between the Banks Peninsula and Otago Harbor, a distance of 150 miles. A reference to the chart will show that for 120 miles of the distance, or as far as Moeraki Bay, it is free from danger to within 2 miles of the shore, but that Timaru Harbor should be approached with caution. The bank of soundings is well-defined, and knowing the latitude, a vessels position on approaching the land may be determined with tolerable accuracy. North of Moeraki Bay, from 91 to 110m, sand, will be found at a distance of 30 miles from the coast, and about 55m at half that distance, decreasing gradually to 18.3m which is found at 3 miles from the shore, where the bottom is chiefly gravel and stones.

Between Lookout Bluff and Otago Harbor, the only dangers are Kelp Reef, which lies across the entrance of Moeraki Bay, Fish and Danger Reefs, and Ahuriri Rock; all these, excepting Ahuriri Rock, are either visible or their positions marked by kelp, and do not lie more than 2 miles from the coast.

South of Moeraki Bay, the deep water approaches nearer to the coast; at the distance of 15 miles offshore there are depths of 110m, sand and coral, and at 30 miles distant no bottom was found at 732m; at 2 miles from the coast the depth is from 27 to 33m.

Immediately E of Otago Harbor, the 183m curve does not extend beyond about 15 miles from the land, and within that distance it shoals rather rapidly to a depth of 55m. Soundings of 26m will be obtained within 2 miles of the entrance.

Caution.—Local authorities recommend that deep-draft vessels keep to depths greater than 55m, in the waters between Cornish Head and **Waipapa Point** (46°40'S., 168°51'E.). Due to the pinnacle contour of the bottom, vessels in unfrequented waters within this area, and in depths of less than 55m should keep a good lookout for surface disturbances, or unusual soundings which may indicate potential danger.

Otago Harbor (45°49'S., 170°37'E.)

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12.68 Otago Harbor contains three separate ports. Port Chalmers and Ravensbourn, stand 4.7 and 9 miles within the entrance, respectively; Dunedin stands at its head, about 3 miles W of Ravensbourne. These ports serve the Dunedin and Central Otago Districts.

The harbor is under the jurisdiction of the Otago Harbor Board.

Port Otago Limited

http://www.portotago.co.nz

Tides—Currents.—The MHW interval at Taiaroa Head is 3 hours 9 minutes; at Port Chalmers it is 3 hours 34 minutes; and at Dunedin it is 4 hours 3 minutes.

The spring tide range at Dunedin is 2.1m; the neap range is 1.4m. The spring tide range at Port Chalmers is 2.0m; the neap range is 1.3m.

At Dunedin, the flood lasts 5 hours 40 minutes while the ebb lasts 6 hours 30 minutes.

The average interval of SW at Port Chalmers is 10 minutes; at Dunedin it is 10 minutes.

The greatest strength of the tide is in the narrow passage abreast Harrington Point, where the ebb runs from 2 to 3 knots and the flood somewhat less; on the bar the greatest rate is 2 to 3 knots.

There is little interval of SW at the entrance of the harbor. The flood runs 5 hours 20 minutes; the ebb runs 7 hours 0 minutes, with the latter beginning at 40 minutes after HW and the former beginning 1 hour 40 minutes after LW. In the upper part of the port, the ebb and flood are of about the same duration, with the greatest velocity being 2 knots on the ebb and 1.5 knots on the flood.

The tidal current runs strongly through Victoria Channel.

Depths—Limitations.—Otago Harbor, entered between Heyward Point and Taiaroa Head, 1.7 miles SE, comprises a narrow inlet of water with a navigable width of 91 to 388m, and dredged depths of 12.5m for 6 miles to Port Chalmers. A dredged channel, known as Victoria Channel, with a least depth of 8.0m and a least width of 73m, continues for another 7 miles to Dunedin.

The three ports are divided between the Lower Harbor and

Otago Harbor—Dunedin

the Upper Harbor. A training wall protects the SE side of Victoria Channel. The basin off the Harbor Office in Dunedin was reported to be shoaling.

A sand spit, with a least charted depth of 6.4m, extends about 1 mile N from Taiaroa Head.

The container terminal at Port Chalmers has four berths. The George Street (inner and outer) berths are 600m long and have a maximum draft of 12.5m. The Beach Street Forestry berth is 412m in length and has a maximum draft of 11.8m.

The wharf at Ravensbourne, in the upper harbor, offers a T-berth with a length of 149m and is able to accept vessels with drafts of 8m alongside. Bulk commodities are handled here.

The channel between Port Chalmers and Dunedin is capable of handling vessels of up to 8m draft and 190m long. Dunedin is situated at the head of the inlet. Tankers, 184m in length and cargo vessels up to 178m in length, can be accommodated in Dunedin, in daylight only. The maximum draft permissible is 8m at HW and 6.4m at LW. A dedicated LPG discharge facility is situated at the NE end of Dunedin Harbor. The maximum draft at this berth is 5.5m. Leith Wharf, which can handle ro-ro vessels, can accommodate vessels up to 180m in length, with a draft of 7.7m. Victoria Wharf is 183m in length and can handle vessels with a draft of 8.0m. Rattray Wharf is 426m in length, with a depth of 5.4m alongside. Cross Wharf has a length of 137m and a depth of 5.2m alongside. Birch Street Wharf has a length of 310m and a depth of 6.6m alongside.

An overhead power cable, with a vertical clearance of 51.2m, spans Victoria Channel about 0.7 mile S of Port Chalmers. Submarine cables cross the channel at several points and are best seen on the chart.

Aspect.—When this harbor is seen from the N and E, it may be identified by the gap in the coast; in hazy weather it may be identified by a bank of dazzling white sand heaped at the base of the steep cliffs forming the W entrance head. From the offing this bank of sand is often mistaken for breakers over the bar.

The approach from the S is well-defined by Cape Saunders and Mount Charles.

Taiaroa Head, the E entrance point of the harbor, is a bold dome-shaped rocky headland, with an elevation of 75m; a flagstaff is situated on its summit. A radiobeacon is situated on Taiaroa Head.

Pilotage.—Pilotage is compulsory. The vessel's ETA at the boarding position must be provided to the harbormaster 12 hours in advance and confirmed 4 hours before arrival.

Pilot boarding areas, Alpha and Bravo, are situated about 3.4 and 2.4 miles NE of Heyward Point. A vessel approaching the entrance should keep a good offing, especially with heavy E weather, which causes the sea to break heavily over the spit extending N from Taiaroa Head, and raises a confused sea in the

Otago Harbor—Port Chalmers

channel.

Regulations.—Vessels requesting pratique will be boarded at the dock.

Any vessel wishing to enter, exit, or transit the waters of the port must obtain permission from the Otago Harbor Control.

Signals.—The Signal Station, which is situated on Taiaroa Head, has been decommissioned (2002) and replaced by Otago Harbor Control, which is based in Port Chalmers. Surveillance of the port and approaches is by radar, camera, and VHF radio systems, with remote relay of data from sites on the Otago Peninsula back to Otago Harbor Control. Vessels should obtain permission to enter the port and will be advised of port movements and, upon request, berth information and the sea state at the entrance.

Otago Harbor Control can be contacted on VHF channel 16; the working frequency is VHF channel 14. It can also be contacted by telephone (64-03-4729882).

When sea conditions at the entrance area are considered hazardous for small craft due to breaking sea on the bar, a flashing red light is exhibited from the mast head on top of the station. This signal does not necessarily indicate the port is closed; however, it is recommended that all vessels contact Otago Harbor Control for sea condition details when the light is on or at any time when in doubt. Conversely, the fact that the light is not showing does not mean that the entrance area is not hazardous and great care must be taken by navigators at all times when navigating in the entrance area.

Anchorage.—The recommended outer anchorage, which is considered safe in nearly all winds except in an E gale, is in 24m, sand and mud, about 1.2 miles NE of Heyward Point Light. There is no anchorage inside the port, but in an emergency, a vessel might find anchorage in the swinging basin off Port Chalmers.

Anchorage is restricted in the approach to Otago for a distance of 4 miles N of Taiaroa Head. The restricted area is best seen on the chart.

Directions.—No vessel should attempt to enter Otago Harbor without the permission of the Harbor Control, or without local knowledge.

Vessels approaching from seaward should keep well off-

shore, especially in E gales, as a heavy sea is raised in the vicinity of the entrance channel. Approach Heyward Point Light between the bearings of 127° and 258°, but do not alter course for the entrance channel until Taiaroa Head Light bears less than 175°. Passing W of the entrance lighted beacon, steer onto the fixed white sector of the directional light shown from **Te-U-Mukuri Point** (45°48'S., 170°43'E.), then into the dredged channel for the various docks and loading places detailed above. The channel above the entrance is well-marked, but requires extensive local knowledge, therefore, no directions are given.

Caution.—The directional light mentioned above shows a fixed white light outside the outer boundaries for the fixed green and red sectors shown on the chart. Mariners should insure that they have passed through either of the fixed colored sectors before changing course for the channel entrance.

12.69 Cape Saunders to Quoin Point.—Cape Saunders (45°53'S., 170°44'E.), a bold headland 6.5 miles S of Taiaroa Head, is the SE extremity of the Otago Peninsula, which forms the S side of Otago Harbor. Mount Charles, 1.2 miles N of the cape, rises to a height of 406m.

Hydra Rock, with a depth of 5.2m, lies near the 20m curve 3 miles NNE of Cape Saunders.

Caution.—An area in which explosives are dumped is centered 21 miles ESE of Cape Saunders.

12.70 The coast from Cape Saunders trends SW and then S, curving toward Quoin Point, a rounded projection, 30 miles distant. The intervening coast forms a bight, the land being moderately high and in some parts thickly wooded.

Black Head (45°56'S., 170°26'E.), a remarkable rocky head, 127m high, is located 10.5 miles WSW of Cape Saunders Light. Saddle Hill, known by its shape, rises to a height of 476m, 3.5 miles WNW of Black Head.

From Black Head the coast is low, with a shingle beach, for 12 miles to the Taieri River. From the Taieri River, for a distance of 2.2 miles SSW, the coast is fringed with reefs. Quoin Point lies about 6 miles S of the river.

Gull Rocks (45°54'S., 170°39'E.) lie close off a cliffy head, 3.7 miles WSW of Cape Saunders Light. Tow Rock, 3.7m high, lies about 0.4 mile S of Gull Rocks.

White Islet, 12.8m high, lies 1 mile off the coast 6.5 miles WSW of Tow Rock. Green Islet, 41m high, lies a similar distance offshore, 4.5 miles WSW of White Islet.

Taieri Islet, 30m high, lies off the mouth of the Taieri River. Submerged rocks extend about 0.5 mile E from the islet, and similar rocks lie between the islet and the coast to the SW.

A 5.5m rocky patch was reported to lie about 4.5 miles ENE of Quoin Point.

12.71 Quoin Point to Waipapa Point.—Cooks Head Rock (46°12'S., 170°05'E.), a remarkable feature, stands on the coast 4.7 miles SW of Quoin Point.

Australian Reef extends about 1 mile offshore from a position 6.2 miles SW of Cooks Head Rock.

A detached 4.9m shoal lies about 3.7 miles SW of Australian Reef and about 1 mile offshore. Foul ground extends from the coast to the reef.

Molyneux Bay is entered between a point 5 miles SW of Australian Reef and **Nugget Point** (46°27'S., 169°49'E.), about 8.5 miles SSW. Kaitangata, a tree covered summit, 213m high, rises 1.7 miles NW of the bays N entrance point.

Nugget Point is a bold projecting headland covered with scrub, that is the termination of a prominent ridge which rises to a height of 220m, 1.2 miles inland.

Anchorage may be taken in Molyneux Bay, with offshore winds, in a depth of 14.6m, about 3 miles N of Nugget Point. Care should be taken to anchor clear of the reef which extends 1 mile N and 0.5 mile E of Campbell Point.

From Nugget Point, the coast trends SW for a distance of 12.5 miles to **Long Point** (46°35'S., 169°35'E.), which has a height of 65m, and a hill, 234m high, rises about 2 miles N of Long Point.

The intervening coast between Nugget Point and Long Point is broken, with some off-lying islets and reefs lying near the shore.

False Islet, a small bare promontory, 60m high, lies 3.5 miles SW of Nugget Point; it is connected to the mainland by a sandy isthmus.

White Head (46°31'S., 169°42'E.), about 3.5 miles SW of False Islet, is a bold cliff which rises to a height of 122m. Hinahina Hill, 376m high, rises 3 miles W of White Head.

The coast from White Head for a distance of about 4 miles SW is formed by cliffs from 61 to 183m high.

Long Point is steep-to, with the 55m curve lying about 0.6 mile off the point. Approaching from the N, the tidal currents of Foveaux Strait begin to be felt in this vicinity.

12.72 The **Tautuku Peninsula** (46°37'S., 169°26'E.) lies 6 miles WSW of Long Point; the peninsula is 30m high.

Tautuku Bay, with a sandy beach backed by low scrub, is formed on the N side of the Tautuku Peninsula. A river enters the sea in the SW corner of the bay.

There is anchorage in Tautuku Bay, in depths of 13 to 17m, during W and NW winds, but it is exposed in other directions.

Chaslands Mistake, 145m high, a prominent black headland, lies 3.7 miles WSW of the Tautuku Peninsula.

Between Chaslands Mistake and The Brothers Point, 6.5 miles WSW, the coast forms a bight, and near its center there is a small rocky headland from which The Sisters, a reef, extends 0.4 mile SE.

The Brothers Point (46°40'S., 169°12'E.) is 54m high; a reef extends 0.4 mile SE from the point.

South Head lies 4 miles W of The Brothers Point. The tidal currents of Foveaux Strait slacken considerably off this part of the coast, and the NE current runs for a longer period.

Between South Head and Waipapa Point, nearly 11 miles W, the coast should not be approached by small craft, except in good weather, due to the irregular tidal currents.

Slope Point (46°41'S., 169°00'E.), 4.5 miles WSW of South Head, is the S extremity of South Island. This is a high and bare point, with the sea breaking on a sunken ridge about 1 mile off it. A light is situated on the point.

12.73 Waipapa Point (46°40'S., 168°51'E.) lies 6.2 miles W of Slope Point; it is low and sandy, sloping gradually to the sea from the mountains to the NE. Foul ground extends in a SSE direction from the point. There are depths of 4.6m and 9.1m, 1 and 2 miles SSE, respectively, of the point. A rocky

ridge, with a least depth of 18.3m, lies about 4 miles SSW of the light on Waipapa Point. The sea is reported to break heavily in depths of 12.2 to 18.3m off this point.

Toetoe Bay lies between Waipapa Point on the E and Bushy Point on the W, a distance of 14 miles WNW.

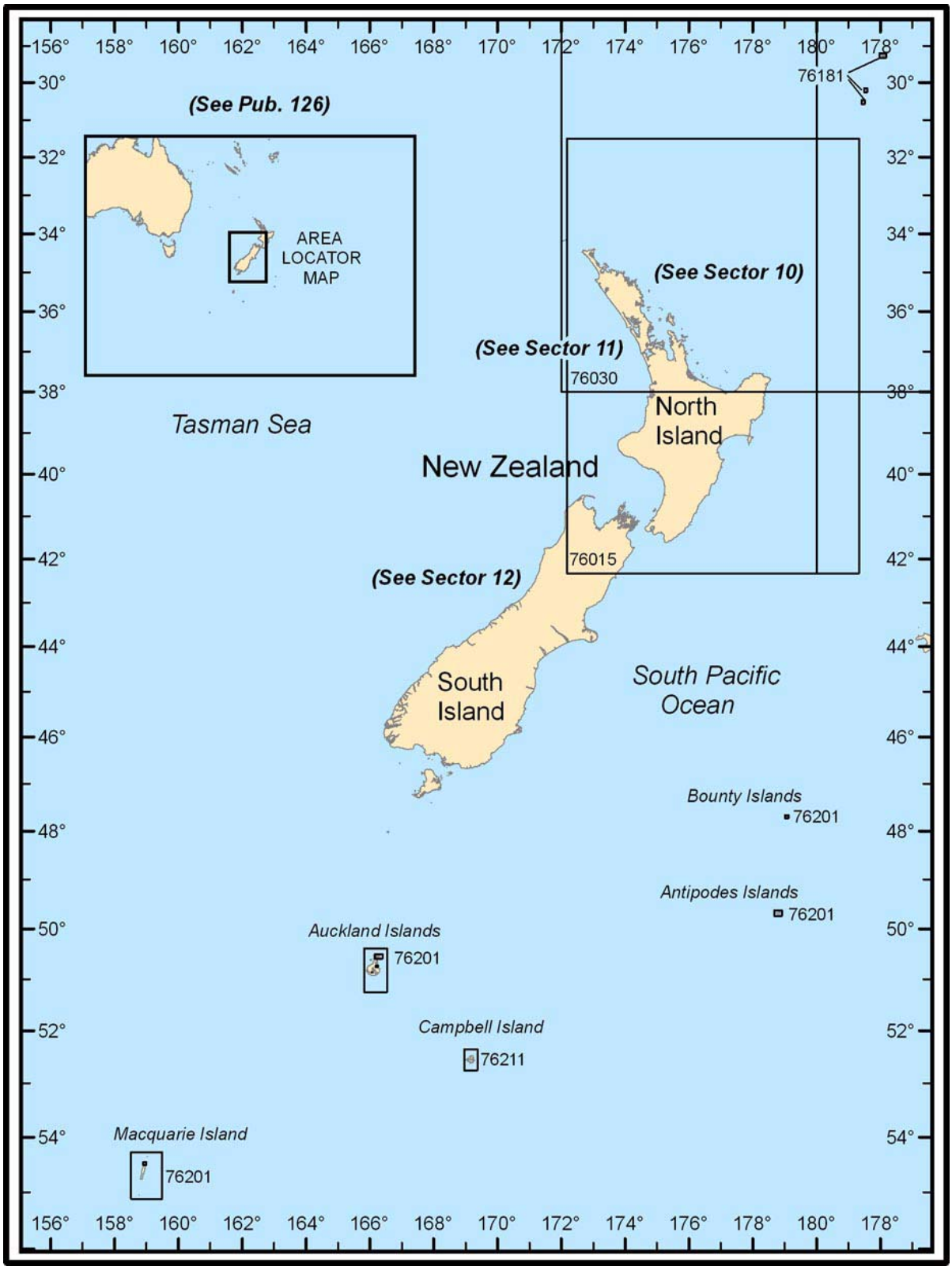
The Mataura River, which drains a large extent of the country, flows into the sea 5 miles NNW of Waipapa Point.

For a distance of 3 miles NNW of Waipapa Point, the coast is formed by low, grass covered hills, and is fronted by foul ground extending 0.8 mile offshore.

Fortrose, a town, stands on the E bank of the Mataura River. The entrance to the river has a shifting bar with a depth of 0.6m.

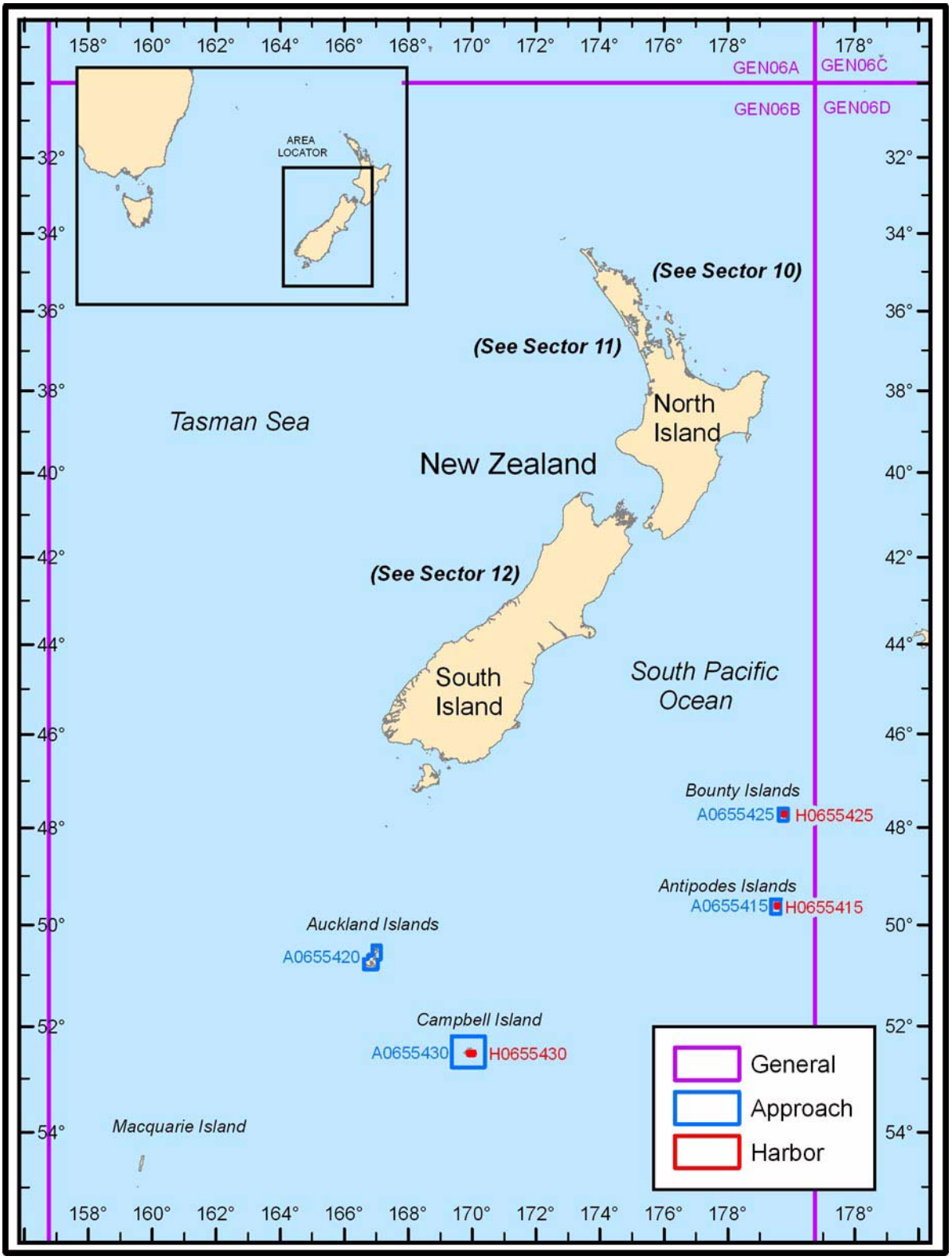
Between Fortrose and Bushy Point, 11.5 miles W, the coast is low, sandy, and backed by an extensive plain.

Bushy Point (46°36'S., 168°31'E.), which is low, can be identified by the light and a prominent patch of scrub.



Additional chart coverage may be found in NGA/DLIS Catalog of Maps, Charts, and Related Products (Unlimited Distribution).

SECTOR **13** — CHART INFORMATION



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SECTOR 13 — DNC LIBRARY INFORMATION

SECTOR 13

NEW ZEALAND—OFF-LYING ISLANDS

Plan.—This sector describes the off-lying islands, which include the Kermadec Group, the Chatham Islands, the Bounty Islands, the Antipodes Islands, Campbell Island, the Auckland Islands, and Macquarie Island. The arrangement is in the order of the islands given above.

General Remarks

13.1 The term New Zealand generally applies to the three principal islands; the off-lying islands are referred to by name.

The New Zealand Government maintains a depot of provisions and clothing at the Kermadec Group, the Chatham Islands, the Bounty Islands, the Antipodes Islands, Campbell Island, the Auckland Islands, and Macquarie Island for the use of shipwrecked mariners.

Winds—Weather.—The climate in the Kermadec Islands is mild most of the time and slightly warmer than that in the N part of New Zealand. There is no frost, rainfall is plentiful but not excessive. In the winter, SW and W winds will prevail, and NE and E in the summer. Strong gales are experienced in winter.

Typhoons commencing at the SE and backing to the NE have been experienced in January and February, although they are rare.

Caution.—A voluntary code of shipping routes around the New Zealand coast, to reduce the potential for pollution of the marine environment, has been introduced. For further information, see Pub. 120, Sailing Directions (Planning Guide) Pacific Ocean and Southeast Asia.

The Kermadec Group

13.2 The **Kermadec Group** (30°00'S., 178°00'W.) are a rocky group lying about 445 miles NE from North Cape of New Zealand and 52 miles SSW of Curtis Island. They are a New Zealand dependency administered by the New Zealand Land and Survey Department for the preservation of inherent flora and fauna.

The principal islands are Raoul Island (Sunday Island); Macaulay Island and Curtis Island, the two central islands; the Herald Islets; and L'Esperance Rock (French Rock), which is the S islet of the Kermadec Group. The islands are volcanic. There is plentiful rainfall and the climate is mild and pleasant.

National Nature Reserves.—All the islands of the Kermadec Group are nature reserves and cannot be visited without a landing permit from the New Zealand Department of Conservation. Raoul Island is the most robust of the islands and visitor permits are available to those with a genuine interest in its natural and cultural history. The other islands are extremely fragile and cannot withstand even low numbers of visitors. Permits to land are only given to people for work which will assist either the management or understanding of the island's ecosystems.

Marine Reserve.—The waters around the Kermadec Islands and rocks, out to the edge of the Territorial Sea Limit (12 miles) are a marine reserve.The following regulations apply:

1. All fishing and other extractive activities are prohibited.
2. Activities that interface with or disturb marine life are also prohibited.
3. Vessels visiting the islands may anchor if they exercise care.
4. It is an offense to discharge any toxic pollutant or rubbish into the reserve.
5. Fines of up to Aus$250,000 and/or six months imprisonment may apply under the Marine Reserves Act 1971 for any offenses committed.

Caution.—The Kermadec Group is being uplifted. In recent times, Curtis Island and Cheeseman Island have been raised about 18m. There may be less water than charted in the vicinity of the islands.

The Kermadec Group and surrounding seas lie in an area of known volcanic activity. In 1979, a submarine volcano, with a depth of 117m, was reported in position 25°53'S, 177°11'W, about 200 miles NNE of Raoul Island.

Numerous depths less than 200m, possibly resulting from volcanic activity, are charted within 240 miles of Raoul Island. The shallowest of these depths may indicate or constitute hazards to shipping; they are 40m, reported 1959, and 22m, reported 1960, charted 10 miles apart, 90 miles NNE; 30m, reported 1983, 47 miles NNE; and a depth of 4m, existence doubtful, 110 miles S.

13.3 **Raoul Island** (Sunday Island) (29°16'S., 177°57'W.) is regarded as the most important in the Kermadec Group and the most habitable. It is about 15 miles in circumference, with its highest peak toward the E at 516m. There are four crater lakes or swamps, and at least two of them contain fresh water, which is not potable. The island is visited every 6 months by a supply vessel. New Zealand naval ships and aircraft land or parachute mail in on an irregular basis. In July 1937, a meteorological reporting station was established on a plateau 40m above sea level on the N coast of Raoul, just off Fleetwood Bluff and across the island from the former Denham Bay settlement. The only present inhabitants are New Zealand personnel on Raoul Island, who man this station which is maintained by the New Zealand Ministry of Transportation.

Anchorage.—Anchorage is found in West Anchorage, in 21.9m, 0.5 mile outside the entrance points. Other anchorages close-in of Raoul Island are best seen on the chart, as well as the dangers that exist in and about Denham Bay.

The **Herald Islets** (29°15'S., 177°52'W.), comprised of two groups of islands and islets, are located 1 to 2 miles NE of Raoul Island. The islets are composed of mostly bare rocks and are the breeding places of sea birds. Meyer Island, 1.2 miles NE of Raoul Island, is the largest and is 67m high, and covered with bush. There is a small boat harbor on the W side of this island.

13.4 Macauley Island, the second largest of the Kermadec Group, is almost circular in outline, about 1.5 miles in diameter. It lies about 60 miles SSW of Raoul Island and is about 238m high. The soil on this island is mostly dark volcanic loam, covered with fine smooth grass.

The coasts are high, with sheer cliffs which can be ascended at the lava cascade, located on the NE side of the island. Macauley Island is uninhabited and is not regularly visited.

Anchorage.—Anchorage is obtainable, when weather conditions are suitable, about 0.4 mile NNW of the NE extremity of Haszard Islet, and about 0.2 mile offshore, in depths of 38.4 to 51.2m. A close examination of Haszard Islet will indicate most sides are fringed by a reef and submerged rocks in places.

Caution.—Mariners are warned that when in shallow water in the vicinity of the Curtisy Island and Macauley Island, compasses may be affected by local magnetic influences.

13.5 The **Curtis Islands** (30°30'S., 178°35'W.) are two remarkable rocky islands known as Curtis Island and Cheeseman Island, separated by Stella Passage, which is about 0.3 mile wide with a least depth of 18.3m. These islands of the Kermadec Group lie about 19 miles SSW of Macauley Island and are reported to lie about 5 miles S of their charted position. Curtis Island, the E and larger, is oval-shaped and about 0.5 mile in extent, giving a good radar return up to 28 miles. The island rises in sheer cliffs from parts of which steam issues. In the N part of the island there is a volcanic crater the floor of which is only 10m above sea level and is formed by a fragile crust over boiling mud; a stream of hot water flows from the crater through a breach in its N side into the sea. At the SE end of the island there is a large chasm. The volcano was active in 1899 and again, to a lesser extent, in 1936. In 1973, Curtis Island was found to lie 2.7 miles SSE of its charted position.

The island was visited in 1989 and found to have uplifted another 9m. No sign of the breach in the N side of the crater was found.

Cheeseman Island is wedge-shaped, with sheer cliffs on the E and is boulder-strewn on the W side. The W shore is formed by rocky cliffs.

Landing by boat is possible on the NE side of Curtis Island, and landings have been made on the SW sides of both islands. Walking on Curtis Island is dangerous due to extensive burrowing by the large bird population.

Anchorage.—Anchorage may be obtained with suitable weather conditions at the N end of Stella Passage, between 0.1 mile N and 0.2 mile NW of the N extremity of Curtis Island, in depths of from 21.9 to 23.8m.

Caution.—Navigation of Stella Passage is not recommended.

13.6 **L'Esperance Rock** (31°26'S., 178°55'W.) lies 52 miles SSW of Curtis Island. It is about 70m high and covers 15 hectares; it is bare and desolate with very steep sides, and only useful as a landmark for Havre Rock, which is a danger.

Landing can be made by boat on the E side of L'Esperance Rock, but only in very good weather.

Havre Rock is located about 5 miles NNW of L'Esperance and is awash; it is reported the sea breaks over it in heavy weather, although there are conflicting reports as to whether this actually occurs. In any case, the mariner should give these rocks a wide berth and allow for the fact that the rock has been reported to lie 6.5 miles, bearing 311° from L'Esperance Rock.

Caution.—A dangerous reef was reported in 1955 in position 35°24'S, 176°17'W. This area should be avoided.

Breakers were reported (1960) in about 39°27'S, 162°27'W, about 620 miles ENE of the Chatham Islands.

The Star of Bengal Bank, with a least reported depth of 48m, lies about 64 miles SSW of L'Esperance Rock; a depth of 57m has been reported to lie about 40 miles SSW of the bank. Depths of less than 300m lie within 20 miles of the bank.

In 1983, depths of 48m and 57m were reported to lie about 5 miles S and 45 miles SSW of the bank, respectively.

Other uncharted dangers shoaler that 200m may exist in this area associated with the Kermadec Ridge and the South Fiji Ridge as a result of submarine volcanic activity. Earthquake and volcanic activity NNE of New Zealand may cause shoals with depths of 35m or less to build up, even in areas that are well surveyed. Not all these dangers have been charted.

The Chatham Islands

13.7 The **Chatham Islands** (44°00'S., 176°30'W.), two in number, occupy a space 55 miles N and S and 50 miles E and W. Chatham Island is the largest, with its NW extremity lying about 370 miles ESE of Cape Palliser, the S extremity of North Island, New Zealand.

Pitt Island lies SE of Chatham Island and extends 8 miles in a N and S direction with numerous islets and rocks surrounding it.

The Chatham Islands are so remote from other land masses that heat and cold are both moderated by sea breezes; showers fall at least a few hours every week. In May, June, and July the climate is mild and agreeable, with the temperature ranging from 7° to 16°C during the day. Mist is frequent, but not of long duration. Prevailing winds are NE and SW.

The effect of the tidal currents may be experienced 10 to 15 miles from the Chatham Islands. The flood splits at the S extremity and travels N along the E and W sides to join again at the N end; similarly the ebb divides at the N extremity, and rejoins at the S end.

The coasts of the Chatham Islands have not been closely examined and should not be approached within 3 miles, except by vessels with local knowledge. As another precautionary measure, it is reported that obstructions to navigation may exist off Cape Young for a distance of about 4 miles.

Aspect.—The island is of irregular shape with a land area of 70,612 hectares indented on its E and W coast by Hanson Bay and Petre Bay, respectively. The island attains an elevation of 283m near its S end. The general aspect is that of beautiful rolling downs covered with grass and patches of fern and spotted by several lakes on the island. Prominent from the W approach to the island is Maunganui Hill, rugged and 179m high. Mount Dieffenbach, E of Maunganui, has a sharp peaked summit and is very conspicuous.

Petre Bay, on the W side of Chatham Island, is about 11 miles wide and extends about 10 miles to the NE. The entrance is between Durham Point, where a light is shown, and Somes Point. On the SE and N sides of the bay are situated the anchorages of Waitangi Bay and Port Hutt.

Red Bluff, 74m high, forms the N entrance of Waitangi Bay.

A group of shoals, with depths of 11 to 12.8m, lie 1.2 miles NNE of Point Weeding; there is a 7.9m shoal 0.4 mile farther N. In heavy weather, the sea breaks on these shoals. A light is situated on the summit of Weeding Point.

13.8 Port Waitangi (43°57'S., 176°31'W.) is the administrative center of the Chatham Islands. The Resident Government Agent resides here. There is a T-head pier at the port, with an alongside depth of 5.8m at its head. There is a prominent shed situated at the root of the jetty. Landing on the beach is not practical and the anchorage is unsafe in W gales.

Tides—Currents.—The tide rises 0.7m at springs, and 0.6m at neaps. The time of HW or LW is roughly 42 minutes fast at Lyttelton.

Anchorage.—Anchorage may be obtained, in a depth of 8.2m, about 0.2 mile NE of Point Hanson, but a mariner should be wary of a high, breaking sea that rolls into this anchorage with a NW or W gale; the bottom is sand.

The River Nairn flows into the sea at the head of Port Waitangi. The meeting of the river and sea causes discoloration along the W side of the bay. There is a prominent road bridge at the river mouth.

13.9 The coast from Waitangi N is a sandy beach for 3 miles and is then broken by Red Bluff. This beach continues until the coast turns W, and from there to Somes Point, the shore is broken and rocky, the entrance to Port Hutt being 8.5 miles E of Somes Point.

Port Hutt (Whangaroa) is sheltered in all directions, but there exists a heavy sea at the entrance when it is under the influence of strong W and S winds. Maunganui Mount appears in line with Tawhirikoko Mount bearing about 310° from the entrance to Port Hutt. This is a useful aid when identifying this entrance, as there are bays E which, like Port Hutt, have sandy beaches at their heads.

There are several freezing establishments where blue cod is packed and sent to New Zealand markets in good condition. There is ship communication between Port Hutt and Lyttelton, New Zealand bimonthly, and more frequently during the first three months of the year.

The sea breaks heavily on the reefs and rocks, which extend about 0.2 mile from each of the entrance points. It is also reported that a patch of kelp usually stretches partly across the entrance from Napper Reef, but there is a depth of 20m where it lies. The outer edge of the kelp marks the deep water off Point Gordon, on the W side within the harbor.

A rock, which breaks with a W swell, lies in the W approach to Port Hutt. From this rock, the W entrance point of Ocean Bay bears approximately 030° and Matikitaki Hill bears approximately 342°.

Tides—Currents.—The mean spring range here is 0.7m.

Anchorage.—The anchorage is in depths of 8 to 9m, with Port Gordon bearing 180° and the island off Evans Point bearing 105°.

A large vessel should moor or anchor farther out, if intending to stay any time, as there is scarcely swinging room at single anchor, unless the anchor is dropped exactly in the center of the harbor.

13.10 Ocean Bay (43°50'S., 176°46'W.), located 3.5 miles W of Port Hutt, provides anchorage, in 7.3 to 10.9m, at its head from all W and S winds around to SE. The bottom is rocky and the holding capabilities may be unreliable. A 4m patch lies 300m SW off the E entrance point. Local knowledge is required.

Cuba Channel, the best approach to Port Hutt in Petre Bay from the W, is about 3 miles wide between Somes Point and West Reef. Depths of 31 to 65.8m were found when passing through the middle of this channel and it appears it is free of dangers.

West Reefs lie about 1.5 miles SW of Somes Point. Foul ground, which breaks, extends out to the E, SE, S, and SW. It should be noted that foul ground is reported to extend farther to the SW than charted. The mariner may observe the sea breaking on West Reefs from a distance of several miles.

The coast trending NE from Somes Point to Alison Point appears to be fringed with rocks and therefore should not be approached nearer than 1 mile. From the E of Alison Point off Waitangi West, there is reported to be good anchorage with offshore E winds. Although conditions here are ideal for anchorage, there is a submerged rock about 0.2 mile offshore about midway between Alison Point and Waitangi West. Between Alison Point and Mohau Point, 3 miles NE, the coast indents forming a bay with foul ground extending about 2 miles WSW of Mohau Point.

Cape Pattison, at the foot of Maunganui Hill, is formed by a level beach backed by a sheer cliff, 30.5m high.

Foul ground lies up to 5 miles N, 6 miles NE, and 5 miles NNW of Cape Young. Several isolated patches, with depths ranging from 5.5 to 27m, lie roughly on a line extending from North West Reef, to The Sisters, and the N end of the foul ground protruding from Cape Young. The bay between Cape Pattison and Cape Young, 8.2 miles ENE, consists of a sandy beach and is backed by wooded hills. In the middle of this bay, four needle-shaped rocks, known as Nagatikitiki, lie about 0.1 mile offshore.

Caution.—Northwest Reef, the outer danger, whose position is doubtful, lies about 16 miles NW of Cape Young.

The Sisters (Rangitutabi), lying about 10.5 miles NW of Cape Young, consist of three small rocky islands, close together, flat-topped, with steep sides and covered with meager brushwood and frequented by birds.

A 12.8m patch, the charted position of which is approximate, lies about 3.5 miles S of the Sisters.

In 1981, a depth of 25m was reported to lie 12.5 miles ENE of Point Munning.

13.11 From Cape Young, the coast extends about 18.5 miles E to Munning Point, the NE extremity of Chatham Island. Again, as with other parts of the N Chatham Island coast, there is a broad beach backed by low wooded hills, but in this stretch of coast, there are numerous scattered rocks, which dry, off of which are regular depths of 36.6 to 45.7m, about 2 or 3 miles offshore.

Kaingaroa Light is shown from the summit of a hill 1.5 miles W of Munning Point.

Kaingaroa Bay (Skirmish Bay) (43°44'S., 176°16'W.) has its entrance obstructed by rocks. The Lure, the outermost danger, is a rocky patch which lies in a position bearing 303°, 1.5 miles from **Pukerakei Light** (43°44.1'S., 176°14.4'W.). This

danger is covered, but occasionally the sea does break on it. Rocks, mostly visible, extend to the middle of the entrance from the W point and terminate in a sunken rock. A sunken rock, over which the sea breaks occasionally, lies about 0.2 mile NW of the E entrance point.

Range beacons at the head of Kaingaroa Bay, in line bearing 169.5°, lead into the harbor, passing close E of the 4m rock on the W side of the entrance. Facilities in the harbor are confined to a wharf, about 122m long, which projects into the harbor from a fish factory, situated 0.1 mile S of the W entrance point.

Munning Point is a low rocky point with wooded land behind it. Te Wakaru Islet is connected with the point by rocks, which dry at LW, with reefs extending nearly 1 mile seaward.

A depth of 23m has been reported about 17 miles NE, and a depth of 25m lies about 12 miles NE of Munning Point.

13.12 Okawa Point (43°46'S., 176°14'W.) lies 3 miles S of Te Wakaru, where the coast recedes to form a bay. At the head of the bay lies a sandy beach. Rocks, above and below-water, lie up to 1.5 mile off the beach which is backed by low wooded hills.

Hanson Bay, on the E side of Chatham Island, is formed between Okawa Point and Cape Fournier, 17 miles S. This bay has not been examined, but fisherman knowledgeable of this coast report there are no dangers 1 mile offshore. There are many reefs in the bay and frequently there is a heavy surf.

Anchorage.—There is anchorage in the N part of Hanson Bay, W of Okawa Point, but is subject to E winds that will set in suddenly. With SW winds, shelter may be obtained at Ouwenga, N of Cape Fournier, in 9 to 11m, mud and sand.

Old Man Reef (44°01'S., 176°21'W.), on which the ground is foul, extends over 1 mile NNE from a position about 2 miles NW of Cape Fournier. Ouwenga, a village, lies close W of the reef.

Anchorage.—Anchorage can be obtained under the lee of this reef, in 10.9m, about 0.7 mile from the shore, sand and mud bottom. This anchorage is marked by leading lights, which when in line bearing 142°, guide the mariner W of Old Man Reef.

13.13 Cape Fournier (44°03'S., 176°20'W.) is a wooded hilly promontory, about 101m high, with reefs projecting nearly 2 miles E. Foul ground extends up to 2.5 miles E and 2 miles NE of Cape Fournier. Foul ground extends up to 3 miles off the coast between Cape Fournier, and Cape L'Eveque.

Bertier Islet (Forty Fours Islet) (Motuhara Islet) lies 22 miles E of Cape Fournier. It is a flat-topped islet, about 46m high, surrounded by four rocks, above-water, which lie no more than 0.2 mile E of the principal islet.

The S side of Chatham Island, between Cape Fournier and **Cape L'Eveque** (44°07'S., 176°35'W.), becomes abrupt and precipitous, with a mean elevation of about 183m and the land above the cliff taking on a level and wooded aspect.

From Cape L'Eveque, the coast turns sharply to the WNW and extends in that direction a distance of 7 miles to Durham Point.

Caution.—Dangers found in this stretch of the coast are a rock, with a depth of less than 2m, which lies 0.7 mile bearing 350° from the W projection of Gap Point (44°04'S., 176°40'W.) and foul ground, with rocks awash, extending about 1.5 miles offshore between Kiringe and the outer end of **Jenny Reef** (44°00'S., 176°43'W.).

13.14 Pitt Strait separates Pitt Island from Chatham Island and is apparently free from dangers, with the exception of **Sentry Reef** (44°12'S., 176°34'W.). Areas of breakers exist about 4.5 miles E of Sentry Reef with another area of breakers about 6.7 miles SW of Cape L'Eveque, and those rocks lying off the W and SW sides of Pitt Island which are steep-to. Vessels should favor the S side when navigating Pitt Strait.

Pitt Island (Rangiauria Island) (44°17'S., 176°13'W.) lies about 12 miles SE of the S side of Chatham Island. At **Whihere** (44°17'S., 176°15'W.), the island is highest at 241m. The island is thickly wooded and has a very fertile soil. European fruits grow and thrive; wheat is also cultivated, but not in sufficient quantities for exportation. The island is surrounded by numerous islets and rocks. Moutapu Point is the N extremity of Pitt Island and is marked by a light.

Anchorage.—Anchorage is good 1 mile WSW of Moutapu Point in Flower Pot Bay, in a depth of 21.9m, sand, but the anchorage is only in an area about 0.3 mile from the head of the bay. Elsewhere, the bottom was found to be rocky and extremely foul with kelp.

On the W side of the island there is good anchorage, in Waihere Bay with N and E winds, in 21.9 to 27.4m.

Good anchorage will be found in Waihere Bay during E winds, with **Round Rock** (44°22'S., 176°20'W.) just shut in by the SW point of the bay. A vessel should exercise caution when leaving the anchorage on a change in direction of wind to avoid the reef off Rabbit Islet.

Anchorage is available off the NE coast of the island, close SE of Kokope Islet, 1 mile NW of Kahuitara Point, in a depth of 20m.

Glory Bay, located on the E side of Pitt Island, provides an anchorage formerly frequented by whalers, where vessels may ride well-sheltered from the effects of W gales.

13.15 From **Mangere Island** (44°16'S., 176°17'W.), on the W side of Pitt Island, a remarkable group of islets extends about 4 miles to the WSW; the first, closely adjoining Mangere Island, is known as Fort Islet. Sail Rock, the W extremity of this group, has an extraordinary resemblance to a boat with a gigantic lug sail.

In 1975, depths of 12.8 to 14.6m, marked by breakers in heavy weather, were reported to lie between 4 and 5 miles WSW of Sail Rock.

Northeast Reef lies about 1.2 miles E of Kahuitara, the E extremity of Pitt Island.

Star Keyes (Motuhope) are a group of five islets with Round Islet, the largest, lying about 6.5 miles ENE of Kahuitara.

Eastern Reef (Ahuru) is about 10 miles SE of Round Island. Numerous shoals lies between Star Keyes and the NE side of Pitt Island.

Rangatira Island (Southeast Island) lies 2.5 miles ENE of the S point of Pitt Island, with Passage Reef in the channel between. This unimportant island, which rises to 207m, is surrounded with rocks and reefs, the positions of which may only be approximate.

The Pyramid (44°26'S., 176°12'W.), a rock 172m high, is

located S of Pitt Island.

Tides—Currents.—The tidal currents are felt at a distance of 10 to 15 miles from Chatham Island. The flood splits at the S extremity and runs N along the E and W sides to join again at the N end; similarly the ebb divides at the N extremity and rejoins off the S end.

The Bounty Islands

13.16 The **Bounty Islands** (47°41'S., 179°03'E.) are a bare and rugged group of uninhabited islands lying about 360 miles ESE of the entrance to Otago Harbor, New Zealand. A deep channel breaks up some 20 islets and rocks into an Eastern Group and a Western Group, facing N in shape. The islands range in elevation from 3 to 88m, showing marks of severe marine erosion.

There are no indentations which afford even moderate shelter over this group, which occupies an area of about 3 miles E and W and 2 miles N and S. These islands were reported (1973) to lie 3.4 miles, bearing 193° from their charted positions.

These islands have been declared a wildlife sanctuary. Landing is by permit only.

The principal island lies NE of the Western Group, standing 88m high, with an inlet on its E side and another on the W. At about 2 miles, bearing 233° from the summit of this island, is a rock nearly awash, and the sea breaks heavily on a reef which extends nearly 0.5 mile NE of the rock. Breakers have been seen 0.5 mile N of this reef.

Anchorage.—Anchorage may be obtained, in 42m, between the N part of the principal island of the Western Group and those W of it.

Caution.—Great care should be observed in approaching the Bounty Islands in thick weather, as the off-lying rocks do not always break.

Norman Rocks, a dangerous group of sunken rocks, lie about 3.5 miles NW of the Western Group; Rosario, a sunken rock, lies about the same distance SW of the same group.

The Antipodes Islands

13.17 The **Antipodes Islands** (49°40'S., 178°50'E.), about 115 miles S of the Bounty Islands and about 400 miles ESE of the entrance to Otago Harbor, New Zealand, are uninhabited. Its coasts are bold and precipitous, and appear to be entirely volcanic. The surface forms a rough and undulating plateau and slopes up from the NE and S cliffs towards the W; the highest point is Mount Galloway, 402m high, on the top of which a lake is said to lie.

The large island is about 5 miles in length, N and S and tapering to its N extremity. There are no openings in the coast of the main island, except Ringdove Bay and Depot Anchorage.

These islands have been declared a wildlife sanctuary. Landing is by permit only.

Depot Anchorage (Anchorage Bay) (49°40'S., 178°50'E.) is an open bay between North Cape and Reef Point, with anchorage in 18 to 29m. Holding ground is only fair due to the characteristics of the bottom., a thin layer of black sand covering rock.

Ringdove Bay (49°42'S., 178°50'E.), on the SE side of the large island S of Leeward Island, is reported to have good anchorage, in about 36.5m. There was smooth water in this bay when a heavy SW swell was running outside.

13.18 Bollons Island (49°38'S., 178°50'E.) is a double island rising to 152m, whose two sections are connected by an extraordinary arch. Bollons Island appears to be part of an extinct crater, broken down on its W side. This island was reported to lie 0.3 mile, bearing 165° from its charted position and that the coast line was inaccurate. There is a deep channel between Bollons Island and the main island, but it is reported to be inaccessible except in the finest weather.

The main island is surrounded by hazards. A reef, having a rock about 1.5m high near its extremity, extends about 0.5 mile from the SW side of the island; South Islet lies at the S extremity. The Windward Islands lie off the NW point. Ordes Lees Islet lies close off the middle of the NW side of the principal island.

Tides—Currents.—The mean HW interval in the Antipodes Islands is 3 hours 20 minutes. The rise at MHWS is 1.8m; no other data is available.

Two streams of fresh water were found, one emptying into the sea on the NE side of the island and the other emptying into the sea on the NW side of the island.

Campbell Island

13.19 Campbell Island (52°33'S., 169°13'E.) is about 440 miles S of the entrance to Otago Harbor and about 148 miles SE of the Auckland Islands. This island is mountainous and, like the Auckland Islands, it is of volcanic origin. The coasts of the Campbell Islands are bold and the rocks and islets are of fantastic forms. The hills are steep and rugged, rising to elevations of 198 to 570m, the highest point of which is in Mount Honey, located S of Perseverance Harbor.

This island is a wildlife sanctuary. Landing is by permit only.

The weather on the island is temperate. Snow never lies on the ground for more than 3 days. In December and January, the temperature averages 26°C. In July, the weather is mild, with temperatures not falling below 3°C in the valleys.

Gales are frequent on the island and continue with persistence. They generally originate from the N with a falling barometer, veer to the W and WSW, and become very severe.

The current generally sets E.

Northeast Harbor indent the E side of the island; South Harbor indents the E side of the island. The other shores are scattered with islets and rocks affording no shelter.

Northeast Harbor (Penquin Bay), located 4 miles N of South Harbor, may be identified by Cossack Rock, a small round island 0.2 mile E of the N entrance point of the harbor. The harbor extends SW for 2 miles and increases in width toward the head, terminating in two creeks, where a fine valley with a large stream flows into the sea.

Anchorage.—Anchorage is obtained in all parts of Northeast Harbor, in 10 to 25.6m. East winds seldom blow in Northeast Harbor.

13.20 Smooth Water Bay, which is unsurveyed, lies between a point about 0.7 mile S of the S entrance of Northeast Harbor and East Cape, about 1.7 miles SSE.

East Cape is a dark, sheer bluff, about 91m high. From this bluff to Erebus Point, the NE entrance point of South Harbor, the coast is foul.

South Harbor (Perseverance Harbor) (52°33'S., 169°09'E.) is entered between Erebus Point and South Point, where there is a 0.5 mile wide opening. The harbor extends about 4.5 miles W to Garden Cove at its head. The shores on either side are steep and rise abruptly to heights between 244m and 274m. Mount Lyall, the highest hill seen from the harbor on the N side, reaches to an elevation of 413m. The hills have a more desolate appearance than those of the Auckland Islands, being less wooded, and, although trees exist in sheltered places, they nowhere attain so great a height as in those islands.

Range beacons lead into the harbor. The first two, in line bearing 299.5°, lead through the entrance and N of Terror Shoal; the second two beacons, in line bearing 262°, lead to the anchorages. The inner limit of the anchorage is reached through two beacons in range 015°.

Lights are shown from the two entrance ranges. In the outer part of the harbor the water is too deep for convenient anchorage, but in the inner part which is almost landlocked, there is abundant room for a number of vessels to anchor in very fine sand and silt cover, with a fine mud base.

A New Zealand Government meteorological station, with a small jetty for boats, is situated in the N part of the harbor.

13.21 South coast of Campbell Island.—Jacquemart Islet, about 183m high, lies about 0.5 mile SSW of the S extremity of Campbell Island, which is also the W entrance of Monument Harbor. Breakers mark the S end of Jacquemart Islet.

La Botte (52°37'S., 169°09'E.), an above-water rock with a similar rock S of it, lies between the W entrance point of Monument Harbor and Jacquemart Islet.

The coast in the vicinity of Monument Harbor and Southeast Harbor presents a desolate and storm beaten appearance; these bays afford no shelter.

13.22 Northwest coast of Campbell Island.—North West Bay lies between Currejolles Point and the W extremity of Campbell Island, about 6 miles SW.

Courrejolles Point, the NW extremity of Campbell Island, is a vertical promontory, about 244m high, joined to the island by a low neck. An island lies close-by the point, where strong tide rips occur in the passage between.

Caution.—Dangers consist of above-water rocks which extend out from the coast at the foot of Mount Azimuth and beyond. Dent Island, rising up to 183m, lies about 1.7 miles ENE of the W extremity of the island.

The Auckland Islands

13.23 The **Auckland Islands** (50°40'S., 166°10'E.) are located about 250 miles SSW of Bluff Harbor, New Zealand. The islands form a group, 28 miles long, nearly N and S and about 16 miles broad, separated by narrow channels. The land is mountainous, culminating in the S at a height of 668m at Adams Island.

These islands have been designated as wildlife sanctuaries. Landing is by permit only.

The weather in these islands is temperate. Snow never lies on the ground for more than 3 days. In December and January, the temperature averages 26°C. In July, the weather is mild, with temperatures not falling below 3°C in the valleys.

Gales are frequent on the islands and continue with persistence. They generally originate from the N with a falling barometer, veer to the W and WSW, and become very severe.

The current generally sets E.

The E part of the main island is deeply indented. The W side is unbroken, having no openings except the narrow separation of Adams Island; in fact, the W side of the main island forms a continuous perpendicular wall from 180 to 365m high.

13.24 Northeast side of Main Island.—Bristow Rock, an off-lying sunken rock lying N of Enderby Island, lies directly in the shipping lane rounding the N end of the group. This rock only breaks occasionally and with a heavy swell; the position is somewhat doubtful.

Heavy overfalls occur within the vicinity of the rock.

Enderby Island (50°30'S., 166°18'E.) is a government reserve forming a tableland of about 480 hectares, covered with scrub; the remainder consists of fluctuating swampy terrain attaining an elevation of 46m.

Tides—Currents.—The tide rips off the N point of Enderby Island can extend out to the NE for as many as 12 miles. The mariner not familiar with these waters could be made uneasy by this appearance. The flood current sets NNE; the ebb current sets S.

Anchorage.—Anchorage is on the S side of the island, 1.7 miles from its E extremity, but should be used only as a temporary anchorage, being protected from all winds except those from the SE. The holding ground is of tenacious clay.

13.25 The entrance to **Port Ross Harbor** (Sarah's Bosom Harbor) (50°32'S., 166°14'E.), at the NE end of the Auckland Islands, is located between Enderby Island on the N and Ewing Island on the S. In the approach to Port Ross, the N end of Ewing Island, in range with Butterfield Point, the W extremity of Enderby Island, leads outside the reef that connects Dundas Islet and Green Islet. This reef, covered in parts at HW, generally shows breakers extending 1 mile NE.

The entrance to Port Ross is 1 mile wide, with depths of 20 to 36.5m. The harbor extends nearly 7 miles to the SW; a depth of 12.8m is found about 1 mile from its head. This large inlet contains several bays, surrounded by basaltic rocks, which are easy of approach.

As previously stated, the E coast of the Auckland Islands is heavily indented. Trending S and all open to the E are Chamber Inlet, Granger Inlet, and Griffith Inlet, between Kekeno Point and Smith Harbor. Northeast of these inlets, a danger exists in **Blanche Rock** (50°37'S., 166°20'E.). Breakers were seen when passing Blanche Rock. Kelp has been reported to lie up to 2.2 miles SE of the island.

13.26 Smith Harbor (Saddle Hill Inlet) indents the coast about 7 miles S of Kekeno Point. It extends W and S for 1.5 miles. At the entrance of Port Ross, with strong W winds, squalls of great violence blow down from the hills.

A remarkable feature marking the N part of Port Ross is Deas Head, formed of basaltic columns rising to 91m.

Shoe Islet (50°32'S., 166°14'E.) lies in the middle of Port

Ross off the entrance to Terror Cove. The islet is very prominent, picturesque, bold, steep-to, and highly magnetic.

Banaba Island (Ocean Island) (50°32'S., 166°16'E.) lies about 0.7 mile W of Ewing Island and is connected by shoal water with Tucker Point, the SE point of the harbor. The island has been reported to give good radar returns up to 23 miles.

Laurie Harbor, at the head of Port Ross, is more secure than either Erebus Cove or Terror Cove, and is almost landlocked. Good water may be obtained from a waterfall in the stream on the SE side of the harbor, which is about 2 miles long in a SW direction, with an average breadth of 0.4 mile to its head. It has a least depth of 4m and forms a good harbor for small vessels.

The anchorage is in the inner part, in depths of 5.5 to 16.5m, landlocked and safe. The head of the inlet, as depicted on the chart, is no more than 0.1 mile off the N shore of Norman Inlet.

13.27 Norman Inlet (50°44'S., 166°10'E.) extends about 4 miles W, where the entrance with a depth of 36.5m is rather difficult to distinguish from seaward, but a flat-topped steep-sided hill, bearing 256°, will bring the mariner to it. The land on both sides of this inlet is high.

Shag Rock (50°43'S., 166°13'E.), a large black flat rock, about 3.1m above water, lies 0.7 mile N of this entrance. Halfway up the inlet, a bank of kelp 0.3 mile in breadth, on which a depth of 21.9m was obtained, lies in the fairway. This bank has depths of 8.9m within 50m of the S side and 14.6m at the same distance from the N side.

A vessel may anchor in a perfectly landlocked anchorage, in depths of 12.8 to 21.9m, at the head of this inlet, where there is a width of about 0.2 mile.

Hanfield Inlet (50°44'S., 166°14'E.) consists of two arms separated by Middle Head. There is anchorage in North Arm, in 12.8m, about 0.2 mile NE of Middle Head; in South Arm, anchorage is available, in 21.9m, about 0.5 mile above Middle Head. The holding ground S of Middle Head is not good.

The E side of the Auckland Islands to Carney Harbor continues with a succession of small inlets. The important inlets have been stated along this part of the coast.

Archer Rock (50°50'S., 166°17'E.) is a conspicuous steep, isolated rock, standing about 15.2m high, located in the center of a wide bay, N of Cape Bennett, 3 miles NNE of the E entrance of Carnley Harbor.

13.28 Carnley Harbor—East entrance.—The E entrance of Carnley Harbor extends about 6 miles W to the S extremity of the Musgrave Peninsula. It opens between Cape Farr, the E extremity of Perpendicular Head, and Gilroy Head. At the Musgrave Peninsula, an irregular inlet runs N and NW into Auckland Island, the W branch of which forms Musgrave Harbor and the E North Arm; the latter is a fine basin which will accommodate several vessels. The E entrance to Carnley Harbor is exposed to a heavy ocean swell with an outgoing current. The land on both sides is high and precipitous and, when the wind is not blowing either directly in or out, it often comes from all quarters in violent gusts. Within the E entrance points, there is a depth of 47.5m; no anchorage is available until 6 miles inside.

Adams Island (South Island) (50°53'S., 166°04'E.) is the southernmost of the Auckland Islands, rising to an elevation of 668m above the sea in Mount Dick on the SW side of the island. The S coast of this island is composed of sheer cliffs with only one small indentation, Fly Harbor, near its E end; this harbor affords shelter inside of a remarkable bar of kelp which crosses the harbor at its entrance.

Caution.—Mariners are warned that in the vicinity of Carney Harbor, the compass may be affected, when in shallow water, by local magnetic forces.

13.29 Carnley Harbor—West entrance.—The narrow entrance opening between South West Cape and Embrasure Point is also known as the SE entrance point to Western Arm. This channel is only suitable for small vessels; there is a large whirlpool, in the narrowest part, W of Monumental Island. At this point in the passage, the channel is only about 90m wide and depths will vary from 6.4 to 23.8m, causing a dangerous rip, inside of which the water is smooth.

13.30 West side of Main Island.—The stretch of coast from South West Cape to **Black Head** (50°31'S., 166°08'E.), its N extremity, forms a continuous perpendicular wall of cliffs, which for miles reaches an elevation of not less than 183m and will rise about 366m.

From Bristow Point to North West Cape, the coast forms Deep Bight, where remarkable pointed rocks form along a coast line which is foreboding and desolate.

Caution.—Sugarloaf Rocks, an above and below-water danger, lies about 1.2 miles E of the E extremity of Disappointment Island.

Several pinnacle islets and rocks, some of the rocks awash, have been seen in the N part of Deep Bight between Disappointment Island and the main island, NE and E.

13.31 Disappointment Island (50°37'S., 166°01'E.) lies just outside the line between Northwest Cape and Bristow Point. The island, 315m high, presents the appearance of three sugarloaf hills when seen from a distance. The island is high, rocky, and generally inaccessible.

A strong current sets between Disappointment Island and the main island; the passage, although it has depths of 73.2m, is only suitable for boats even in excellent weather.

Disappointment Island is reported to lie 0.3 mile S of its charted position relative to the main island.

Macquarie Island

13.32 Macquarie Island (54°45'S., 158°40'E.) lies about 340 miles SW of the Auckland Islands, the nearest major island. The island, with an area of 46 miles, lies with **North Head** (54°28.4'S., 158°58'E.), its N extremity, 795 miles SE of Tasmania. Macquarie Island is under the government of Tasmania and are sometimes known as the Subantarctic Islands of New Zealand.

Macquarie Island is about 18 miles long in a N-S direction, with a maximum width of 3 miles, and rises to its maximum elevation at Mount Hamilton, 433m high, near Point Hurd, the S extremity.

The general appearance of the island is barren in the extreme and it is almost surrounded by rocky ledges and reefs, making landing difficult; the coast is dangerous for a vessel to approach closely.

N end of Macquarie Island from SE, distant 4 miles

Macquarie Island does not have any well-defined bays for good anchorage, but there are a few open roadsteads in which shelter can be obtained under the lee of the hills.

This island is continually struck by high winds, with overcast skies and frequent precipitation, in the form of either rain or snow. The wind is W and NW most of the year, at about 20 knots.

The island is often obscured by mist or very low clouds and caution is advised when approaching land as soundings are unreliable.

The Australian National Antarctic Research Expeditions (ANARE) established a scientific station at Buckles Bay. The station includes auroral geophysical observatories and has radio and meteorological facilities. Emergency accommodations are available for 20 people. A doctor and medical facilities are available. Six outstations provide shelter for a limited number of people. The stations contain radio for communications with ANARE at Buckles Bay, but a listening watch is not maintained unless the huts are known to be occupied.

North Head is the N extremity of the island. Wireless Hill is the summit of the peninsula of which North Head is the extreme and on the neck of the peninsula is the previously-described meteorological station. The station is conspicuous, with its brightly covered buildings and a group of 18m high radio antennas.

Elliott Reef, a line of above and below-water rocks, extends N of North Head, where apparently there are no known dangers more than 0.3 mile outside the outermost rock.

Hasselborough Bay, on the N end of the island, is about 0.7 mile deep and affords shelter from E or SE winds, but rocks and shoal water extend in most places for a distance of 0.3 to 0.4 mile from the shore. A vessel must steer up the middle of the bay for the two small hummocks on the low isthmus and should anchor, in 22m, 0.4 mile WSW of Anchor Rock and not proceed farther into the bay.

13.33 Buckles Bay (54°29'S., 158°58'E.) is a small cut on the SE side of the isthmus connecting Wireless Hill to the main part of the island. Kelp extends about 0.3 mile offshore, but except for the kelp, the bay is apparently clear of dangers.

A set of range lights, in line bearing 296°, reportedly stands 0.5 mile SSW of Wireless Hill. In 1983, when requested, the rear light showed a flashing red characteristic, while the front light showed a flashing green or white light. Authorities disagree as to the best anchorage available in the bay. In 1979, a vessel 134m in length anchored on the alignment and about 0.6 mile off the beacons. The vessel reported that soundings approaching the anchorage shoaled regularly after crossing the 200m curve. Anchorage S of the range line is not recommended.

Besides Wireless Hill, the Expedition Hut, painted red and white stripes, is a good landmark for making the anchorage.

Tides—Currents.—In Buckles Bay and along the E side of the island, the current sets to the S with a flood tide and to the N with an ebb tide, at a maximum rate of 1.5 knots.

This part of the coast will provide sheltered anchorage in good weather.

There is anchorage with shelter from W winds near **Nuggets Point** (54°31'S., 158°58'E.); landing can be made only in calm weather. Sandy Bay (Ballast Bay) will afford anchorage sheltered from W winds.

13.34 Waterfall Bay (54°40'S., 158°55'E.) will provide temporary anchorage in good weather.

Lusitania Bay lies on the E side of the island, 4 miles N of Hurd Point, the SE extremity of the island. On the beach are the remains of two large red iron boilers which afford a good mark.

The S coast of Macquarie Island rises sharply in a series of three mountains with sheer cliffs surmounting **Hurd Point** (54°46'S., 158°53'E.).

Southeast Reef lies 0.5 mile SE of a small islet located close off Hurd Point. There are heavy tide rips off Hurd Point and Southeast Reef. A number of above and below-water rocks, lie within 1.2 miles of the island. Two submerged rocks, the existence of both of which is doubtful, are charted 3 miles S of Hurd Point and 1.2 miles SW of **South-West Point** (54°45'S., 158°48'E.). A rock, which breaks, has been reported to lie about 1.5 miles S of South West Point.

On the S coast, the bays are scattered with rocks and are futile as anchorages; however, in 1982, a vessel anchored, in a depth of 26m, 0.5 mile WSW of Hurd Point.

Caroline Cove (54°44'S., 158°49'E.), located near the S end of Macquarie Island, affords shelter for small craft during E winds, but is exposed to W winds; the cove is burdened with rocks, but there is a 75m wide channel leading to a deep basin.

13.35 Sandell Bay is entered between Cape Toucher, 3.5 miles N of Caroline Cove and Davis Point, 1.5 miles farther NE.

Bauer Bay opens and is entered 3.5 miles S of Handspike Point (54°29'S., 158°54'E.).

Langdon Bay and Half Moon Bay indent the coast 1.5 and 3 miles N, respectively, of Bauer Bay.

Caution.—The Bishop and Clerk Islands consist of a chain of barren islets and rocks lying about 21 miles SSW of Macquarie Island. The highest island of this group, near the S end, is about 43m high. These islands, extending in a N and S direction, are connected with Macquarie Island by a submarine ridge which extends farther to the S. Depths of less than 18.2m have been reported to lie within 1.5 miles of the Bishop and Clerks Islands' charted position.

These islets and rocks, including Judge Island (54°21'S., 159°01'E.), lie 8.5 miles N of North Head. A submarine ridge also connects these islands with Macquarie Island.

A rock, awash, lies in approximate position 54°18.5'S, 159°02.1'E. Another rock, awash, lies in approximate position 54°19.1'S, 159°1.8'E. A third rock, awash, lies in approximate position 54°20.3'S, 159°01.4'E.

A depth of 34m is reported to lie 5.7 miles SW; depths of

37m and 60m are reported to lie 6.5 miles and 7 miles SSW, of the Bishop and Clerk Islands.

Judge Island and the Bishop and Clerk Islands were reported (1982) to lie 1.2 miles further SW than charted.

How to use the Index—Gazetteer

Geographic names of navigational features are generally those used by the nation having sovereignty and are listed alphabetically. Diacritical marks, such as accents, cedillas, and circumflexes, which are related to specific letters in certain foreign languages, are not used in the interest of typographical simplicity.

Geographic names or their spellings do not necessarily reflect recognition of the political status of an area by the United States Government. Positions are approximate and are intended merely as locators to facilitate reference to the charts.

To use as a Gazetteer note the position and Sector number of the feature and refer to the Chart Information diagram for the Sector. Plot the approximate position of the feature on this diagram and note the approximate chart number.

To use as an Index of features described in the text note the paragraph number at the right. To locate this feature on the best scale chart use the Gazetteer procedure above.

Index—Gazetteer

	Position °	'	°	'	Sec. Para
A					
A.N.L. WHARF	27	27 S	153	03 E	5.32
ABBOT BAY	19	51 S	147	57 E	7.41
ABINGTON REEF	18	05 S	149	37 E	6.17
ABUT HEAD	43	06 S	170	16 E	12.8
ACHERON ANCHORAGE	47	11 S	167	41 E	12.44
ACHERON LEDGE	35	44 S	150	15 E	4.8
ACKERS POINT	46	55 S	168	12 E	12.49
ACKERS SHOAL	10	19 S	142	49 E	9.12
ADAMS ISLAND	50	53 S	166	04 E	13.28
ADMIRALTY BAY	40	52 S	173	57 E	11.38
ADMIRALTY ISLANDS	31	30 S	159	05 E	5.4
ADOLPHUS CHANNEL	10	40 S	142	35 E	8.89
AIGUILLES ISLAND	36	02 S	175	24 E	10.33
AKAROA	43	48 S	172	58 E	12.62
AKENS ISLAND	22	21 S	150	17 E	7.11
ALARM REEF	21	07 S	150	15 E	7.21
ALBANY ROCK	10	43 S	142	38 E	8.90
ALBATROSS ISLET	40	23 S	144	39 E	3.33
ALBATROSS POINT	38	07 S	174	41 E	11.12
ALERT ROCK	10	30 S	142	21 E	9.25
ALPHA ROCK	10	37 S	142	31 E	8.92
AMITY POINT	27	24 S	153	27 E	5.29
ANCHOR CAY	9	22 S	144	07 E	9.7
ANCHOR ISLAND	45	46 S	166	30 E	12.26
ANCHOR ISLAND HARBOR	45	46 S	166	32 E	12.27
ANCHORAGE ISLETS	19	54 S	158	28 E	6.11
ANDERSON BAY	40	57 S	147	27 E	3.6
ANDERSON REEF	15	47 S	145	48 E	8.12
ANGLEM POINT	46	55 S	168	12 E	12.51
ANTIPODES ISLANDS	49	40 S	178	50 E	13.17
ANVIL ISLET	36	14 S	175	18 E	10.34
AOTEA HARBOR	38	01 S	174	48 E	11.10
APOLLO BAY	38	45 S	143	41 E	1.25
AQUILA ISLET	21	58 S	149	35 E	7.13
ARCH ISLET	43	17 S	147	11 E	3.54
ARCHER POINT	15	36 S	145	20 E	8.25
ARCHER ROCK,	50	50 S	166	17 E	13.27
ARDEN ISLET	9	52 S	143	10 E	9.11
ARKWRIGHT SHOAL	26	33 S	53	07 E	5.33
ARNOLD ISLET	11	01 S	142	59 E	8.85
ARTHUR POINT	22	08 S	150	04 E	7.11
ARTHURS SEAT	38	21 S	144	57 E	1.28
ASHMORE REEF	10	15 S	144	25 E	8.88
ASP SHOALS	10	38 S	142	22 E	9.15
ASTROLABE REEF	37	32 S	176	26 E	10.64
ATIA POINT	42	26 S	173	41 E	12.58
AUCKLAND HARBOR	36	50 S	174	47 E	10.49
AUCKLAND ISLANDS	50	40 S	166	10 E	13.23
AUKLAND POINT	23	50 S	151	15 E	5.46
AVON ISLES	19	30 S	158	15 E	6.13
AWARUA POINT	44	16 S	168	03 E	12.12
B					
BABEL ISLAND	39	57 S	148	20 E	2.22
BADGER HEAD	41	06 S	146	39 E	3.18
BAFFLE CREEK	24	31 S	152	04 E	5.44
BAILEY ISLAND	21	02 S	149	33 E	7.27
BAIT REEF	19	49 S	149	04 E	7.21
BALACLAVA ISLAND	23	32 S	150	56 E	5.52
BALL'S PYRAMID	31	46 S	159	14 E	5.4
BALLINA	28	51 S	153	34 E	5.25
BAMPFIELD HEAD	10	43 S	142	07 E	9.21
BAMPTON ISLAND	19	07 S	158	36 E	6.14
BAMPTON REEFS	19	18 S	158	40 E	6.14
BANABA ISLAND	50	32 S	166	16 E	13.26
BANKS PENINSULA	43	45 S	173	00 E	12.59
BARE BLUFF	30	10 S	153	12 E	5.21
BARN ISLAND	10	51 S	142	19 E	9.17
BARNES BAY	43	08 S	147	20 E	3.61
BARRAGGA POINT	36	30 S	150	04 E	4.5
BARROW POINT	14	22 S	144	39 E	8.43
BARUNGUBA ISLAND	36	15 S	150	14 E	4.6
BARWON HEAD	38	18 S	144	30 E	1.27
BASILISK BANK	10	00 S	142	18 E	9.39
BASKET BAY	43	12 S	147	51 E	3.73
BASS HILL	38	29 S	145	33 E	2.4
BASS ISLET	34	28 S	150	57 E	4.17
BASS PYRAMID	39	49 S	147	15 E	2.14
BASTION POINT	37	34 S	149	45 E	2.42
BATE BAY	34	03 S	151	11 E	4.21
BATEMAN BAY	35	44 S	150	12 E	4.8
BATHURST HEAD	14	15 S	144	15 E	8.53
BATTERY ISLET	40	27 S	148	11 E	2.25
BATTERY POINT	42	53 S	147	20 E	3.66
BAY OF FIRES	41	02 S	148	20 E	3.84
BAY ROCK	19	07 S	146	45 E	7.44
BEACH HILL	19	44 S	147	35 E	7.42
BEAUTY POINT	41	09 S	146	49 E	3.13
BEDWELL GROUP	21	50 S	149	48 E	7.17
BEE REEF	15	38 S	145	26 E	8.19
BELL BANK	13	27 S	143	37 E	8.57
BELL BAY	41	08 S	146	52 E	3.14
BELL CAY	21	46 S	151	15 E	7.4
BELL POINT	38	53 S	146	00 E	2.5
BELL REEF	40	23 S	144	05 E	1.22
BELLAMBI POINT	34	22 S	150	56 E	4.19
BEN BUCKLER	33	54 S	151	17 E	4.23
BENNETT ISLET	19	55 S	158	22 E	6.12
BENSBACH RIVER	9	07 S	141	02 E	9.1
BERMAGUI INLET	36	25 S	150	04 E	4.6
BEVERLY GROUP	21	29 S	149	53 E	7.19
BEWICK ISLAND	14	26 S	144	49 E	8.42
BICHENO	41	52 S	148	18 E	3.82
BINGE-BINGE POINT	36	01 S	150	10 E	4.7
BIRD ISLET	22	10 S	155	28 E	6.3
BLACK HEAD	38	33 S	145	28 E	2.4
BLACK HEAD	45	56 S	170	26 E	12.70
BLACK HEAD	50	31 S	166	08 E	13.30
BLACK JACK ROCKS	43	02 S	147	29 E	3.68
BLACK PYRAMID	40	29 S	144	21 E	1.23
BLACK REEF	39	38 S	177	05 E	10.80
BLACK ROCK POINT	46	41 S	167	52 E	12.46
BLACK ROCKS	12	12 S	143	55 E	8.76
BLACKMAN BAY	42	52 S	147	51 E	3.77

	Position °	'	°	'	Sec. Para
BLACKNEY POINT	34	52 S	173	17 E	10.7
BLANCHE ROCK,	50	37 S	166	20 E	13.25
BLIGH ENTRANCE	9	15 S	143	55 E	9.6
BLIGH POINT	39	45 S	147	51 E	2.16
BLIGH SOUND	44	46 S	167	29 E	12.15
BLINKING BILLY POINT	42	55 S	147	22 E	3.64
BLUE ROCKS POINT	40	06 S	147	57 E	2.17
BOBARDT POINT	13	11 S	143	31 E	8.58
BOLD HEAD	40	03 S	144	06 E	1.20
BOLD HEAD	42	56 S	170	42 E	12.8
BOLLONS ISLAND	49	38 S	178	50 E	13.18
BOLT HEAD	12	15 S	143	06 E	8.73
BON ACCORD HARBOR	36	25 S	174	49 E	10.38
BONNET ISLAND	42	13 S	145	14 E	3.39
BOOBY ISLAND	10	36 S	141	55 E	9.28
BOOBY REEF	21	01 S	158	34 E	6.10
BOTANY BAY	34	00 S	151	14 E	4.22
BOUGAINVILLE REEF	15	30 S	147	07 E	6.26
BOULDER POINT	38	24 S	142	09 E	1.6
BOULT REEF	23	45 S	152	17 E	5.42
BOUNTY ISLANDS	47	41 S	179	03 E	13.16
BOW REEF	13	18 S	143	40 E	8.62
BOWDEN REEF	19	03 S	147	56 E	7.6
BOWLING GREEN BAY	19	22 S	147	15 E	7.43
BOYDONG CAYS	11	28 S	143	01 E	8.85
BOYNE ISLAND	23	55 S	151	20 E	5.46
BRAMBLE CAY	9	09 S	143	53 E	9.8
BRAMBLE COVE	43	20 S	146	00 E	3.45
BRAMBLE PATCHES	10	30 S	141	35 E	9.30
BRAMSTON POINT	17	15 S	145	59 E	7.56
BREAM HEAD	35	51 S	174	35 E	10.28
BREAM TAIL	36	03 S	174	35 E	10.31
BREMNER POINT	19	09 S	146	52 E	7.44
BRIG ROCKS	40	06 S	144	02 E	1.19
BRISBANE	27	28 S	153	04 E	5.32
BRISBANE ROCK	10	35 S	142	12 E	9.33
BROAD SOUND	22	12 S	149	45 E	7.12
BROAD SOUND CHANNEL	22	07 S	150	17 E	7.12
BROKEN BAY	33	34 S	151	22 E	5.7
BROOMFIELD ROCK	14	12 S	144	39 E	8.34
BROUGHTON ISLANDS	32	37 S	152	19 E	5.14
BROULEE ISLAND	35	52 S	150	11 E	4.7
BROWNS ISLAND	36	50 S	174	54 E	10.45
BRUNNER RIVER	42	43 S	170	59 E	12.8
BRUNSWICK RIVER ENTRANCE	28	32 S	153	32 E	5.26
BRUNY ISLAND	43	18 S	147	18 E	3.56
BRUSH ISLAND	35	32 S	150	25 E	4.9
BUCHAN POINT	16	44 S	145	40 E	8.13
BUCKLES BAY	54	29 S	158	58 E	13.33
BULK GRAIN PIER	38	07 S	144	22 E	1.44
BULL BAY	43	05 S	147	22 E	3.62
BULLER BAY	41	45 S	171	32 E	12.4
BULLI POINT	34	20 S	150	57 E	4.19
BULLOCK POINT	43	11 S	146	59 E	3.53
BUNDABERG	24	52 S	152	21 E	5.40
BUNKER GROUP	23	50 S	152	21 E	5.41
BURDEKIN ROCK	19	08 S	146	42 E	7.46
BURKITT ISLET	13	56 S	143	45 E	8.60
BURLEIGH HEADS	28	05 S	153	27 E	5.28
BURNETT POINT	43	26 S	147	02 E	3.51
BURNIE	41	03 S	145	55 E	3.23
BURRUM RIVER	25	11 S	152	35 E	5.38
BUSHETT ROCKS	42	43 S	173	30 E	12.58
BUSHY POINT	46	36 S	168	31 E	12.73
BUSTARD HEAD	24	01 S	151	46 E	5.44
BYRON BAY	28	38 S	153	37 E	5.26

C

	Position °	'	°	'	Sec. Para
CAIRNCROSS ISLETS	11	15 S	142	56 E	8.83
CAIRNS	16	56 S	145	47 E	8.14
CALLE-CALLE BAY	37	04 S	149	56 E	4.5
CAMPBELL ISLAND	52	33 S	169	13 E	13.19
CAMPBELL POINT	13	32 S	143	35 E	8.57
CAMPBELL REEF	10	20 S	142	29 E	9.13
CAPE BARREN	40	26 S	148	29 E	2.24
CAPE BARRIER	36	21 S	175	32 E	10.36
CAPE BEDFORD	15	14 S	145	20 E	8.28
CAPE BERNIER	42	44 S	147	57 E	3.77
CAPE BOUGAINVILLE	42	31 S	148	00 E	3.80
CAPE BOWEN	14	31 S	144	40 E	8.43
CAPE BOWLING GREEN	19	18 S	147	26 E	7.42
CAPE BRETT	35	11 S	174	20 E	10.18
CAPE BRIDGEWATER	38	24 S	141	24 E	1.3
CAPE BRUNY	43	30 S	147	09 E	3.57
CAPE BYRON	28	38 S	153	38 E	5.26
CAPE CAMPBELL	41	44 S	174	16 E	11.55
CAPE CAPRICORN	23	29 S	151	14 E	5.47
CAPE CLEVELAND	19	11 S	147	01 E	7.43
CAPE CLINTON	22	32 S	150	48 E	5.53
CAPE COLVILLE	36	28 S	175	21 E	10.50
CAPE CORNWALL	10	46 S	142	11 E	9.18
CAPE DIRECTION	12	51 S	143	32 E	8.59
CAPE DROMEDARY	36	18 S	150	08 E	4.6
CAPE EDGECUMBE	19	59 S	148	16 E	7.40
CAPE EGMONT	39	17 S	173	45 E	11.15
CAPE ELIE	40	43 S	145	04 E	3.29
CAPE FAREWELL	40	30 S	172	41 E	11.26
CAPE FLATTERY	14	57 S	145	21 E	8.29
CAPE FLINDERS	14	08 S	144	14 E	8.48
CAPE FOULWIND	41	45 S	171	28 E	12.6
CAPE FOURNIER	44	03 S	176	20 W	13.13
CAPE FRANKLAND	39	52 S	147	45 E	2.16
CAPE GRAFTON	16	52 S	145	55 E	8.2
CAPE GRENVILLE	11	58 S	143	14 E	8.78
CAPE GRIFFITH	12	41 S	143	25 E	8.71
CAPE GRIM	40	41 S	144	41 E	3.35
CAPE HAWKE	32	13 S	152	34 E	5.15
CAPE HAWKE HARBOR	32	10 S	152	30 E	5.16
CAPE HILLSBOROUGH	20	54 S	149	03 E	7.29
CAPE HOME	35	23 S	174	23 E	10.25
CAPE HORN	36	56 S	174	44 E	11.7
CAPE JACKSON	40	59 S	174	19 E	11.44
CAPE KARIKARI	34	47 S	173	24 E	10.7
CAPE KEPPEL	23	27 S	151	03 E	5.49
CAPE KERAUDREN	40	24 S	144	47 E	1.22
CAPE KIDNAPPERS	39	39 S	177	05 E	10.80
CAPE KIMBERLEY	16	17 S	145	29 E	8.17
CAPE KOAMARU	41	05 S	174	23 E	11.48
CAPE L'EVEQUE	44	07 S	176	35 W	13.13
CAPE LAMBERT	40	59 S	174	13 E	11.44
CAPE LIPTRAP	38	55 S	145	55 E	2.5
CAPE MANIFOLD	22	41 S	150	50 E	5.53
CAPE MARIA VAN DIEMEN	34	29 S	172	39 E	10.3
CAPE MELVILLE	14	10 S	144	31 E	8.45
CAPE NATURALISTE	40	51 S	148	13 E	3.2
CAPE NELSON	38	26 S	141	33 E	1.4
CAPE NORTHUMBERLAND	38	04 S	140	40 E	1.1
CAPE OTWAY	38	52 S	143	31 E	1.13
CAPE PALLISER	41	37 S	175	17 E	10.84
CAPE PALMERSTON	21	32 S	149	29 E	7.23
CAPE PATTERSON	38	41 S	145	36 E	2.4
CAPE PATTON	38	42 S	143	50 E	1.26
CAPE PILLAR	43	14 S	148	02 E	3.75
CAPE PORTLAND	40	44 S	147	56 E	3.5
CAPE PROVIDENCE	46	01 S	166	28 E	12.30
CAPE QUEEN ELIZABETH	43	15 S	147	26 E	3.62
CAPE RAOUL	43	14 S	147	48 E	3.73
CAPE REINGA	34	25 S	172	41 E	10.3
CAPE RODNEY	36	17 S	174	49 E	10.31
CAPE RUNAWAY	37	32 S	177	59 E	10.67
CAPE SAUNDERS	45	53 S	170	44 E	12.69
CAPE SCHANCK	38	30 S	144	53 E	2.2
CAPE SIDMOUTH	13	25 S	143	36 E	8.57
CAPE SIR JOHN	40	25 S	147	59 E	2.23
CAPE SORELL	42	12 S	145	10 E	3.37
CAPE ST. VINCENT	43	19 S	145	50 E	3.42
CAPE STEPHENS	40	42 S	173	57 E	11.37
CAPE SURVILLE	42	57 S	148	00 E	3.76
CAPE TERAWHITI	41	17 S	174	37 E	11.24
CAPE TOURVILLE	42	07 S	148	21 E	3.81
CAPE TRIBULATION	16	05 S	145	29 E	8.17
CAPE TURNAGAIN	40	30 S	176	37 E	10.82
CAPE UPSTART	19	42 S	147	45 E	7.42
CAPE WANBROW	45	07 S	170	59 E	12.65
CAPE WELLINGTON	39	04 S	146	29 E	2.29
CAPE WEYMOUTH	12	37 S	143	26 E	8.72
CAPE WICKHAM	39	35 S	143	57 E	1.16
CAPE WIWIKI	35	09 S	174	08 E	10.16
CAPE WOOLAMAI	38	34 S	145	22 E	2.3
CAPE YORK	10	41 S	142	32 E	8.81
CAPEL BANK	25	16 S	159	27 E	5.6
CARDWELL	18	15 S	146	02 E	7.51

	Position °	'	°	'	Sec. Para
CARLISLE ISLAND	20	47 S	149	17 E	7.27
CARNARVON BAY	43	09 S	147	51 E	3.74
CAROLA CAY	19	06 S	152	23 E	6.8
CAROLINE COVE	54	44 S	158	49 E	13.34
CAROLINE ROCK	12	39 S	143	32 E	8.74
CARPENTARIA SHOAL	10	45 S	141	03 E	9.29
CASCADE COVE	45	48 S	166	36 E	12.29
CASCADE POINT	44	01 S	168	21 E	12.12
CASTLE POINT	40	54 S	176	13 E	10.81
CASTLE POINT	40	55 S	176	13 E	10.83
CATARAN BAY	20	10 S	149	02 E	7.33
CATHERINE HILL BAY	33	09 S	151	38 E	5.9
CATO ISLAND	23	15 S	155	32 E	6.2
CAVERN HEAD	46	05 S	166	40 E	12.33
CELEBRATION REEF	13	17 S	143	42 E	8.65
CENTRE ISLAND	46	27 S	167	51 E	12.38
CHALLENGER BAY	18	44 S	146	34 E	7.48
CHANNEL BAY	42	15 S	145	14 E	3.39
CHANNEL ROCK	14	08 S	144	29 E	8.45
CHANNEL ROCK	43	07 S	147	17 E	3.54
CHAPMAN ISLET	12	53 S	143	36 E	8.63
CHARLOTTE COVE	43	16 S	147	09 E	3.52
CHARON POINT	22	23 S	149	49 E	7.13
CHATHAM ISLANDS	44	00 S	176	30 W	13.7
CHELSEA BULK SUGAR WHARF	36	49 S	174	43 E	10.49
CHESTER RIVER	13	42 S	143	33 E	8.56
CHETWODE ISLANDS	40	54 S	174	05 E	11.41
CHEVIOT ISLAND	22	05 S	150	40 E	7.15
CHIMMO SHOAL	11	48 S	143	15 E	8.84
CHURCH ROCK	40	49 S	144	35 E	3.36
CIRCULAR HEAD	40	46 S	145	18 E	3.26
CLACK REEF	14	04 S	144	14 E	8.49
CLAREMONT POINT	14	00 S	143	41 E	8.56
CLARENCE HEAD	29	29 S	153	22 E	5.22
CLARENCE PEAK	29	34 S	153	15 E	5.22
CLARENCE RIVER	42	10 S	173	55 E	12.56
CLAYFACE POINT	40	56 S	173	51 E	11.39
CLEFT ISLAND	39	10 S	146	18 E	2.9
CLEVELAND POINT	27	31 S	153	17 E	5.32
CLIFF ISLANDS	14	14 S	143	47 E	8.54
CLIFFY ISLAND	38	55 S	146	42 E	2.32
CLONMEL ISLAND	38	45 S	146	40 E	2.35
CLOUDY BAY	43	29 S	147	13 E	3.57
CLUMP POINT	17	52 S	146	08 E	7.52
COAL CLIFF	34	15 S	150	59 E	4.19
COASTER CHANNEL	21	26 S	149	32 E	7.23
COATES REEF	17	12 S	146	22 E	7.8
COBB BLUFF	38	27 S	145	26 E	2.3
COBRA ROCK	36	41 S	175	59 E	10.59
COCKBURN REEF	11	50 S	143	19 E	8.84
COCKLE BANK	40	48 S	148	11 E	3.2
COCONUT ISLAND	10	03 S	143	04 E	9.11
COCONUT POINT	21	36 S	149	28 E	7.23
COFFS HARBOR	30	18 S	153	08 E	5.20
COLCLOUGH REEF	13	05 S	143	44 E	8.68
COLLINET POINT	40	55 S	173	51 E	11.39
COMBE POINT	14	15 S	144	13 E	8.53
CONICAL ROCK	15	08 S	145	20 E	8.28
COOK ROCK	41	03 S	174	26 E	11.46
COOK SHOAL	10	04 S	141	22 E	9.29
COOKS HEAD ROCK	46	12 S	170	05 E	12.71
COOKTOWN	15	28 S	145	15 E	8.27
COOLANGATTA MOUNT	34	51 S	150	43 E	4.15
COOPER POINT	17	24 S	146	04 E	7.55
COQUET ISLAND	14	33 S	144	59 E	8.42
CORDELIA ROCKS	19	00 S	146	41 E	7.47
CORINGA ISLETS	16	58 S	150	00 E	6.18
CORNELIAN BAY	42	51 S	147	19 E	3.67
CORNISH HEAD	45	37 S	170	42 E	12.66
CORNWALLIS WHARF	37	01 S	174	36 E	11.7
COROMANDEL HARBOR	36	48 S	175	28 E	10.51
COWAN-COWAN POINT	27	08 S	153	22 E	5.30
COWLISHAW REEF	15	32 S	145	19 E	8.26
COWPER POINT	39	50 S	144	08 E	1.20
COX BIGHT	43	30 S	146	15 E	3.46
CRAB ISLAND	10	59 S	142	06 E	9.20
CRAGGY ISLAND	39	41 S	147	41 E	2.14
CRAYFISH POINT	42	57 S	147	21 E	3.64
CREECH REEF	13	38 S	144	06 E	8.67
CRIB POINT	38	21 S	145	13 E	2.3
CROCODILE HEAD	35	05 S	150	51 E	4.14
CROISILLES HARBOR	41	03 S	173	37 E	11.35
CROOKED ARM	45	22 S	167	03 E	12.23
CROOKHAVEN BIGHT	35	00 S	150	49 E	4.15
CROPPIES POINT	40	49 S	147	36 E	3.5
CROWDY HEAD	31	51 S	152	45 E	5.16
CURACOA ISLAND	18	40 S	146	33 E	7.49
CURLEW ISLAND	21	36 S	149	48 E	7.18
CURTIS ISLAND	39	28 S	146	39 E	2.11
CURTIS ISLANDS	30	30 S	178	35 W	13.5
CUTTLE COVE	46	04 S	166	41 E	12.34
CUVIER BAY	40	28 S	144	45 E	3.32

D

	Position °	'	°	'	Sec. Para
D'ENTRECASTEAUX CHANNEL	43	36 S	147	09 E	3.48
DALRYMPLE ISLET	9	37 S	143	18 E	9.10
DANGER POINT	28	09 S	153	33 E	5.27
DANGER POINT	38	03 S	140	48 E	1.2
DANGER RIDGE	21	00 S	154	21 E	6.7
DANGER ROCK	35	21 S	174	24 E	10.24
DARNLEY ISLAND	9	35 S	143	46 E	9.7
DART BANK	43	12 S	147	42 E	3.72
DART REEF	17	24 S	48	11 E	6.24
DAVY PATCHES	14	20 S	144	43 E	8.34
DAWSON ISLETS	35	35 S	150	21 E	4.9
DAYMAN CHANNEL	10	28 S	142	12 E	9.36
DAYMAN POINT	16	23 S	145	25 E	8.16
DEADMANS POINT	36	51 S	175	24 E	10.52
DEAL ISLAND	38	30 S	147	19 E	2.8
DECAPOLIS REEF	14	51 S	145	16 E	8.38
DENISON CANAL	42	54 S	147	48 E	3.70
DENT ISLAND	20	22 S	148	56 E	7.32
DEPOT ANCHORAGE	49	40 S	178	50 E	13.17
DERRY REEF	13	01 S	143	51 E	8.68
DEVONPORT	41	11 S	146	22 E	3.19
DIAMOND HEAD	31	44 S	152	48 E	5.17
DIAMOND ISLETS	17	25 S	151	00 E	6.17
DIANE BANK	15	46 S	149	43 E	6.21
DIGBY ISLAND	21	30 S	149	54 E	7.19
DISAPPOINTMENT ISLAND	50	37 S	166	01 E	13.31
DISASTER BAY	37	16 S	149	58 E	4.2
DOLPHIN REEF	12	34 S	143	31 E	8.75
DOME ISLAND	22	25 S	150	45 E	5.55
DONOVAN POINT	16	01 S	145	27 E	8.24
DOUBLE HEAD	23	10 S	150	48 E	5.53
DOUBLE ISLAND POINT	25	56 S	153	12 E	5.34
DOUBLE POINT	17	39 S	146	09 E	7.53
DOUBTFUL SOUND	45	16 S	166	51 E	12.22
DOVE ISLET	10	00 S	143	02 E	9.11
DOVER	43	19 S	147	01 E	3.52
DRAKE SHOALS	13	26 S	143	42 E	8.65
DROMONA	38	20 S	143	57 E	2.2
DRU POINT	43	02 S	147	17 E	3.55
DRYDEN BAY	41	10 S	174	12 E	11.47
DUCK COVE	45	44 S	166	40 E	12.28
DUKE ISLANDS	21	58 S	150	08 E	7.16
DUNALLEY	42	53 S	147	49 E	3.71
DUNALLEY BAY	42	55 S	147	47 E	3.70
DUNK ISLAND	17	57 S	146	10 E	7.52

E

	Position °	'	°	'	Sec. Para
EAGLE ROCK	10	47 S	142	14 E	9.18
EAST CAPE	37	41 S	178	33 E	10.69
EAST CAY	9	24 S	144	13 E	8.87
EAST HEAD	43	46 S	173	08 E	12.62
EAST HEAD	46	51 S	168	08 E	12.46
EAST POINT LEDGE	23	52 S	151	24 E	5.47
EAST SANDY POINT	40	56 S	147	21 E	3.6
EAST STRAIT ISLAND	10	30 S	142	27 E	9.13
EASTERN FIELDS	10	07 S	145	40 E	8.88
EASTERN LIGHT	38	21 S	144	56 E	1.30
EASTERN PROJECTION	21	15 S	155	50 E	6.5
EBORAC ISLAND	10	41 S	142	32 E	8.81
EDDYSTONE POINT	41	00 S	148	21 E	3.2
EDEN	37	04 S	149	56 E	4.4
EDEN REEF	14	05 S	143	55 E	8.52
EDGECUMBE BAY	20	05 S	148	22 E	7.39
EDGELL BANK	22	53 S	151	47 E	5.43
EDWARD ISLAND	20	15 S	149	10 E	7.33
EDWARDS ROCK	10	31 S	142	26 E	9.25

	Position °	'	°	'	Sec. Para
EEL REEF	12	30 S	143	26 E	8.75
EGG ROCK	23	12 S	151	06 E	5.50
EGMONT REEF	16	31 S	145	32 E	8.15
ELAMANG ISLET	21	28 S	149	39 E	7.20
ELEANOR CREEK	18	52 S	146	17 E	7.46
ELECTRONA	43	04 S	147	16 E	3.55
ELIZABETH REEF	29	56 S	159	02 E	5.5
ELLIOT HEADS	24	56 S	152	30 E	5.38
ENDEAVOR LIGHT	34	00 S	151	14 E	4.22
ENDEAVOUR REEF	15	47 S	145	35 E	8.19
ENDERBY ISLAND	50	30 S	166	18 E	13.24
ENTRANCE ISLAND	10	43 S	142	18 E	9.16
ENTRANCE ISLAND	47	05 S	168	13 E	12.52
ENTRY ANCHORAGE	40	53 S	174	55 E	11.21
ERITH ISLAND	39	27 S	147	18 E	2.13
EUSTON REEF	16	41 S	146	15 E	8.7
EVANS HEAD	29	08 S	153	28 E	5.22
EVANS RIVER ENTRANCE	29	07 S	153	26 E	5.23
EVES REEF	13	58 S	144	34 E	8.50
EYE REEF	14	54 S	145	29 E	8.31

F

FAHEY REEF	14	04 S	143	51 E	8.52
FAIR CAPE	12	24 S	143	16 E	8.72
FALSE CAPE	16	52 S	145	51 E	8.13
FALSE HEAD	36	13 S	175	17 E	10.34
FAMILY ISLANDS	18	02 S	146	12 E	7.52
FANTOME ISLAND	18	42 S	146	31 E	7.49
FIFE ISLAND	13	39 S	143	43 E	8.62
FIN REEF	16	36 S	146	10 E	8.8
FINGAL HEAD	28	12 S	153	34 E	5.27
FINLAYSON POINT	20	53 S	148	57 E	7.29
FIRST POINT	33	29 S	151	27 E	5.8
FIRST RED ROCKY POINT	13	04 S	143	31 E	8.58
FIRST STONY POINT	12	23 S	143	15 E	8.73
FIRST THREE MILE OPENING	13	28 S	144	01 E	8.67
FITZROY ISLAND	16	56 S	145	59 E	7.57
FITZROY RIVER	23	30 S	150	55 E	5.51
FIVE MILE BLUFF	41	01 S	146	52 E	3.8
FLAGSTAFF HILL	34	28 S	150	52 E	4.19
FLAGSTAFF POINT	34	25 S	150	55 E	4.18
FLAT ISLAND	34	59 S	173	52 E	10.13
FLAT ISLAND PASSAGE	21	59 S	149	37 E	7.13
FLAXMAN HILL	38	33 S	142	55 E	1.10
FLINDERS BAY	42	59 S	147	50 E	3.71
FLINDERS BREAKWATER JETTY	38	29 S	145	02 E	2.3
FLINDERS ENTRANCE	9	38 S	144	14 E	8.87
FLINDERS GROUP	14	10 S	144	15 E	8.47
FLINDERS ISLAND	14	11 S	144	15 E	8.48
FLINDERS PASSAGE	18	55 S	148	00 E	7.6
FLINDERS PEAK	37	57 S	144	25 E	1.28
FLINDERS REEF	43	01 S	147	50 E	3.71
FLINDERS REEFS	17	35 S	148	24 E	6.22
FLORA PASSAGE	17	00 S	146	21 E	7.9
FLORA POINT	35	00 S	150	43 E	4.13
FLORA REEF	16	45 S	147	45 E	6.25
FLUTED CAPE	43	22 S	147	23 E	3.62
FLY POINT	10	45 S	142	36 E	8.81
FLY REEF	14	30 S	145	10 E	8.34
FLYING FISH POINT	17	30 S	146	05 E	7.55
FLYING SCUD ROCK	43	53 S	146	59 E	3.48
FORRESTER REEF	15	10 S	145	30 E	8.20
FORSBERG POINT	15	40 S	145	20 E	8.25
FORT DENNISON	33	51 S	151	13 E	4.24
FORTH RIVER	41	09 S	146	15 E	3.20
FRANKLAND ISLANDS	17	13 S	146	05 E	7.56
FRASER ISLAND	25	11 S	153	10 E	5.34
FREDERICK HENRY BAY	42	55 S	147	35 E	3.68
FREDRICK REEFS	20	58 S	154	24 E	6.7
FRENCH PASS	40	55 S	173	50 E	11.34
FRENCHMAN ISLAND	35	52 S	174	32 E	10.30
FRESHWATER POINT	21	25 S	149	20 E	7.23
FRIDAY ISLAND	10	36 S	142	10 E	9.32

G

GABLE END FORELAND	38	32 S	178	18 E	10.72
GABO ISLAND	37	34 S	149	55 E	2.42
GAP POINT	44	04 S	176	40 W	13.13
GATCOMBE HEAD	23	53 S	151	23 E	5.46
GEELONG	38	09 S	144	22 E	1.44
GEORGE POINT	20	04 S	148	34 E	7.39
GEORGE SOUND	44	50 S	167	22 E	12.16
GEORGES BAY	41	19 S	148	17 E	3.83
GERANIUM PASSAGE	17	42 S	146	30 E	7.8
GERTRUDE REEF	13	10 S	143	40 E	8.65
GHIBBER ROCK	10	35 S	142	10 E	9.32
GIBSON ROCK	10	44 S	142	18 E	9.16
GIPPS LAND LAKES	37	53 S	147	58 E	2.27
GISBORNE	38	41 S	178	01 E	10.75
GLADSTONE	23	55 S	151	23 E	5.46
GLENELG RIVER	38	04 S	140	59 E	1.2
GLORY COVE	46	58 S	168	10 E	12.51
GLOUCESTER ISLAND	20	00 S	148	27 E	7.39
GOAT POINT	41	05 S	174	52 E	11.23
GODLEY HEAD	43	35 S	172	49 E	12.59
GOLDSMITH ISLAND	20	41 S	149	09 E	7.28
GOODS ISLAND	10	34 S	142	09 E	9.27
GOODWIN SHOAL	22	55 S	151	44 E	5.42
GOODWOOD ISLAND	29	24 S	153	19 E	5.22
GOOSE ISLAND	40	18 S	147	48 E	2.18
GRAFTON PASSAGE	16	40 S	146	12 E	8.6
GRANT POINT	41	16 S	148	20 E	3.84
GRASSY ISLAND	20	09 S	148	37 E	7.38
GREAT DETACHED REEF	11	45 S	144	00 E	8.77
GREAT KEPPEL ISLAND	23	10 S	150	58 E	5.50
GREAT MERCURY ISLAND	36	36 S	175	47 E	10.56
GREAT OYSTER BAY	42	12 S	148	10 E	3.81
GREAT PALM ISLAND	18	45 S	146	38 E	7.48
GREAT SANDY ISLAND	25	11 S	153	10 E	5.34
GREAT SANDY STRAIT	25	30 S	152	59 E	5.36
GREAT TAYLOR BAY	43	25 S	147	09 E	3.58
GREAT WOODY ISLAND	10	42 S	142	21 E	9.16
GREEN BLUFF	30	07 S	153	13 E	5.21
GREEN HEAD	42	56 S	147	40 E	3.69
GREEN ISLAND	16	46 S	145	58 E	8.8
GREY GROUP ISLANDS	36	11 S	175	18 E	10.34
GREYMOUTH HARBOR	42	26 S	171	13 E	12.7
GUARDFISH CLUSTER	21	35 S	149	51 E	7.18
GUARDS BAY	40	57 S	174	08 E	11.43
GULL ROCKS	45	54 S	170	39 E	12.70
GUMBRELL ISLAND	20	06 S	148	36 E	7.38
GUTHRIE SHOAL	23	03 S	151	51 E	5.42

H

HAAST RIVER	43	51 S	169	03 E	12.9
HALF MOON BAY	43	01 S	147	24 E	3.65
HALF MOON BAY	46	53 S	168	09 E	12.48
HALLY BAYLEY SHOAL	40	49 S	144	23 E	3.36
HAM REEF	13	02 S	143	52 E	8.67
HAMMOND ISLAND	10	31 S	142	12 E	9.26
HAMMOND REEF	12	56 S	143	33 E	8.59
HAMMOND ROCK	10	31 S	142	13 E	9.26
HANDSPIKE POINT	54	29 S	158	54 E	13.35
HANFIELD INLET	50	44 S	166	14 E	13.27
HANNAH ISLET	13	52 S	143	43 E	8.61
HANNIBAL ISLANDS	11	35 S	142	57 E	8.82
HARRIER REEF	15	08 S	145	42 E	8.22
HARRINGTON INLET	31	53 S	152	41 E	5.16
HARVEY ROCKS	10	19 S	142	41 E	9.13
HAUMURI BLUFFS	42	34 S	173	31 E	12.58
HAUTAPU ROCKS	36	44 S	175	25 E	10.50
HAVANNAH ISLAND	18	50 S	146	33 E	7.47
HAWERA	39	36 S	174	17 E	11.15
HAWES ROCK	41	12 S	174	13 E	11.49
HAWKESBURY ISLAND	10	22 S	142	08 E	9.37
HAWKINS POINT	19	11 S	146	51 E	7.44
HAY ISLAND	13	40 S	143	41 E	8.62
HAY POINT	21	18 S	149	18 E	7.23
HAYMAN ISLAND	20	03 S	148	53 E	7.34
HAZEL REEF	12	16 S	143	18 E	8.75
HEATH REEF	13	29 S	143	41 E	8.62
HEBE REEF	41	03 S	146	45 E	3.9
HELSDON REEF	14	57 S	145	29 E	8.20
HENNING ISLAND	20	19 S	148	56 E	7.32
HERALD CAYS	16	56 S	149	13 E	6.19
HERALD ISLAND	19	02 S	146	38 E	7.47
HERALD ISLAND	36	47 S	174	40 E	10.49
HERALD ISLETS	29	15 S	177	52 W	13.3

	Position °	'	°	'	Sec. Para
HERALD PASSAGE	17	24 S	151	58 E	6.16
HERALD'S BEACON ISLET	17	25 S	155	52 E	6.9
HERALD'S SURPRISE	17	20 S	148	26 E	6.24
HERBERT PEAK	43	41 S	172	47 E	12.60
HEREHERETAURA	36	50 S	175	49 E	10.60
HEROINE ROCK	10	46 S	142	19 E	9.16
HERVEY BAY	24	55 S	152	52 E	5.38
HIGH ISLAND	10	44 S	142	25 E	9.17
HIGH ISLAND	17	09 S	146	01 E	7.56
HIGH PEAK ISLAND	21	57 S	150	42 E	7.15
HIGHFIELD POINT	40	45 S	145	18 E	3.28
HIKURANGI	37	55 S	178	04 E	10.68
HILDER REEF	14	26 S	145	24 E	8.33
HILLIARD HEAD	43	23 S	145	55 E	3.43
HINCHINBROOK ISLAND	18	22 S	146	15 E	7.50
HIPPOLITE ROCKS	43	08 S	148	03 E	3.76
HIPPOLYTE ROCKS	43	08 S	148	03 E	3.76
HIXSON CAY	22	21 S	152	40 E	7.4
HOBART	42	53 S	147	20 E	3.66
HOGAN ISLAND	39	13 S	146	59 E	2.12
HOKIANGA HARBOR	35	32 S	173	22 E	11.2
HOKITIKA RIVER	42	43 S	170	59 E	12.8
HOLDSWORTH ROCK	13	46 S	143	36 E	8.56
HOLMES REEF	16	28 S	147	58 E	6.25
HOME ISLANDS	11	59 S	143	17 E	8.78
HOME POINT	35	19 S	174	23 E	10.24
HONEYCOMB ROCK	41	22 S	175	49 E	10.83
HOOK ISLAND	20	06 S	148	55 E	7.33
HOOK PEAK	20	06 S	148	56 E	7.33
HOPE BEACH	43	02 S	147	27 E	3.68
HOPE ISLAND	43	20 S	147	03 E	3.51
HOPE ISLANDS	15	44 S	145	28 E	8.25
HOPE REEF	16	32 S	146	08 E	8.9
HORN ISLAND	10	37 S	142	17 E	9.15
HOROERA POINT	37	38 S	178	29 E	10.68
HORSESHOE BAY	46	52 S	168	09 E	12.48
HOTSPUR ISLETS	21	29 S	150	16 E	7.15
HOUHORA HARBOR	34	49 S	173	09 E	10.6
HOVELL ROCK	10	36 S	142	13 E	9.33
HOWE POINT	35	10 S	174	07 E	10.23
HOWICK ISLAND	14	30 S	144	58 E	8.42
HUIA BANKS	37	02 S	174	35 E	11.7
HUMMOCKY ISLAND	23	24 S	151	09 E	5.49
HUMPY POINT	20	20 S	148	51 E	7.36
HUNTER BANK	40	58 S	174	49 E	11.22
HUNTER ISLAND	40	30 S	144	45 E	3.31
HUNTER POINT	11	30 S	142	50 E	8.79
HUON RIVER	43	15 S	147	05 E	3.52
HURD POINT	54	46 S	158	53 E	13.34
HUTCHISON ROCK	23	15 S	155	36 E	6.2
HYDROGRAPHERS'S PASSAGE	19	47 S	150	24 E	7.22
HYTHE	43	26 S	146	59 E	3.50

I

ILES DES PHOQUES	42	25 S	148	10 E	3.80
ILUKA	29	25 S	153	21 E	5.22
INDIAN HEAD	15	23 S	145	17 E	8.27
INDIAN HEAD	25	00 S	153	22 E	5.34
INDIAN HEAD	31	44 S	152	48 E	5.17
INGOT ISLANDS	20	43 S	149	08 E	7.28
INGRAM ISLAND	14	24 S	144	52 E	8.34
INSCRIPTION POINT	34	00 S	151	13 E	4.22
INSET REEF	12	15 S	143	16 E	8.75
INSKIP POINT	25	49 S	153	04 E	5.34
IONA ISLET	46	54 S	168	07 E	12.50
IRENE REEF	15	39 S	145	43 E	8.22
IRONSTONE POINT	42	58 S	147	45 E	3.71
ISLAND HEAD	22	20 S	150	40 E	5.56
ISLAND POINT	16	29 S	145	28 E	8.15
ISTHMUS BAY	43	15 S	147	19 E	3.60

J

JABIRU SHOALS	23	21 S	151	05 E	5.50
JACKSON REEF	37	53 S	174	43 E	11.10
JACKSONS BAY	43	59 S	168	40 E	12.11
JACOBUS WEST SHOAL	9	53 S	143	04 E	9.11
JANE TABLE HILL	14	30 S	144	08 E	8.54
JENNY REEF	44	00 S	176	43 W	13.13
JERVIS BAY	35	07 S	150	48 E	4.13
JERVIS ISLAND	9	57 S	142	11 E	9.39
JERVIS REEF	10	00 S	142	08 E	9.39
JEWELL REEF	14	23 S	145	22 E	8.33
JOAN REEF	13	57 S	144	21 E	8.51
JUBILEE REEF	13	10 S	143	46 E	8.68
JUDGE ISLAND,	54	21 S	159	01 E	13.35
JUNCTION ISLANDS	36	14 S	175	19 E	10.35

K

KAHURANGI POINT	40	46 S	172	13 E	12.2
KAIKOURA PENINSULA	42	25 S	173	42 E	12.57
KAINGAROA BAY	43	44 S	176	16 W	13.11
KAIPARA HARBOR	36	25 S	174	09 E	11.6
KAI-YELUBI ISLAND	10	42 S	142	21 E	9.16
KAKANUI POINT	45	09 S	170	54 E	12.66
KAPITI ISLAND	40	52 S	174	55 E	11.20
KARAMEA RIVER	41	15 S	172	06 E	12.3
KAREPIRO BAY	36	39 S	174	45 E	10.42
KARITANE POINT	45	38 S	170	40 E	12.67
KARORI ROCK	41	21 S	174	39 E	11.24
KATIKI POINT	45	24 S	170	52 E	12.66
KAURI POINT	36	46 S	175	12 E	10.46
KAURI POINT	36	50 S	174	43 E	10.49
KAWA ROCK	34	58 S	173	43 E	10.11
KAWAU ISLAND	36	25 S	174	51 E	10.38
KAWHIA HARBOR	38	05 S	174	47 E	11.11
KELSO BANK	24	16 S	159	27 E	5.6
KEMP ROCKS	12	26 S	143	22 E	8.72
KEMPE POINT	41	02 S	174	19 E	11.47
KENN REEFS	21	16 S	155	48 E	6.5
KEPPEL BAY	23	22 S	151	00 E	5.48
KERMADEC GROUP	30	00 S	178	00 W	13.2
KEYSER ISLAND	20	32 S	149	05 E	7.31
KIAMA HARBOR	34	40 S	150	53 E	4.16
KILT SHOAL	40	14 S	148	01 E	2.19
KING ISLAND	14	06 S	144	20 E	8.47
KING REEF	17	47 S	146	10 E	7.52
KINGSTON	29	04 S	167	57 E	5.2
KINGSTON BAY	42	59 S	147	19 E	3.64
KIRKCALDIE REEF	10	20 S	142	50 E	9.12
KOHERURAHI POINT	36	55 S	175	08 E	10.47
KOHI POINT	37	56 S	177	01 E	10.66
KOHUAMARUA BLUFF	43	14 S	170	10 E	12.8
KOLAN RIVER	24	40 S	152	12 E	5.44
KORORAEKA POINT	35	16 S	174	07 E	10.22
KOROROIT CREEK	37	52 S	144	52 E	1.37

L

L'ESPERANCE ROCK	31	26 S	178	55 W	13.6
LA BOTTE	52	37 S	169	09 E	13.21
LACHLAN ISLET	42	39 S	147	58 E	3.78
LADY BAY	38	24 S	142	29 E	1.9
LADY ELLIOT ISLET	24	07 S	152	43 E	5.41
LADY JULIA PERCY ISLAND	38	25 S	142	00 E	1.6
LAGOON BAY	42	53 S	147	58 E	3.76
LAKE MACQUARIE ENTRANCE	33	05 S	151	40 E	5.8
LAKES ENTRANCE	37	54 S	147	58 E	2.38
LANSDOWN REEF	12	49 S	143	33 E	8.71
LARPENT BANK	10	35 S	142	01 E	9.28
LAUNCESTON	41	27 S	147	07 E	3.17
LAVINIA POINT	39	40 S	144	06 E	1.21
LAXTON REEF	9	24 S	143	49 E	9.7
LEICESTER ISLAND	22	16 S	150	27 E	7.11
LIGHTHOUSE POINT	38	51 S	146	29 E	2.31
LIHOU REEF AND CAYS	17	22 S	151	45 E	6.16
LIMEBURNERS CREEK	38	05 S	144	24 E	1.44
LIMEBURNERS POINT	38	09 S	144	23 E	1.44
LIMESTONE ISLAND	35	47 S	174	22 E	10.30
LINDEMAN GROUP	20	30 S	149	05 E	7.31
LINDEMAN ISLAND	20	27 S	149	02 E	7.31
LINDEN BANK	16	18 S	146	00 E	8.12
LINDISFARNE BAY	42	51 S	147	21 E	3.67
LINDQUIST ISLAND	17	39 S	146	09 E	7.53
LINNE ISLAND	20	40 S	149	11 E	7.28
LINNET REEF	14	47 S	145	21 E	8.39
LION ROCK	36	57 S	174	28 E	11.6
LITTLE ADOLPHUS ISLAND	10	36 S	142	37 E	8.91

	Position °	'	°	'	Sec. Para
LITTLE BARRIER ISLAND	36	12 S	175	05 E	10.32
LITTLE DOG ISLAND	40	15 S	148	18 E	2.20
LITTLE DRAGON BEACON	41	10 S	146	54 E	3.14
LITTLE GRASSY BAY	40	04 S	144	04 E	1.19
LITTLE NORFOLK BAY	43	02 S	147	51 E	3.71
LIZARD ISLAND	14	40 S	145	28 E	8.39
LLEWELLYN REEF	23	42 S	152	11 E	5.42
LLEWELLYN SHOAL	21	00 S	149	19 E	7.29
LONG BAY	43	08 S	147	52 E	3.75
LONG ISLAND	19	52 S	158	19 E	6.12
LONG ISLAND	20	22 S	148	52 E	7.35
LONG ISLAND	40	22 S	148	00 E	2.19
LONG ISLAND PASSAGE	19	51 S	158	17 E	6.12
LONG POINT	33	45 S	151	19 E	5.7
LONG POINT	39	10 S	177	49 E	10.79
LONG POINT	41	45 S	148	18 E	3.82
LONG POINT	46	35 S	169	35 E	12.71
LONG REEF POINT	46	13 S	166	41 E	12.36
LOOKOUT BLUFF	45	16 S	170	52 E	12.66
LOOKOUT HEAD	40	34 S	148	07 E	2.26
LOOKOUT POINT	14	50 S	145	14 E	8.38
LOOP ISLET	19	58 S	158	28 E	6.11
LORD HOWE ISLAND	31	33 S	159	05 E	5.3
LORDS RIVER	47	07 S	168	08 E	12.45
LORNE	38	33 S	143	59 E	1.26
LORT POINT	35	40 S	174	31 E	10.30
LOW HEAD	41	03 S	146	47 E	3.8
LOW ISLETS	16	23 S	145	34 E	8.16
LUCINDA POINT	18	31 S	146	20 E	7.50

M

MAATSUYKER GROUP	43	38 S	146	19 E	3.46
MABUIAG ISLAND	9	57 S	142	11 E	9.39
MABUIAG REEF	10	00 S	142	08 E	9.39
MACDONALD REEF	13	33 S	143	39 E	8.62
MACKAY	21	09 S	149	13 E	7.26
MACKAY REEF	16	03 S	145	39 E	8.4
MACLEAR ISLAND	14	13 S	144	15 E	8.48
MACQUARIE HARBOR	42	13 S	145	14 E	3.38
MACQUARIE ISLAND	54	45 S	158	40 E	13.32
MAER ISLAND	9	55 S	144	03 E	8.87
MAGDELAINE CAYS	16	36 S	150	20 E	6.19
MAGNETIC ISLAND	19	09 S	146	50 E	7.44
MAGNETIC PASSAGE	18	30 S	147	15 E	7.7
MAHINAPUA BAY	36	43 S	175	48 E	10.55
MANGERE ISLAND	44	16 S	176	17 W	13.15
MANGONUI HARBOR	34	59 S	173	32 E	10.10
MANLEY PIER	33	48 S	151	17 E	4.24
MANLEY POINT	33	49 S	151	17 E	4.24
MANSELL ISLAND	20	28 S	149	08 E	7.31
MANUKAU HARBOR	36	55 S	174	30 E	11.7
MARAETA POINT	36	53 S	175	02 E	10.49
MARGATE	43	02 S	147	16 E	3.55
MARIA ISLAND	42	40 S	148	04 E	3.77
MARINA ROCK	10	28 S	142	23 E	9.25
MARION REEF	19	05 S	152	17 E	6.8
MAROOCHY RIVER	26	39 S	153	05 E	5.33
MARSDEN POINT	35	50 S	174	30 E	10.30
MARSHALS ROCK	46	10 S	166	38 E	12.36
MARTHA POINT	38	18 S	144	59 E	1.30
MATATA	37	54 S	176	45 E	10.65
MATATUA POINT	38	04 S	174	50 E	11.11
MATAWHERA POINT	35	24 S	173	29 E	11.4
MAUNGANUI BLUFF	35	45 S	173	34 E	11.5
MAYOR ISLAND	37	17 S	176	15 E	10.62
MCHAFFIE POINT	38	28 S	145	10 E	2.3
MEABURN ROCK	17	34 S	146	10 E	7.55
MEDDLER ISLAND	10	42 S	142	23 E	9.16
MEGAERA REEF	14	29 S	144	58 E	8.34
MELANIE ROCK	14	06 S	144	34 E	8.50
MELBOURNE	37	50 S	144	56 E	1.37
MELLISH REEF	17	24 S	155	51 E	6.9
MERCURY BAY	36	47 S	175	49 E	10.57
MERCURY PASSAGE	42	40 S	148	00 E	3.78
MEREDITH POINT	42	33 S	148	55 E	3.78
MID ROCK	10	41 S	142	36 E	8.92
MIDDLE BANK	41	03 S	146	47 E	3.11
MIDDLE BELLONA REEFS	21	25 S	158	25 E	6.10
MIDDLE BROTHER	10	43 S	142	41 E	8.91
MIDDLE ISLAND	38	24 S	142	28 E	1.9
MIDDLE REEF	12	31 S	143	23 E	8.72
MIDDLE SHOALS	21	57 S	149	44 E	7.13
MIDDLETON	43	14 S	147	16 E	3.54
MIDDLETON REEF	29	28 S	159	04 E	5.6
MIKOTAHI LIGHT	39	03 S	174	02 E	11.14
MILES REEF	14	32 S	144	55 E	8.41
MILFORD SOUND	44	34 S	167	47 E	12.14
MILMAN ISLET	11	10 S	143	01 E	8.85
MIMIWHANGATA BAY	35	27 S	174	25 E	10.26
MINERVA SHOAL	20	55 S	159	22 E	6.10
MISSIONARY BAY	43	11 S	147	19 E	3.60
MOERAKI POINT	45	21 S	170	52 E	12.66
MOKOHINAU ISLANDS	35	55 S	175	08 E	10.31
MOLINEUX POINT	33	59 S	151	13 E	4.22
MOLLE ISLAND	20	16 S	148	50 E	7.36
MONKHOUSE POINT	15	30 S	145	17 E	8.26
MONTAGUE ISLAND	36	15 S	150	14 E	4.6
MOODY REEF	12	05 S	143	16 E	8.75
MOOLOOLABA HARBOR	26	41 S	153	08 E	5.33
MOON ISLET	33	05 S	151	40 E	5.9
MOORE REEFS	16	00 S	149	09 E	6.21
MORDIALLOC	38	01 S	145	05 E	1.37
MORESBY ROCK	10	11 S	142	43 E	9.13
MORETON BAY	27	20 S	153	15 E	5.30
MORETON ISLAND	27	12 S	153	24 E	5.29
MORIARTY ROCKS	40	35 S	148	17 E	2.26
MORRIS ISLAND	13	30 S	143	43 E	8.65
MOTITI ISLAND	37	38 S	176	25 E	10.64
MOTUAROHIA ISLAND	35	14 S	174	10 E	10.20
MOTUEKA	36	49 S	175	48 E	10.59
MOTUHORA	37	52 S	176	58 E	10.65
MOTUNGARARA ISLAND	40	57 S	174	10 E	11.43
MOTUNUI ISLET	37	47 S	177	39 E	10.66
MOTUORA ISLAND	36	30 S	174	48 E	10.40
MOUNT ADOLPHUS ISLAND	10	38 S	142	39 E	8.91
MOUNT ANGLEM	46	45 S	167	55 E	12.54
MOUNT AUGUSTUS	10	09 S	142	19 E	9.38
MOUNT BARKLY	37	53 S	147	58 E	2.37
MOUNT BEERWAH	26	54 S	152	53 E	5.31
MOUNT CHAPPELL ISLAND	40	16 S	147	56 E	2.18
MOUNT DOUBLEDUKE	29	17 S	153	11 E	5.22
MOUNT EARS	40	48 S	173	55 E	11.38
MOUNT ELIOT	19	29 S	146	58 E	7.43
MOUNT KINCAID	38	11 S	141	22 E	1.3
MOUNT LA PEROUSE	43	30 S	146	46 E	3.47
MOUNT LEEPER	17	35 S	146	06 E	7.55
MOUNT MCLEAN	44	01 S	168	45 E	12.11
MOUNT MUNRO	40	22 S	148	07 E	2.23
MOUNT RUMNEY	42	52 S	147	27 E	3.68
MOUNT SINGAPORE	38	47 S	146	27 E	2.34
MOUNT TAPUAENUKA	41	39 S	173	40 E	12.56
MOUNT VEREKER	38	58 S	146	22 E	2.6
MOUNT WAKAHURANGI	36	19 S	174	18 E	11.6
MOUNT WARRNAMBOOL	38	19 S	142	44 E	1.9
MOUNT WILLIAM	40	55 S	148	11 E	2.26
MOURILYAN HARBOR	17	36 S	146	08 E	7.54
MOUTERE BLUFF	41	13 S	173	05 E	11.32
MUD ISLAND	27	20 S	153	15 E	5.30
MURDERING POINT	17	46 S	146	07 E	7.52
MURDOCH POINT	14	37 S	144	55 E	8.41
MURRAY RIVER	18	05 S	146	02 E	7.52
MUSSELROE BAY	40	49 S	148	09 E	3.2
MUTEE HEAD	10	55 S	142	15 E	9.17
MYRMIDON REEF	18	15 S	147	22 E	7.7

N

NAMBUCCA HEADS	30	39 S	153	01 E	5.20
NAPIER HARBORS	39	29 S	176	54 E	10.81
NARDANA PATCHES	10	30 S	142	15 E	9.26
NARES ROCKS	40	35 S	144	41 E	3.33
NARROW BEND	46	04 S	166	46 E	12.35
NATIVE ISLAND	46	55 S	168	09 E	12.49
NELSON HARBOR	41	16 S	173	17 E	11.36
NEPEAN ISLAND	29	07 S	167	56 E	5.2
NEREUS REEF	20	07 S	160	28 E	6.15
NEW REEF	13	06 S	143	39 E	8.66
NEW YEAR ISLAND	39	40 S	143	50 E	1.17
NEW ZEALAND STAR BANK	37	47 S	149	44 E	2.42
NEWCASTLE HARBOR	32	55 S	151	47 E	5.11
NEWTON ISLAND	14	30 S	144	55 E	8.42

	Position °	'	°	'	Sec. Para
NIGHT ISLAND	13	10 S	143	34 E	8.62
NIGHT ISLET	40	29 S	148	01 E	2.25
NILE HEAD	40	44 S	173	52 E	11.33
NINEPIN ROCK	10	14 S	142	41 E	9.13
NINTH ISLAND	40	50 S	147	16 E	3.7
NOBLE ISLAND	14	30 S	144	46 E	8.43
NOEL BANK	20	32 S	158	34 E	6.10
NOGGIN PASSAGE	17	13 S	146	25 E	7.8
NOOSA RIVER	26	25 S	153	04 E	5.34
NORAH HEAD	33	17 S	151	35 E	5.8
NORFOLK BAY	42	58 S	147	47 E	3.70
NORFOLK ISLAND	29	02 S	167	57 E	5.2
NORMAN COVE	43	22 S	145	57 E	3.43
NORMAN INLET	50	44 S	166	10 E	13.27
NORMAN REEF	16	25 S	146	00 E	8.11
NORMANBY ISLAND	17	12 S	146	05 E	7.56
NORTH BAMPTON REEF	19	03 S	158	43 E	6.14
NORTH BAY POINT	14	16 S	144	36 E	8.44
NORTH CAPE	34	24 S	173	02 E	10.4
NORTH CAY	16	09 S	150	01 E	6.20
NORTH DIRECTION ISLAND	14	45 S	145	31 E	8.31
NORTH HEAD	35	31 S	173	22 E	11.3
NORTH HEAD	46	44 S	168	32 E	12.40
NORTH HEAD	54	28 S	158	58 E	13.32
NORTH ISLET	42	34 S	148	04 E	3.78
NORTH MOLLE ISLAND	20	13 S	148	49 E	7.37
NORTH PALM ISLAND	18	33 S	146	30 E	7.49
NORTH PANIA BUOY	41	22 S	175	49 E	10.81
NORTH PASSAGE	16	13 S	150	01 E	6.20
NORTH POINT	33	48 S	151	19 E	5.7
NORTH POINT	39	43 S	148	56 E	2.16
NORTH POINT LIGHT	27	02 S	153	27 E	5.30
NORTH POINT PASSAGE	22	02 S	149	53 E	7.13
NORTH PORT	45	59 S	166	36 E	12.32
NORTH REEF	17	27 S	148	20 E	6.23
NORTH REEF	23	11 S	151	54 E	5.42
NORTH SOLITARY ISLAND	29	56 S	153	24 E	5.22
NORTH TRAP	47	22 S	167	55 E	12.45
NORTH WEST BAY	43	03 S	147	17 E	3.54
NORTH WEST HEAD	43	00 S	147	38 E	3.69
NORTH WEST REEF	10	30 S	142	11 E	9.26
NORTH WEST SOLITARY ISLAND	30	01 S	153	16 E	5.21
NORTHEAST BAMPTON REEF	19	06 S	159	03 E	6.14
NORTHEAST CAY	21	38 S	153	46 E	6.6
NORTHERN SMALL DETACHED REEF	12	25 S	143	49 E	8.69
NORTHWEST BELLONA REEF	20	52 S	158	28 E	6.10
NORTHWEST POINT	19	37 S	158	13 E	6.13
NOTCH POINT	21	44 S	149	29 E	7.23
NUBEENA	43	06 S	147	45 E	3.72
NUGGET POINT	46	27 S	169	49 E	12.71
NUGGETS POINT	54	31 S	158	58 E	13.33
NYMPH ISLAND	14	39 S	145	15 E	8.40

O

OAMARU HARBOR	45	07 S	170	59 E	12.65
OBAN	46	53 S	168	08 E	12.48
OBERON POINT	39	05 S	146	19 E	2.7
OBREE POINT	15	46 S	145	22 E	8.24
OBREE REEF	13	59 S	143	41 E	8.56
OBSERVATORY CAY	17	08 S	152	06 E	6.16
OBSERVATORY CAY	21	02 S	154	23 E	6.7
OBSERVATORY CAY	21	24 S	158	51 E	6.10
OCEAN BAY	43	50 S	176	46 W	13.10
OCEAN ISLAND	50	32 S	166	16 E	13.26
OKAWA POINT	43	46 S	176	14 W	13.12
OKEHAMPTON BAY	42	32 S	147	58 E	3.80
OKIATO POINT	35	18 S	174	07 E	10.23
OKUKARI BAY	41	12 S	174	19 E	11.52
OLD MAN REEF	44	01 S	176	21 W	13.12
OLRY REEF	21	26 S	159	34 E	6.10
OMAHA BAY	36	19 S	174	50 E	10.37
ONE MILE OPENING	14	28 S	145	31 E	8.33
ONEHUNGA HARBOR	36	55 S	174	30 E	11.7
OPAL REEF	16	14 S	145	53 E	8.12
OPANIAPUTA POINT	41	05 S	174	00 E	11.42
OPAPE POINT	37	58 S	177	21 E	10.66
OPITO BAY	36	43 S	175	48 E	10.55
OPONONI	35	30 S	173	23 E	11.4
OPOUNUI POINT	35	01 S	173	53 E	10.13
OPUA	35	19 S	174	07 E	10.23
OPUNAKE	39	27 S	173	51 E	11.15
ORCHID POINT	12	51 S	143	27 E	8.70
ORMAN REEF	9	54 S	142	15 E	9.39
OSBORNE REEF	13	03 S	143	38 E	8.66
OSPREY REEF	13	55 S	146	36 E	6.27
OTAGO	45	49 S	170	37 E	12.68
OTAGOS RETREAT	46	09 S	166	38 E	12.35
OTAHU RIVER	37	14 S	175	53 E	10.61
OTAHUHU POINT	36	47 S	174	55 E	10.49
OTTERBOURNE ISLAND	22	02 S	150	18 E	7.16
OUTER NORTH HEAD	33	49 S	151	18 E	4.24
OUTER NORTH HEAD	43	04 S	147	38 E	3.69
OUTER SOUTH HEAD	35	33 S	173	22 E	11.4
OVERFALL ROCK	21	16 S	149	38 E	7.16
OWHIRO BAY	41	20 S	174	46 E	11.25
OYSTER BAY	41	15 S	174	15 E	11.52

P

PACKE ISLAND	10	45 S	142	13 E	9.18
PADDYS ISLET	41	24 S	148	18 E	3.83
PAGET CAY	19	15 S	152	21 E	6.8
PALM PASSAGE	18	19 S	147	00 E	7.7
PALMER HEAD	41	20 S	174	49 E	11.25
PALMER POINT	17	10 S	145	58 E	7.57
PALUMA SHOAL	11	55 S	143	18 E	8.82
PANCAKE CREEK	24	01 S	151	44 E	5.44
PAPUAN PASS	15	46 S	145	49 E	8.21
PARATUTAI ISLAND	37	03 S	174	31 E	11.7
PARAU ISLAND	10	51 S	142	19 E	9.17
PARENGARENGA HARBOR	34	32 S	173	01 E	10.5
PARKER REEF	20	33 S	149	45 E	7.21
PARRY ROCK	13	15 S	143	38 E	8.62
PARTRIDGE ISLE	43	24 S	147	06 E	3.58
PASSAGE ISLAND	35	50 S	174	30 E	10.30
PASSAGE ISLET	19	55 S	158	22 E	6.12
PASSAGE PATCH	22	22 S	150	23 E	7.11
PATEA HARBOR	39	47 S	174	29 E	11.16
PATITI POINT	44	25 S	171	16 E	12.65
PATUATINI ROCK	37	53 S	174	43 E	11.10
PAUHENEHENE SPIT LIGHT	36	54 S	175	11 E	10.49
PEAK ISLAND	23	21 S	150	56 E	5.50
PEAK POINT	10	43 S	142	26 E	9.15
PEARCE CAY	9	31 S	143	17 E	9.10
PEARL BAY	22	25 S	150	42 E	5.55
PEARL POINT	37	47 S	148	53 E	2.40
PEARL REEF	15	43 S	145	48 E	8.22
PEARN ROCK	11	25 S	142	56 E	8.82
PEDRA BLANCA	43	52 S	146	59 E	3.48
PEKAPEKA BAY	35	01 S	173	45 E	10.12
PELICAN ISLAND	13	55 S	143	50 E	8.64
PELICAN ISLAND	23	15 S	150	52 E	5.50
PELICAN ISLET	33	04 S	151	38 E	5.9
PELICAN ISLET	43	27 S	146	58 E	3.50
PELORUS ISLAND	18	33 S	146	30 E	7.49
PELORUS SOUND	40	56 S	174	04 E	11.40
PENINSULA POINT	45	22 S	166	46 E	12.24
PERANO HEAD	41	12 S	174	22 E	11.51
PERCY ISLETS	21	39 S	150	19 E	7.15
PERKINS BAY	40	46 S	145	10 E	3.28
PERPENDICULAR POINT	42	06 S	171	20 E	12.6
PERSEVERANCE HARBOR	52	33 S	169	09 E	13.20
PETHEBRIDGE ISLETS	14	44 S	144	06 E	8.40
PETRICOLA SHOAL	14	38 S	145	28 E	8.39
PICKERING POINT	38	24 S	142	28 E	1.8
PICTON HARBOR	41	17 S	174	00 E	11.50
PIERSON POINT	43	03 S	147	21 E	3.55
PIG HEAD POINT	40	16 S	148	07 E	2.19
PIGEON POINT	43	37 S	172	55 E	12.61
PINE COVE	42	12 S	145	22 E	3.40
PINETREES POINT	22	20 S	150	38 E	5.56
PINNACLE POINT	20	03 S	148	58 E	7.33
PIONEER BAY	20	14 S	148	42 E	7.38
PIONEER POINT	20	14 S	148	46 E	7.37
PIPER REEF	12	15 S	143	14 E	8.73
PIPON ISLETS	14	07 S	144	31 E	8.47
PIPON SHOALS	14	06 S	144	32 E	8.47
PIRATES BAY	43	01 S	147	56 E	3.76
PIROGUE ROCKS	36	17 S	175	20 E	10.35
PIRONGIA MOUNTAIN	38	00 S	175	08 E	11.11
PITH REEF	18	12 S	147	02 E	7.7

	Position °	'	°	'	Sec. Para
PITT ISLAND	44	17 S	176	13 W	13.14
PLANTATION CREEK	19	32 S	147	30 E	7.42
PLATYPUS BAY	24	57 S	153	09 E	5.38
POINT ABEONA	38	05 S	144	24 E	1.44
POINT BAILLY	42	21 S	148	01 E	3.80
POINT COOK	37	56 S	144	48 E	1.37, 1.38
POINT DANGER	38	24 S	141	39 E	1.4
POINT ELIZABETH	42	23 S	171	13 E	12.6
POINT GELLIBRAND	37	52 S	144	54 E	1.37
POINT GEORGE	38	08 S	144	42 E	1.32
POINT GIBSON	42	53 S	173	19 E	12.58
POINT GILLIBRAND	37	52 S	144	54 E	1.37
POINT GRANT	38	31 S	145	07 E	2.3
POINT HENRY	38	08 S	144	25 E	1.43
POINT HIBBS	42	37 S	145	15 E	3.41
POINT HICKS	37	48 S	149	16 E	2.40
POINT HOME LOOKOUT	42	33 S	147	57 E	3.79
POINT KEAN	42	26 S	173	43 E	12.57
POINT LILLIAS	38	06 S	144	27 E	1.41
POINT LONSDALE	38	18 S	144	37 E	1.28
POINT LOOKOUT	27	26 S	153	33 E	5.28
POINT NEPEAN	38	18 S	144	39 E	1.28
POINT ORMOND	37	50 S	144	56 E	1.36
POINT PERPENDICULAR	35	06 S	150	49 E	4.14
POINT PLOMER	31	18 S	152	59 E	5.19
POINT RESOLUTION	36	51 S	174	48 E	10.49
POINT RICARDO	37	49 S	148	38 E	2.39
POINT RICHARDS	38	07 S	144	38 E	1.44
POINT RONALD	38	43 S	143	09 E	1.12
POINT SMYTHE	38	39 S	145	44 E	2.4
POINT STEPHENS	32	45 S	152	12 E	5.12
POINT WILSON	38	06 S	144	30 E	1.41
POLL ISLET	10	15 S	142	50 E	9.12
POOR KNIGHTS ISLANDS	35	28 S	174	44 E	10.27
PORIRUA HARBOR	41	05 S	174	50 E	11.23
PORPOISE HEAD	27	57 S	153	26 E	5.28
PORPOISE SHOAL	24	38 S	153	09 E	5.35
PORT ABERCROMBIE	36	10 S	175	19 E	10.33
PORT ADVENTURE	47	04 S	168	11 E	12.52
PORT ALBERT	38	40 S	146	42 E	2.35
PORT ALBERT WHARF	38	40 S	146	41 E	2.35
PORT ALMA	23	36 S	150	52 E	5.52
PORT CAMPBELL	38	37 S	142	59 E	1.11
PORT CLINTON	22	32 S	150	46 E	5.54
PORT CURTIS	23	55 S	151	23 E	5.46
PORT ESPERANCE	43	20 S	147	03 E	3.51
PORT FAIRY	38	23 S	142	15 E	1.7
PORT FITZROY	36	11 S	175	20 E	10.33
PORT GORE	41	02 S	174	14 E	11.44
PORT HACKING	34	04 S	151	09 E	4.20
PORT HACKING POINT	34	05 S	151	10 E	4.19
PORT HARDY	40	45 S	173	54 E	11.37
PORT HUON	43	10 S	146	59 E	3.53
PORT KEMBLA	34	28 S	150	55 E	4.17
PORT LATTA	40	51 S	145	23 E	3.25
PORT LEVY	43	37 S	172	50 E	12.61
PORT LYTTELTON	43	36 S	172	43 E	12.60
PORT MACQUARIE	31	26 S	152	55 E	5.18
PORT MOLLE	20	19 S	148	51 E	7.36
PORT MOTUEKA	41	08 S	173	01 E	11.32
PORT NEWRY	20	51 S	148	56 E	7.29
PORT OF BOWEN	20	01 S	148	15 E	7.39
PORT OF HAY POINT	21	16 S	149	19 E	7.24
PORT OF INNISFAIL	17	31 S	146	02 E	7.55
PORT OF LUCINDA	18	31 S	146	20 E	7.51
PORT OF MARYBOROUGH	25	53 S	152	43 E	5.39
PORT PEGASUS	47	12 S	167	42 E	12.44
PORT PHILLIP	38	18 S	144	38 E	1.28
PORT ROSS HARBOR	50	32 S	166	14 E	13.25
PORT RUSSELL	35	16 S	174	07 E	10.22
PORT SORELL	41	08 S	146	33 E	3.18
PORT STEPHENS	32	43 S	152	12 E	5.13
PORT STEWART	14	05 S	143	41 E	8.55
PORT TARANAKI	39	03 S	174	02 E	11.14
PORT UNDERWOOD	41	20 S	174	08 E	11.54
PORT WAITANGI	43	57 S	176	31 W	13.8
PORT WILLIAM	46	51 S	168	05 E	12.46
PORTLAND	38	21 S	141	37 E	1.5
PORTLAND WHARVES	35	48 S	174	20 E	10.30
PORTLOCK REEFS	9	35 S	144	50 E	8.88
POSSESSION ISLAND	10	44 S	142	24 E	9.16
POTT POINT	10	36 S	142	09 E	9.31
POTTER REEF	17	40 S	146	34 E	7.8
POVERTY BAY	38	44 S	178	02 E	10.73
POYNTER ISLAND	21	50 S	149	48 E	7.17
PRATT ROCK	16	09 S	145	37 E	8.4
PRIME SEAL POINT	40	02 S	147	46 E	2.17
PRINCE OF WALES BAY	42	50 S	147	18 E	3.67
PRINCE OF WALES ISLAND	10	41 S	142	11 E	9.15
PROMISE BAY	42	11 S	148	16 E	3.81
PROUDFOOT SHOAL	10	32 S	141	28 E	9.30
PROVIDENTIAL CHANNEL	12	36 S	143	49 E	8.69
PRUDHOE CHANNEL	21	23 S	149	43 E	7.20
PRUDHOE ISLAND	21	19 S	149	40 E	7.20
PRUDHOE SHOAL	21	19 S	149	41 E	7.20
PUKERAKEI LIGHT	43	44 S	176	14 W	13.11
PULLAR PATCHES	10	31 S	142	15 E	9.26
PULLEN REEFS	15	15 S	145	35 E	8.22
PUPONGA POINT	37	01 S	174	36 E	11.7
PYRAMID ROCK	38	32 S	145	13 E	2.3
PYRMONT BRIDGE	33	52 S	151	12 E	4.24

Q

	Position °	'	°	'	Sec. Para
QUETTA ROCK	10	40 S	142	38 E	8.92
QUEUE REEF	11	56 S	143	22 E	8.75
QUOIN ISLAND	22	34 S	150	48 E	5.53

R

	Position °	'	°	'	Sec. Para
RABBIT ISLAND	38	55 S	146	30 E	2.30
RAGLAN HARBOR	37	48 S	174	50 E	11.9
RAINBOW CHANNEL	27	27 S	153	25 E	5.29
RAINE ISLAND	11	36 S	144	01 E	8.77
RAKEAHUA	46	57 S	167	53 E	12.49
RAKITU ISLAND	36	08 S	175	30 E	10.36
RALPH BAY	42	57 S	147	26 E	3.65
RAME HEAD	37	47 S	149	28 E	2.41
RANGAUNU HARBOR	34	52 S	173	17 E	10.8
RANGIAURIA ISLAND	44	17 S	176	13 W	13.14
RANGIHOUA BAY	35	11 S	174	06 E	10.16, 10.17
RANGIKAPITI HEAD	34	59 S	173	31 E	10.10
RANGIPUKEA ISLAND	36	50 S	175	25 E	10.51
RANGITOTO ISLAND	36	47 S	174	52 E	10.43
RANGITOTO ISLANDS	40	46 S	173	59 E	11.38
RANGITOTO POINT	37	48 S	174	51 E	11.9
RAOUL BAY	43	13 S	147	46 E	3.73
RAOUL ISLAND	29	16 S	177	57 W	13.3
RAPER SHOAL	26	46 S	153	10 E	5.33
RAPID HORN	14	01 S	146	42 E	6.27
RATTLESNAKE ISLAND	19	02 S	146	37 E	7.47
RATTLESNAKE POINT	15	50 S	145	23 E	8.24
RAWENE	35	24 S	173	30 E	11.4
RECHERCHE BAY	43	33 S	146	55 E	3.48
RED BLUFF	37	52 S	148	04 E	2.38
RED HEAD	35	12 S	174	12 E	10.19
RED ISLAND	10	51 S	142	21 E	9.17
RED POINT	14	33 S	144	46 E	8.43
RED POINT	37	06 S	149	57 E	4.3
RED POINT	38	33 S	145	22 E	2.3
RED WALLIS ISLAND	10	51 S	142	01 E	9.22
REDHEAD	33	01 S	151	44 E	5.10
REEF POINT	40	55 S	173	50 E	11.34
REGINALD POINT	38	46 S	143	16 E	1.12
REID ROCKS	40	15 S	144	10 E	1.22
RENNEL ISLAND	9	46 S	143	16 E	9.10
REPULSE BAY	20	35 S	148	48 E	7.30
RESOLUTION ISLAND	45	41 S	166	39 E	12.25
RESTORATION ROCK	12	37 S	143	28 E	8.72
REVOLVER BAY	46	05 S	166	45 E	12.35
REYNARD ISLAND	19	14 S	158	58 E	6.14
RIB REEF	18	28 S	146	52 E	7.7
RIBBON REEF	14	56 S	145	42 E	8.21
RICHARDS POINT	23	59 S	151	38 E	5.45
RICHARDS ROCK	36	35 S	175	56 E	10.59
RICHARDSON REEF	10	07 S	143	03 E	9.12
RICKETTS POINT	38	00 S	145	02 E	1.36
RIEDLE BAY	42	41 S	148	05 E	3.77
RIMARIKI ISLAND	35	26 S	174	27 E	10.26
RINGDOVE BAY	49	42 S	178	50 E	13.17

	Position °	'	°	'	Sec. Para
RIVER DON	41	10 S	146	20 E	3.20
RIVER INGLIS	40	59 S	145	44 E	3.24
ROBERTS ISLET	9	59 S	143	07 E	9.11
ROCK COD POINT	42	50 S	147	19 E	3.67
ROCKINGHAM BAY	18	08 S	146	07 E	7.52
ROCKY CAPE	40	51 S	145	31 E	3.24
ROCKY ISLET	12	35 S	143	25 E	8.72
RODDA REEF	13	55 S	144	21 E	8.67
RODONDO ISLAND	39	14 S	146	23 E	2.10
ROMA POINT	20	17 S	148	50 E	7.36
ROONEY POINT	24	49 S	153	07 E	5.38
ROSEVEARS	41	19 S	147	00 E	3.10
ROUND HEAD	20	29 S	148	54 E	7.35
ROUND HILL	14	48 S	145	01 E	8.40
ROUND HILL HEAD	24	10 S	151	53 E	5.44
ROUND HILL POINT	41	04 S	145	57 E	3.22
ROUND MOUNTAIN	13	34 S	143	31 E	8.56
ROUND ROCK	44	22 S	176	20 W	13.14
ROUNDISH ISLET	22	03 S	149	37 E	7.13
ROYAL GEORGE SHOAL	38	16 S	144	42 E	1.33
RUAKURA POINT	36	56 S	175	11 E	10.53
RUAPAPAKA ISLET	35	21 S	173	35 E	11.4
RUAPUKE ISLAND	46	46 S	168	31 E	12.40
RUGGED POINT	10	11 S	142	08 E	9.38
RUGGED POINT	46	43 S	167	44 E	12.43
RUNDLE ISLANDS	23	32 S	151	17 E	5.47
RUSSELL ISLAND	17	14 S	146	06 E	7.56

S

SADDLE ISLAND	10	10 S	142	41 E	9.6
SADDLE POINT	46	43 S	167	59 E	12.46
SAIL ROCK	42	58 S	173	13 E	12.59
SAND HILL POINT	46	15 S	167	21 E	12.36
SAND ISLET	14	31 S	144	51 E	8.41
SAND PATCH POINT	37	44 S	149	36 E	2.41
SANDON BLUFFS	29	40 S	153	20 E	5.22
SANDSPIT LIGHT	36	54 S	175	11 E	10.49
SANDSPIT PASSAGE	36	54 S	175	11 E	10.47
SANDY BAY	42	54 S	147	20 E	3.64
SANDY CAPE	24	42 S	153	16 E	5.35
SANDY CAPE	41	25 S	144	45 E	3.36
SANDY CAPE SHOAL	24	35 S	153	20 E	5.35
SANDY POINT	36	52 S	174	53 E	10.48
SANDY POINT	38	25 S	145	14 E	2.3
SANDY SHOALS	21	50 S	149	33 E	7.23
SARAH'S BOSOM HARBOR	50	32 S	166	14 E	13.25
SATELLITE ISLAND	43	19 S	147	13 E	3.60
SATELLITE REEF	16	26 S	145	41 E	8.3
SAUMAREZ REEFS	21	48 S	153	42 E	6.6
SAUVAGE POINT	40	57 S	173	46 E	11.33
SCAWFELL ISLAND	20	52 S	149	37 E	7.27
SCRUB POINT	38	17 S	145	17 E	2.3
SEAFORTH ISLAND	20	28 S	149	02 E	7.31
SEAL POINT	40	07 S	143	58 E	1.19
SEAL ROCKS	23	57 S	151	29 E	5.45
SEALERS COVE	39	01 S	146	27 E	2.30
SECOND LUMP	23	21 S	150	56 E	5.50
SENTRY REEF	44	12 S	176	34 W	13.14
SETTLEMENT POINT	40	01 S	147	52 E	2.16
SEVEN MILE BEACH	42	51 S	147	33 E	3.69
SHAG POINT	45	28 S	170	50 E	12.66
SHAG ROCK	42	49 S	173	21 E	12.58
SHAG ROCK	50	43 S	166	13 E	13.27
SHAKESPEARE CLIFF	36	50 S	175	44 E	10.58
SHANKS ISLETS	43	21 S	145	57 E	3.44
SHARK REEF	14	17 S	146	56 E	6.27
SHARP POINT	10	58 S	142	43 E	8.80
SHELLBACK ISLAND	38	58 S	146	14 E	2.7
SHELTER ISLANDS	45	17 S	166	53 E	12.23
SHEPHERDESS REEF	41	45 S	174	18 E	12.56
SHERRARD ISLETS	12	59 S	143	37 E	8.66
SHIP ROCK	23	25 S	151	11 E	5.49
SHOALWATER BAY	22	23 S	150	23 E	7.11
SHOE ISLET	50	32 S	166	14 E	13.26
SHORTLAND BLUFF	38	17 S	144	39 E	1.32
SIM REEF	14	49 S	145	17 E	8.38
SINGLE ROCK ENTRANCE	12	01 S	143	56 E	8.76
SINGLETON PATCH	14	10 S	144	35 E	8.44
SIR JAMES SMITH GROUP	20	38 S	149	08 E	7.28
SISTERS POINT	38	22 S	142	19 E	1.8
SKELETON CAY	19	27 S	158	57 E	6.14
SKIRMISH BAY	43	44 S	176	16 W	13.11
SKIRMISH POINT	27	05 S	153	12 E	5.30
SLADE POINT	21	04 S	149	14 E	7.29
SLIPPER ISLAND	37	03 S	175	57 E	10.61
SLOOP ROCK	42	17 S	145	11 E	3.41
SLOPE POINT	46	41 S	169	00 E	12.72
SLOPING HUMMOCK	24	50 S	152	25 E	5.40
SMOKY CAPE	30	56 S	153	05 E	5.19
SMYTHE SHOALS	21	44 S	149	52 E	7.17
SNAKE ISLAND	38	05 S	144	28 E	1.41
SNARE PEAK ISLAND	21	06 S	149	56 E	7.27
SNARES ISLANDS	48	00 S	166	34 E	12.45
SOLANDER ISLANDS	46	34 S	166	54 E	12.42
SOLITARY CONE	45	24 S	167	07 E	12.23
SOUTH BARNARD ISLANDS	17	45 S	146	10 E	7.52
SOUTH BRIG ROCK	40	06 S	144	02 E	1.19
SOUTH CHANNEL PILE	38	20 S	144	51 E	1.31
SOUTH DIRECTION ISLAND	14	50 S	145	31 E	8.31
SOUTH EAST CAPE	43	38 S	146	52 E	3.48
SOUTH EAST POINT	39	08 S	146	25 E	2.8
SOUTH ELBOW	19	59 S	158	29 E	6.11
SOUTH EVANS REEF	29	12 S	153	26 E	5.22
SOUTH GABLE	35	37 S	174	33 E	10.26
SOUTH HARBOR	52	33 S	169	09 E	13.20
SOUTH HEAD	20	19 S	148	52 E	7.36
SOUTH HEAD	36	31 S	174	44 E	10.41
SOUTH ISLAND	50	53 S	166	04 E	13.28
SOUTH ISLET	16	18 S	149	59 E	6.20
SOUTH LEDGE	10	43 S	142	44 E	8.85
SOUTH PASSAGE	16	16 S	149	59 E	6.20
SOUTH POINT	45	49 S	166	28 E	12.29
SOUTH PORT	43	27 S	146	58 E	3.49
SOUTH PORT	46	03 S	166	38 E	12.32
SOUTH PORT LAGOON	43	29 S	146	58 E	3.49
SOUTH RIORDAN SHOAL	29	00 S	153	30 E	5.24
SOUTH SOLITARY ISLAND	30	12 S	153	16 E	5.21
SOUTH WEST CAPE	43	35 S	146	02 E	3.46
SOUTH WEST ISLAND	39	32 S	147	08 E	2.13
SOUTHEAST ELBOW	21	55 S	153	35 E	6.6
SOUTHPORT ISLET	43	29 S	147	01 E	3.66
SOUTHWEST CAPE	47	17 S	167	29 E	12.44
SOUTHWEST CAY	21	50 S	153	30 E	6.6
SOUTHWEST ISLET	16	57 S	149	55 E	6.18
SOUTH-WEST POINT	54	45 S	158	48 E	13.34
SPENCER ISLAND	10	17 S	142	06 E	9.37
SPERM WHALE HEAD	37	59 S	147	43 E	2.37
SPITFIRE REEFS	16	01 S	145	38 E	8.19
SPLIT POINT	38	28 S	144	06 E	1.27
SPLIT SOLITARY ISLAND	30	14 S	153	11 E	5.21
SPRING BAY	42	33 S	147	56 E	3.79
SPRING COVE	33	49 S	151	17 E	4.24
SPUR REEF	16	24 S	146	03 E	8.9
ST. BEES ISLAND	20	55 S	149	27 E	7.27
ST. GEORGE HEAD	35	12 S	150	42 E	4.12
ST. HELENS	41	19 S	148	15 E	3.83
ST. HELENS POINT	41	17 S	148	21 E	3.83
ST. PATRICKS FORELAND	41	35 S	148	20 E	3.82
STANLEY	40	46 S	145	17 E	3.27
STEEP HEAD	43	44 S	173	08 E	12.61
STEEP ISLAND	22	02 S	150	27 E	7.15
STEPHENS ISLET	9	30 S	143	33 E	9.9
STEWART ISLAND	47	00 S	168	00 E	12.42
STEWART PENINSULA	20	47 S	148	50 E	7.30
STIRLING POINT	46	37 S	168	22 E	12.39
STOKES POINT	36	50 S	174	45 E	10.49
STOKES POINT	40	10 S	143	55 E	1.18
STONEHAVEN ANCHORAGE	20	06 S	148	53 E	7.34
STONEHENGE	10	19 S	142	06 E	9.37
STORM BAY	43	08 S	147	31 E	3.72
STRAHAN	42	10 S	145	20 E	3.40
STRIPE POINT	20	19 S	148	49 E	7.36
STRONG TIDE PASSAGE	22	20 S	150	32 E	5.56
SUE ISLET	10	13 S	142	49 E	9.12
SUGARLOAF POINT	32	27 S	152	32 E	5.14
SUNDAY ISLAND	29	16 S	177	57 W	13.3
SUNK REEFS	10	32 S	142	08 E	9.27
SURREY RIVER	38	16 S	141	42 E	1.6
SVENOR POINT	43	12 S	145	45 E	3.41
SW EXTREME	21	17 S	155	43 E	6.5
SWAIN REEFS	22	00 S	152	30 E	7.4
SWAN ISLAND	38	15 S	144	41 E	1.32

	Position °	'	°	'	Sec. Para
SWAN ISLAND	40	44 S	148	06 E	3.3
SWAN POINT	38	15 S	144	42 E	1.34
SWANSEA	42	09 S	148	05 E	3.81
SWINGER REEF	15	15 S	145	32 E	8.20
SWITZER REEF	14	22 S	144	45 E	8.34
SYDNEY	33	52 S	151	12 E	4.24
SYDNEY HARBOR BRIDGE	33	51 S	151	13 E	4.24
T					
TABLE CAPE	39	06 S	178	00 E	10.77
TABLE CAPE	40	57 S	145	44 E	3.24
TABLE ROCK	46	06 S	166	32 E	12.31
TACKING POINT	31	29 S	152	56 E	5.17
TAHAROA IRONSAND TERMINAL	38	10 S	174	41 E	11.12
TAIHARURU HEAD	35	43 S	174	34 E	10.28
TAKAPUNA HEAD	36	49 S	174	48 E	10.44
TAKATU POINT	36	22 S	174	52 E	10.37
TAKOU BAY	35	05 S	173	57 E	10.14
TANIWHANUI POINT	36	49 S	175	10 E	10.46
TANNADICE ROCK	12	40 S	143	31 E	8.74
TAPEKA POINT	35	15 S	174	07 E	10.20
TARAKOHE	40	51 S	172	54 E	11.28
TARANNA	43	03 S	147	52 E	3.71
TASMAN HEAD	43	31 S	147	18 E	3.57
TATHRA HEAD	36	43 S	149	59 E	4.5
TAUPO BAY	34	59 S	173	43 E	10.11
TAURANGA	37	39 S	176	11 E	10.63
TAUTUKU PENINSULA	46	37 S	169	26 E	12.72
TE AUMITI	40	55 S	173	50 E	11.34
TE HAMENGA	41	32 S	175	11 E	11.25
TE HUE POINT	35	13 S	174	15 E	10.19
TE KAHA POINT	37	45 S	177	40 E	10.67
TE KAKAHO	40	54 S	174	06 E	11.41
TE KOUMA HARBOR	36	49 S	175	26 E	10.51
TE PAHI ISLANDS	35	11 S	174	05 E	10.17
TE PUNA INLET	35	12 S	174	03 E	10.17
TE RAWHITI INLET	35	14 S	174	12 E	10.19
TE ROA BAY	35	14 S	174	19 E	10.24
TE UWHI	35	16 S	174	11 E	10.21
TELEGRAPH POINT	37	33 S	149	54 E	2.42
TE-U-MUKURI POINT	45	48 S	170	43 E	12.68
THE BLUFF	36	16 S	174	15 E	11.6
THE BROTHERS POINT	46	40 S	169	12 E	12.72
THE DOUGHBOY	39	35 S	143	58 E	1.21
THE NARROWS	35	23 S	173	32 E	11.3
THE PIGEONS	36	17 S	175	20 E	10.35
THE PIGSTIES	43	33 S	146	54 E	3.48
THE PYRAMID	44	26 S	176	12 W	13.15
THE YELLOW BLUFF	43	08 S	147	24 E	3.62
THOMAS ISLAND	20	33 S	149	07 E	7.31
THOMPSON POINT	17	32 S	146	05 E	7.55
THORPE POINT	11	55 S	143	09 E	8.79
THREE HUMMOCK ISLAND	40	25 S	144	55 E	3.30
THREE ISLES	15	07 S	145	25 E	8.28
THREE KINGS ISLANDS	34	09 S	172	06 E	10.2
THREE SISTERS ISLETS	10	12 S	142	49 E	9.6
THRUSH REEF	11	43 S	143	11 E	8.84
THURSDAY ISLAND	10	35 S	142	13 E	9.33
THURSDAY ISLAND HARBOR	10	35 S	142	13 E	9.34
TI POINT	35	16 S	174	05 E	10.22
TIA ISLAND	47	05 S	168	13 E	12.52
TIJOU REEF	13	10 S	143	57 E	8.67
TIMANDRA BANK	23	26 S	151	00 E	5.49
TIMARU HARBOR	44	23 S	171	16 E	12.64
TIMUTIMU HEAD	43	54 S	172	57 E	12.63
TIRUA POINT	38	23 S	174	38 E	11.13
TITI ISLAND	40	57 S	174	10 E	11.43
TITITIRA HEAD	43	37 S	169	26 E	12.9
TOBIAS SPIT	17	08 S	146	00 E	7.56
TOETOES BAY	46	38 S	168	41 E	12.39
TOKATOKA POINT	37	47 S	174	52 E	11.9
TOKATU POINT	36	22 S	174	52 E	10.39
TOKOMARU BAY	38	08 S	178	22 E	10.71
TOLLGATE ISLANDS	35	45 S	150	16 E	4.8
TOMS CAP	38	20 S	146	48 E	2.36
TONGUE POINT	20	14 S	149	01 E	7.32
TORTOISE HEAD	38	25 S	145	16 E	2.3
TORY CHANNEL	41	13 S	174	19 E	11.19
TOWER HILL	38	19 S	142	23 E	1.7
TOWN POINT	37	45 S	176	28 E	10.64
TOWNSVILLE	19	15 S	146	50 E	7.45
TOWRADGI POINT	34	23 S	150	55 E	4.18
TRANMERE	42	55 S	147	25 E	3.65
TREBLE ISLET	21	36 S	149	50 E	7.18
TREBLE MOUNT	46	01 S	166	43 E	12.33
TREFOIL ISLAND	40	38 S	144	41 E	3.34
TREGROSSE REEFS	17	47 S	150	37 E	6.17
TRIANGLE REEF	10	45 S	143	57 E	8.86
TROUSERS POINT	40	13 S	148	01 E	2.17
TRYPHENA HARBOR	36	19 S	175	28 E	10.35
TUAHENI POINT	38	43 S	178	04 E	10.73
TUDU ISLAND	9	48 S	142	58 E	9.11
TUHAWAIKI POINT	44	27 S	171	16 E	12.65
TUNNEL BAY	43	12 S	147	44 E	3.72
TURAKIRAE HEAD	41	25 S	174	55 E	11.19
TURAKIRAE HEAD	41	26 S	174	55 E	11.25
TURANGANUI RIVER	38	40 S	178	01 E	10.73
TURTLE GROUP	14	43 S	145	12 E	8.40
TURU CAY	9	49 S	141	25 E	9.29
TUTUKAKA HARBOR	35	37 S	174	33 E	10.27
TUTUKAKA HEAD	35	37 S	174	33 E	10.26
TWILIGHT BEACH	34	30 S	172	42 E	11.1
TWIN ISLAND	10	28 S	142	27 E	9.25
TWOFOLD BAY	37	04 S	149	56 E	4.3
TYDEMAN REEF	13	59 S	144	31 E	8.51
TYNEMOUTH ISLAND	22	00 S	150	08 E	7.16
U					
ULLADULLA HARBOR	35	22 S	150	30 E	4.10
ULVA ISLAND	46	56 S	168	08 E	12.49
ULVERSTONE	41	10 S	146	10 E	3.21
UNDERWOOD SHOAL	14	35 S	145	28 E	8.39
UNISON REEF	14	18 S	144	41 E	8.34
UPOLU CAY	16	40 S	145	56 E	8.3
URANGAN	25	18 S	152	53 E	5.39
URCHIN SHOAL	18	20 S	147	05 E	7.7
USSHER POINT	11	10 S	142	48 E	8.80
V					
VANSITTART ISLAND	40	16 S	148	18 E	2.20
VARZIN SHOAL	10	33 S	141	55 E	9.28
VENTENAT POINT	43	21 S	147	12 E	3.59
VERNON ROCKS	21	28 S	150	19 E	7.15
VIKING REEF	11	36 S	143	00 E	8.85
W					
WAEWAETOREA ISLAND	35	12 S	174	13 E	10.19
WAI WEER ISLET	10	34 S	142	10 E	9.32
WAIAROHEA STREAM	35	31 S	173	23 E	11.4
WAIHEKE ISLAND	36	48 S	175	05 E	10.45
WAIKANAE RIVER	40	52 S	175	00 E	11.22
WAIKARO POINT	36	07 S	175	26 E	10.36
WAIKATO RIVER	37	24 S	174	45 E	11.8
WAIPAPA POINT	42	12 S	173	52 E	12.56
WAIPAPA POINT	46	40 S	168	51 E	12.73
WAIRIKI POINT	35	15 S	174	14 E	10.20
WAIROA RIVER	39	02 S	177	25 E	10.79
WAIWERA BLUFF	36	32 S	174	43 E	10.42
WALKER ISLAND	40	36 S	144	56 E	3.29
WANGANUI HARBOR	39	57 S	174	59 E	11.17
WAPPARABURRA	23	10 S	150	58 E	5.50
WARDEN HEAD LIGHT	35	22 S	150	30 E	4.9
WARRIOR REEFS	9	14 S	143	12 E	9.11
WARRNAMBOOL HARBOR	38	24 S	142	29 E	1.9
WASP REEF	13	02 S	143	33 E	8.58
WATERFALL BAY	54	40 S	158	55 E	13.34
WATERHOUSE POINT	40	49 S	147	40 E	3.5
WATERWITCH PASSAGE	14	11 S	144	53 E	8.35
WATERWITCH POINT	39	57 S	143	51 E	1.18
WATERWITCH REEF	13	09 S	143	37 E	8.63
WEDGE BAY	43	07 S	147	42 E	3.72
WEDGE ISLAND	43	08 S	147	40 E	3.72
WEDNESDAY ISLAND	10	31 S	142	18 E	9.25
WEKEKA RIVER	43	26 S	169	48 E	12.9
WELLINGTON HARBOR	41	21 S	174	50 E	11.25
WERRIBEE RIVER	37	59 S	144	41 E	1.40

	Position °	'	°	'	Sec. Para
WEST HEAD	38	29 S	145	02 E	2.2
WEST HEAD	41	04 S	146	42 E	3.9
WEST HILL ISLAND	21	50 S	149	29 E	7.23
WEST ISLAND	10	21 S	142	03 E	9.37
WEST ISLET	22	12 S	155	10 E	6.4
WEST MOLLE ISLAND	20	15 S	148	49 E	7.37
WEST POINT	21	52 S	159	25 E	6.10
WEST POINT	40	57 S	144	38 E	3.36
WEST SISTER ISLAND	39	42 S	147	55 E	2.15
WESTERN PORT	38	21 S	145	14 E	2.3
WESTPORT HARBOR	41	44 S	171	36 E	12.5
WHAKAARI ISLAND	37	32 S	177	11 E	10.65
WHAKAKAIWHARA POINT	36	54 S	175	06 E	10.47
WHAKAMAWAHI POINT	41	03 S	173	59 E	11.42
WHAKATAUTUNA POINT	36	11 S	175	30 E	10.36
WHALE HILL	13	29 S	143	32 E	8.57
WHALE ISLAND	37	52 S	176	58 E	10.65
WHANGAMUMU HARBOR	35	15 S	174	18 E	10.24
WHANGAPARAPARA HARBOR	36	15 S	175	24 E	10.35
WHANGAREI	35	45 S	174	21 E	10.30
WHANGAREI HARBOR	35	48 S	174	26 E	10.30
WHANGAROA BAY	34	59 S	173	45 E	10.11
WHANGAROA HARBOR	35	02 S	173	44 E	10.12
WHANGARURU HARBOR	35	24 S	174	22 E	10.25
WHAREATA BAY	40	49 S	173	56 E	11.38
WHARTON REEF	14	08 S	144	00 E	8.49
WHIDBEY POINT	45	42 S	166	33 E	12.27
WHIHERE	44	17 S	176	15 W	13.14
WHITE BLUFFS	41	33 S	174	09 E	11.55
WHITE CLIFF POINT	16	39 S	145	34 E	8.15
WHITE CLIFFS	38	22 S	144	49 E	1.30
WHITE CLIFFS	38	52 S	174	33 E	11.13
WHITE HEAD	46	31 S	169	42 E	12.71
WHITE ISLAND	37	32 S	177	11 E	10.65
WHITE ROCK	42	25 S	148	10 E	3.80
WHITE ROCKS	10	28 S	142	02 E	9.36
WHITE ROCKS	22	12 S	150	15 E	7.11
WHITE ROCKS	41	13 S	174	17 E	11.52
WHITSUNDAY GROUP	20	15 S	149	00 E	7.32
WHITSUNDAY ISLAND	20	15 S	149	00 E	7.32
WIDE BERTH ISLAND	35	26 S	174	27 E	10.26
WIGTON ISLAND	20	44 S	149	28 E	7.27
WILLIS ISLETS	16	14 S	150	00 E	6.20
WILMOT COVE	42	53 S	147	58 E	3.76
WILSON REEF	13	57 S	144	24 E	8.51
WINDANG ISLAND	34	33 S	150	53 E	4.16
WOLLON GONG HARBOR	32	45 S	150	54 E	4.18
WOLLONGONG HEAD POINT	34	25 S	150	55 E	4.18
WOMBAT POINT	40	27 S	148	08 E	2.23
WOODBRIDGE	43	10 S	147	15 E	3.54
WOODY WALLIS ISLAND	10	53 S	142	02 E	9.22
WOOLI RIVER	29	53 S	153	16 E	5.22
WOOLI WOOLI RIVER	29	53 S	153	16 E	5.22
WOOLNORTH POINT	40	38 S	144	44 E	3.28
WRECK BAY	12	08 S	143	52 E	8.76
WRECK BAY	35	12 S	150	42 E	4.12
WRECK REEFS	22	11 S	155	20 E	6.3
WRIGHT ROCK	39	36 S	147	32 E	2.14
WYBORN REEF	10	49 S	142	45 E	8.83
WYE REEF	12	49 S	143	37 E	8.66
Y					
YEPPOON INLET	23	08 S	150	45 E	5.53
YONGE REEF	14	36 S	145	37 E	8.32
YOUNG NICKS HEAD	38	46 S	177	58 E	10.76
YOUNG REEF	12	08 S	143	13 E	8.73
YULE DETACHED REEF	11	58 S	143	58 E	8.76
YULE ENTRANCE	10	23 S	143	55 E	8.86
YULE POINT	10	46 S	142	09 E	9.21
YULE POINT	16	35 S	145	31 E	8.15
YULE ROAD	27	05 S	153	20 E	5.32
Z					
ZENITH REEF	12	46 S	143	36 E	8.74
ZODIAC CAY	21	07 S	152	40 E	7.4
ZUIDPOOL ROCK	43	20 S	147	10 E	3.59
ZUNA ISLAND	10	43 S	142	18 E	9.16