PUB. 175

SAILING DIRECTIONS (ENROUTE)

★

NORTH, WEST, AND SOUTH COASTS OF AUSTRALIA

★

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2014

TWELFTH EDITION

Preface

Pub. 175, Sailing Directions (Enroute) North, West, and South Coasts of Australia, Twelfth Edition, 2014, is issued for use in conjunction with Pub. 160, Sailing Directions (Planning Guide) South Atlantic Ocean and Indian Ocean. Companion volumes are Pubs. 171, 172, 173, and 174.

Digital Nautical Charts 4 and 5 provide electronic chart coverage for the area covered by this publication.

This publication has been corrected to 6 September 2014, including Notice to Mariners No. 36 of 2014. Subsequent updates have corrected this publication to 3 December 2016, including Notice to Mariners No. 49 of 2016.

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://msi.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-SFH
   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 updated as needed and available as a downloadable corrected publication 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.

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on the ISPS Code can be found at the International Maritime Organization web site:

International Maritime Organization Home Page
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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.

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Maritime Administration (MARAD) Home Page
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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.

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Time.—Time is normally expressed as local time unless specifically designated as Universal Coordinated Time (UTC).

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

Reference List

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 sites, as follows:

1.Albany Port Authority
http://www.albanyport.com.au
2.Broome Port Authority
http://www.broomeport.com
3.Bunbury Port Authority
http://www.byport.com.au
4.Dampier Port Authority
http://www.dpa.wa.gov.au
5.Darwin Port Authority
http://www.nt.gov.au/dpa
6.Esperance Port Authority
http://www.esperanceport.com.au
7.Fremantle Port Authority
http://www.freport.wa.gov.au
8.Geraldton Port Authority
http://www.geroport.wa.gov.au
9.Grant and Tracey's Lighthouse Page (Grant and Tracey Maizels):
* Robe Light—paragraph 8.65
* Penguin Islet—paragraph 8.68
http://www.maizels.nu/lights
10.Lighthouses of Australia (Malcolm Macdonald)
http:/www.lighthouse.net.au/lights

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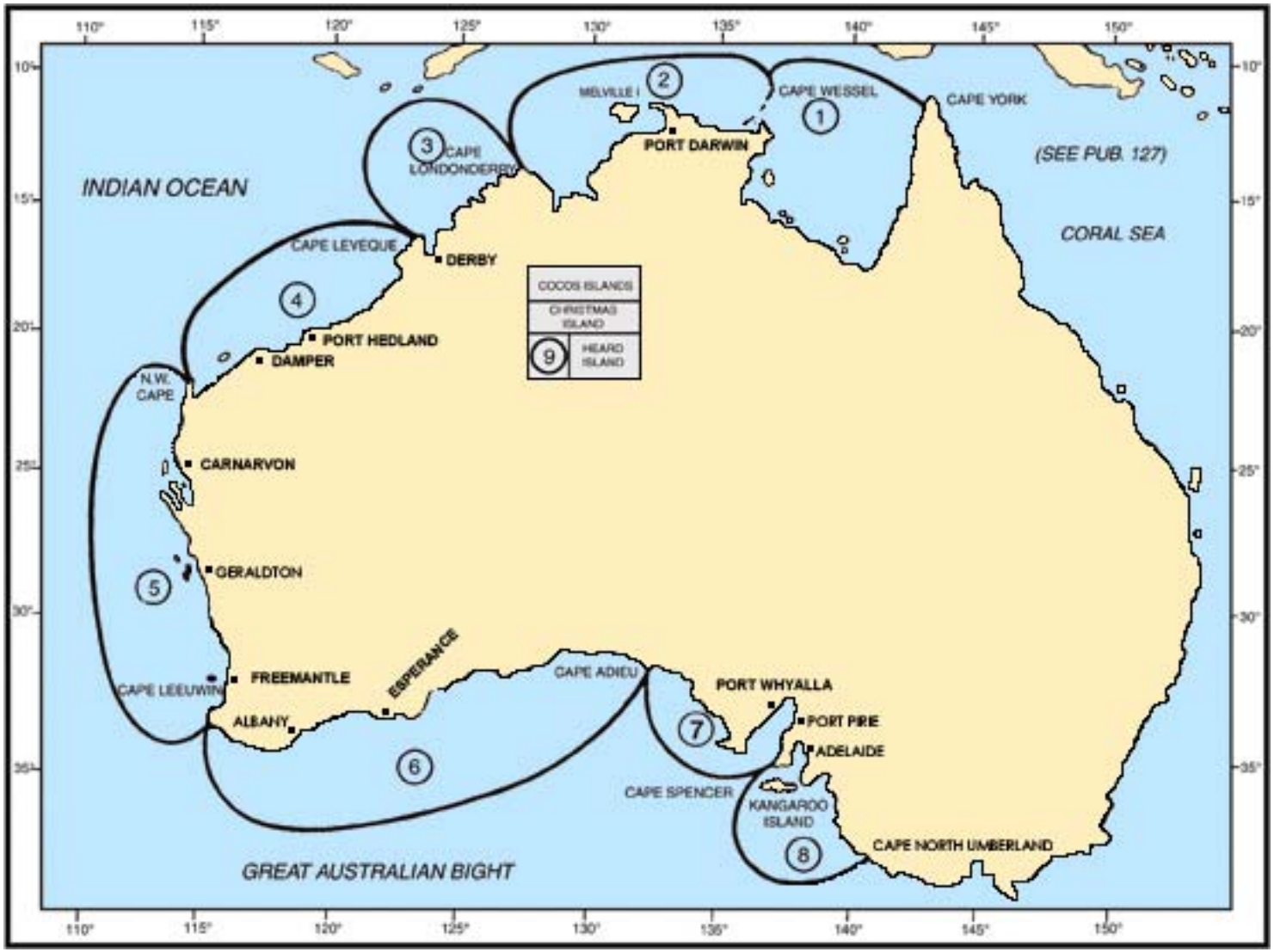
Date of Change: 3 December 2016	
Notice to Mariners: 49/2016	
Sector	**Paragraphs**
Sector 2	Paragraph 2.68 and 2.84
Sector 3	Paragraph 3.19
Sector 4	Paragraphs 4.14,4.31,4.42,4.45,4.50,4.54,4.55 and 4.63
Sector 5	Paragraphs 5.1 and 5.41



SECTOR LIMITS — PUB. **175**

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
NGL	Natural Gas Liquids	FSU	Floating Storage Unit
FSRU	Floating Storage and Regasification Unit	FPSO	Floating Production Storage and Offloading

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	TFW	Tropical Fresh Water
HWS	high water springs	HAT	highest astronomical tide
LWN	low water neaps	LAT	lowest astronomical tide

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

The following abbreviations may be used in the text:

CALM	Catenary Anchor Leg Mooring

Miscellaneous

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
IMDG	Intermational Maritime Dangerous Goods Code		
LOA	length overall	St./Ste.	Saint/Sainte
UKC	Under keel clearance	ISPS	International Ship and Port facility Security
ITC	International Convention on the Tonnage Measurement of Ships (1969)	ECDIS	Electronic Chart Display and Information System

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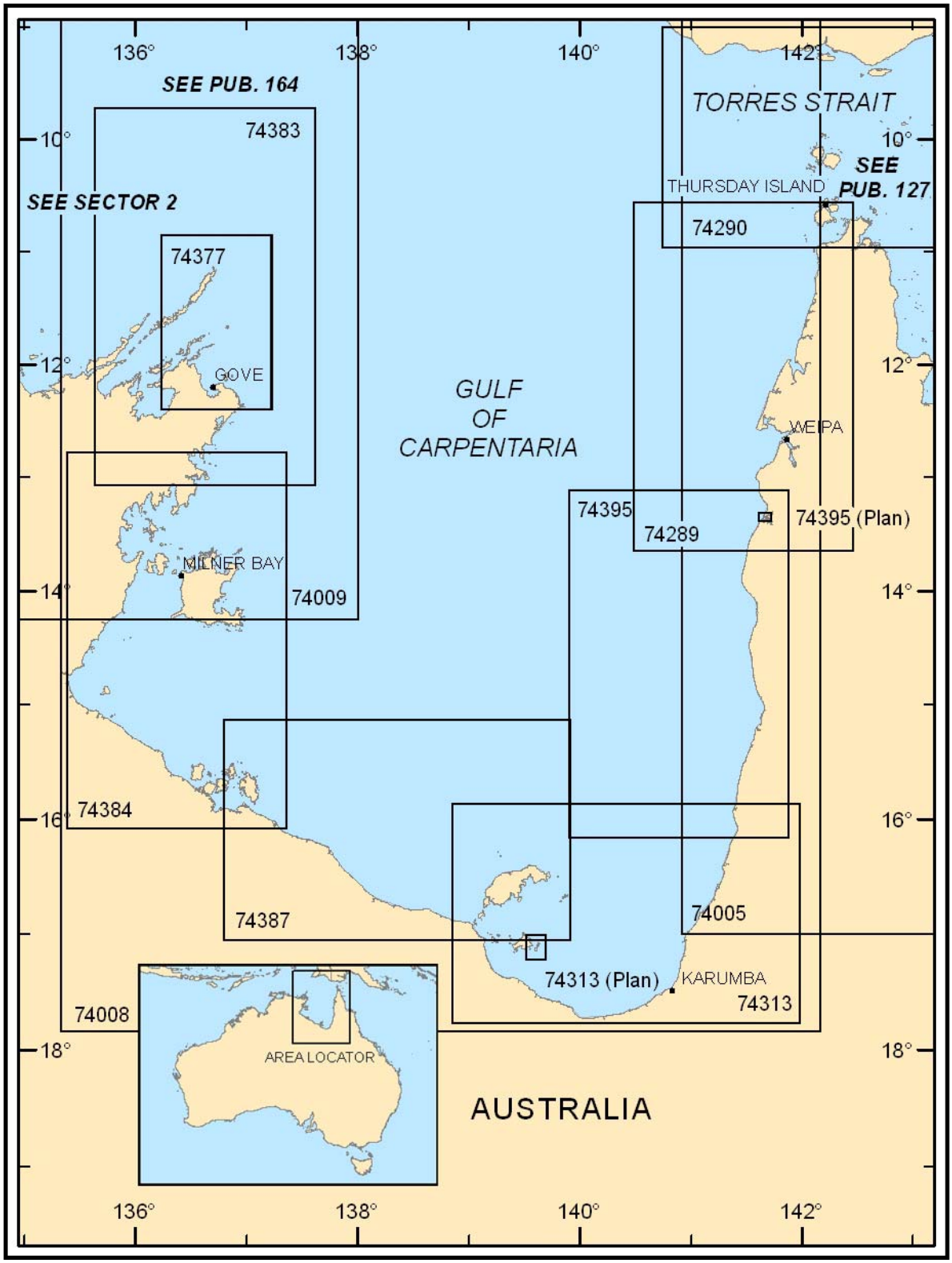
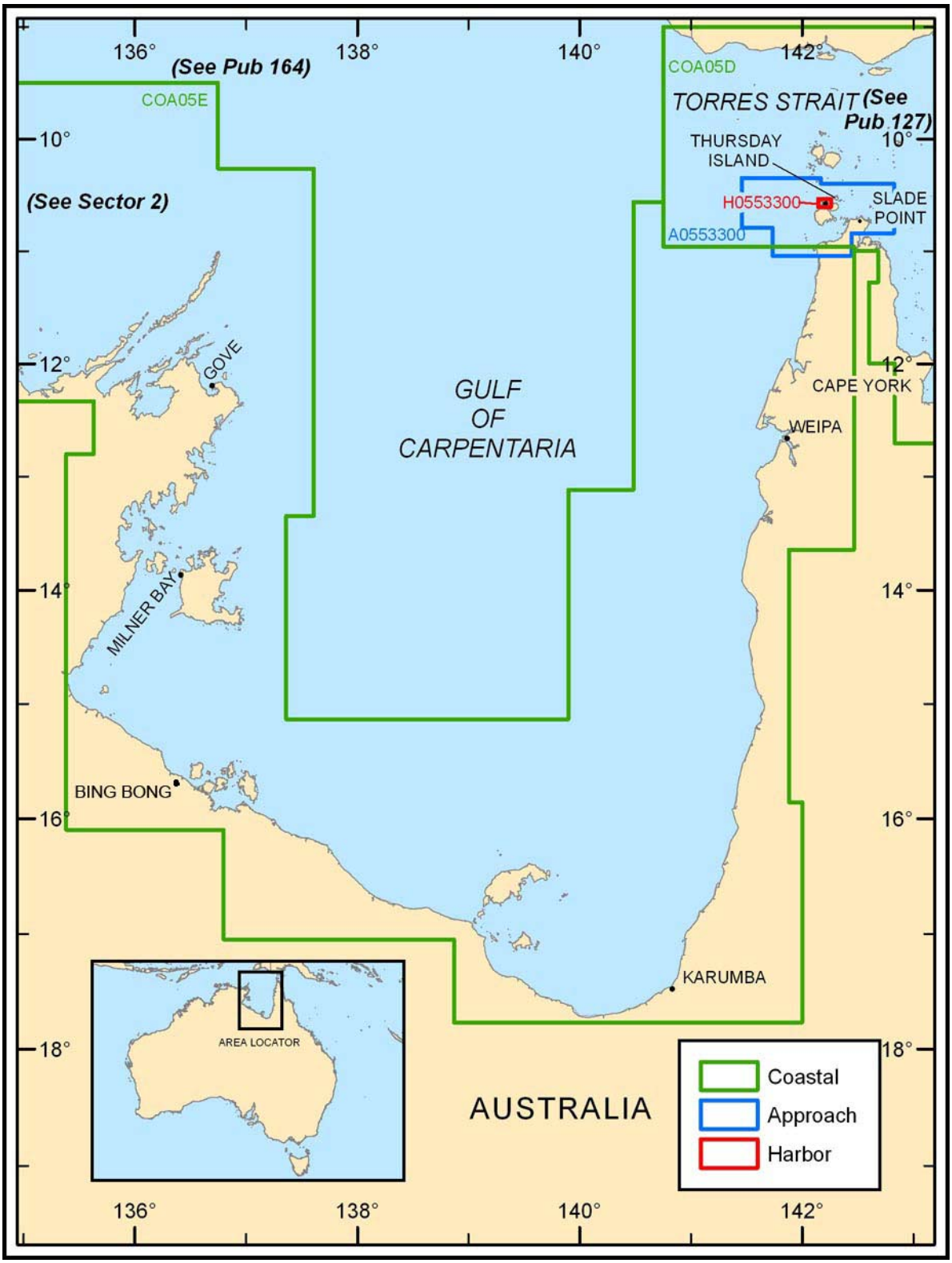


Additional chart coverage may be found in NGA/DLIS Catalog of Maps, Charts, and Related Products (Unlimited Distribution).

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

NORTH COAST OF AUSTRALIA—THE GULF OF CARPENTARIA

Plan.—This sector describes the Gulf of Carpentaria from the Cape York Peninsula to The English Company's Islands, and includes the offshore island groups off the S and W coasts of the gulf. The arrangement is S from Slade Point to the head of the Gulf of Carpentaria, then N to Cape Arnhem, and finally W to Arnhem Bay.

General Remarks

1.1 The Gulf of Carpentaria is a deep indentation in the N coast of Australia which is entered between the NW extremity of the Cape York Peninsula and Cape Arnhem, about 300 miles WSW. The E shore of the gulf is low and regular, but the W side rises in parts to wooded hills and is indented with bays and creeks which are fronted in places by groups of numerous islands. The head of the gulf is mostly covered with mangroves up to 9m high, which restrict the view of the plains beyond.

Soundings in the gulf do not exceed 82m anywhere with general depths of 55 to 66m in the center. In general, there is deeper water closer to the W shore than the E, but the entire coast is difficult to approach because it is fronted by shoals in many places. The 6m line generally lies from 3 to 10 miles offshore, except at the head of the gulf, where it is 15 miles off most of the coast.

Winds—Weather.—The Southeast Monsoon (also known as the Southeast Trade Winds), which is generally associated with clear weather, extends from April to September and becomes well-established in July, when it dominates all the area N of 25°S, with directions varying between S and E. Within 20 miles of the coast, land and sea breeze effects are felt under suitable conditions. Away from the coast, the wind generally maintains a remarkably steady direction, with wind speeds of 11 to 27 knots; wind speeds of 28 to 33 knots are not uncommon. This can raise a considerable sea in the western part of the Gulf of Carpentaria and low-powered vessels are recommended to stay nearer the E shore during this period.

From September to November characteristic squalls are reported on the S shores of the Gulf of Carpentaria on about two mornings in five and occasionally in April. They have the character of a line squall and are known locally by the name "Morning Glory." In general, it has the characteristic of a cold-front squall and is accompanied by an arch of clouds extending from horizon to horizon. It occurs out of calm conditions, which prevail again with a short time after the passage of the squall. The squall normally comes from the ENE, but at times can come from other directions between NE and S. In most cases, the wind speed reached is between 12 and 22 knots.

The Northwest Monsoon blows from December to March. During December, NW to N winds spread from W and N across the Arafura Sea and the Timor Sea and into the Gulf of Carpentaria. By January, the Northwest Monsoon has established itself over most of the sea area N of 20°S and E of 110°E and has also spread to the Torres Strait region. It continues to occupy this area through February, with the winds becoming variable in March and the Southeast Monsoon beginning to establish itself in April. In contrast to the Southeast Monsoon, the Northwest Monsoon is associated, especially at its onset, with clouds and rain, and frequently with thunderstorms. The onset of the Northwest Monsoon is preceded by a period of calms and variable winds, with high daytime temperatures. The winds of the Northwest Monsoon do not have the strength of those from the Southeast Monsoon, and become variable in the transition periods.

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The Gulf of Carpentaria—"Morning Glory" cloud system

With the approach of the Northwest Monsoon, squalls, with thunder and heavy rain, occur first at interval of 4 to 5 days, but their frequency gradually increases until they occur almost daily.

During the Northwest Monsoon period and the following transitional period prevailing winds are liable to be disrupted by temporary disturbances, in the form of clockwise circulations of wind accompanying tropical depressions.

Between the Northwest Monsoon and the Southeast Monsoon, there is a transitional period that generally lasts several weeks. This period occurs before the Northwest Monsoon at some point in the October to December time frame. After the Northwest Monsoon and prior to the Southeast Monsoon, another transition period also occurs at some point during the March and April time frame. During these periods, the wind is unsteady in direction, but more often tends to blow from the direction associated with the Northwest Monsoon or the trade wind season. Winds are generally light, but not often calm. During the calmer periods there will often be no wind other than the daily alternation of land and sea breezes.

Visibility.—Fog is very rare and in the coastal waters its frequency is either nil or less than 2 per cent throughout the year. In November and December, more than 20 percent of observations report mist or haze from some part of the N coast

of Australia, but from April to June there are very few reports (less than 5 per cent) of even haze.

Dust and smoke from bush fires are common causes of coastal haze, which is frequent during the Southeast Monsoon.

In the Gulf of Carpentaria, the few occasions of true fog occur mainly in the dry season, and most frequently in some lagoons and estuaries. Visibility is also liable to be reduced to fog limits in some of the heavier downpours of the wet season.

Radiation fog, which occasionally forms towards dawn near the coast, clears quickly after sunrise.

Tides—Currents.—From December to April in the Gulf of Carpentaria, the Northwest Monsoon causes a clockwise current that sets S along the E coast, W along the S coast, and N along the W coast. The rate is usually not over 0.5 knot, except along the islands on the W coast, where it combines with the tidal current to attain a somewhat greater rate.

From April to September during the period of the Southeast Monsoon, the current is weak and variable, with little effect except in the extreme N part of the Gulf of Carpentaria, where the drift is about 0.5 knot to the W.

In the Gulf of Carpentaria, the tides rise somewhat uniformly, although various differences are in effect, mostly in the Groote Eylandt and Sir Edward Pellow groups. In general, the tidal rise is about 2.3m on the E side of the gulf, 3.5m at the head of the gulf, and 1 to 3m on the W side of the gulf.

From April to November the offshore currents of this region are highly variable and are affected to a considerable extent by the changing monsoon winds, so that the predominant direction of the current reverses with the season. During the Southeast Monsoon, the predominant direction of the current is W through the Torres Strait, WSW through the Arafura Sea and the Timor Sea, and then W as the beginning of the South Equatorial Current.

From December to April during the Northwest Monsoon, the predominant direction of the offshore current is reversed over the area, becoming NE or ENE through the Timor Sea and the Arafura Sea. Offshoots of this E current reach into Joseph Bonaparte Gulf (14°15'S., 128°40'E.) and the Gulf of Carpentaria (14°00'S., 139°00'E.), where they may develop weak clockwise circulations. Another offshoot curves into the large, but shallow, indentation in the coastline between Cape Leveque (16°23'S., 122°56'E.) and Port Hedland (20°19'S., 118°34'E.), to set SW as a countercurrent in the region of Eighty Miles Beach (18°56'S., 121°33'E.).

The mean rate is usually less than 1 knot but, on individual occasions, rates of between 2 and 3 knots, setting either E or W (sometimes opposed to the predominant directions) have occurred in both seasons.

In contrast, the tidal currents of the coastal areas are sometimes very strong and usually completely override the outer offshore currents.

Caution.—Information on the shores and soundings of the Gulf of Carpentaria is imperfect and in some cases is taken from very early surveys. Great care is therefore necessary when navigating in these waters.

Slade Point to Duyfken Point

1.2 Slade Point (10°59'S., 142°08'E.), about 30 miles SW of Cape York, is low and sandy and forms the NE entrance point of the Gulf of Carpentaria. Extensive sandy shoals, including the low Crab Island, lie off the point and extend over 15 miles NW, almost completely across the entrance of Endeavour Strait. The E side of the Gulf of Carpentaria, between 11°S and the entrance to the Wenlock River, about 60 miles S, has been satisfactorily surveyed. A stranded wreck lies 10 miles S of Slade Point.

Carpentaria Lightfloat, equipped with a racon, marks Carpentaria Shoal and lies about 65 miles WNW of Slade Point and is primarily placed for vessels approaching Torres Strait.

Vrilya Point (11°14'S., 142°07'E.), about 15 miles S of Slade Point, is fringed with cliffs 15 to 20m high, and a steep bare 30m hill close E. A rock, which dries 0.7m, lies 1 mile SSW, and depths of less than 5m extend up to 1 mile from the point.

A rock, with a depth of 25m, position doubtful, lies 50 miles W of Vrilya Point.

The **Skardon River** (11°45'S., 142°00'E.), about 12 miles N of Cullen Point, was declared a port in February 2002. The river and bar are shallow in areas. The port services a mine situated upstream.

Cullen Point (11°57'S., 141°54'E.), marked by a conspicuous clump of trees, extends N from the coast about 46 miles SSW of Vrilya Point.

Kerr Reef (11°48'S., 141°50'E.), a rock, which dries 0.3m, lies about 10 miles NNW of Cullen Point; in 1975, a reef with a depth less than 2m was reported to extend from 1 to 3 miles NW of Kerr Reef. A spit, with depths of less than 5m, extends 7 miles from the coast a short distance S of Kerr Reef.

Port Musgrave (12°00'S., 141°55'E.), entered between Cullen Point and the coast 2 miles E, forms a good natural harbor for the protection of small vessels seeking shelter from either monsoon. The entrance channel is narrow and intricate, with a least charted depth of 3.3m, and local knowledge is necessary.

A sand bar, with a depth of 0.3m, extends nearly 3 miles NNW from Cullen Point and caution is required.

The estuary is about 3 miles in diameter with the Wenlock River entering from the S and the Ducie River from the E. Numerous shoals and flats lie within the entrance, but good anchorage is reported available, in a depth of 11m, sand, about 1 mile S of Cullen Point.

Mappon Mission Station, established in 1891, is situated about 1 mile SW of Cullen Point and maintains radio communication with Thursday Island. There is an airstrip between the mission and the point.

Two unexamined shoals, with depths of 9.1m and 10.1m, lie 15 and 18 miles SW, respectively, of Cullen Point. A stranded wreck lies on the coast about 3.25 miles NE of Cullen Point.

The coast between Cullen Point and Duyfken Point, about 41 miles SSW, consists of low sand dunes backed by swampy ground.

Albatross Bay

1.3 Duyfken Point (12°34'S., 141°36'E.), consisting of four low, sandy, and tree-covered points, has low red cliffs on its SE side. A few hillocks, 21m high, lie along the S edge of the point and are the only noticeable natural features along this part of the coast. Drying reefs and foul ground extend up to 1 mile S and W from the point.

Duyfken Point Light is shown from a stainless steel framework tower, 28m high, on the SW extremity of the point. A monument stands between the shore and the light structure. Duyfken Point Light has been reported difficult to identify in daylight. The light is equipped with a racon.

Caution.—Due to the coast being fronted by shoals and surveys in certain areas being incomplete, recommended routes between Albatross Bay and Torres Bay are indicated on the chart.

1.4 Janssen Shoal (12°35'S., 141°34'E.), with a least depth of 5.5m, lies 2 miles WSW of Duyfken Point. There is a drying reef between the shoal and the point, and no attempt should be made to pass inside this danger.

Albatross Bay (12°40'S., 141°40'E.), entered between Duyfken Point and Boyd Point, about 21 miles to the S, is the estuary for the Pine River in the N and the Mission River and the Embley River in the NE. The head of the bay is generally shoal with the 5m line lying up to 6 miles offshore, mostly in the NE part. There are sand banks and shoals off the mouths of all the rivers and caution is required.

The Mission River is approached over depths of 3m and is available to small vessels with local knowledge.

The Embley River, entered between Kerr Point on the N and Urquhart Point to the S, contains the main facilities for the bauxite port of Weipa; it can be approached by a natural channel on the N or a dredged channel to the S.

Fairway Lighted Beacon (12°42'S., 141°41'E.), a red and white metal tripod, marks the entrance to South Channel, the dredged approach to Weipa. A spoil ground lies from 2 to 4 miles N of Fairway Lighted Beacon.

Anchorage.—Anchorage is permitted anywhere in Albatross Bay, except in the area shown on the chart, extending for 3 miles to seaward of Fairway Lighted Beacon and 1 mile either side of the leading line for South Channel. Anchoring is also prohibited in South Channel.

Good anchorage for light-draft vessels seeking shelter from NW winds can be taken ESE of Duyfken Point, in 5.5 to 6.4m, good holding ground, about 1 mile offshore.

Small craft can anchor in any of the sheltered coves, clear of the tidal currents.

Weipa (12°40'S., 141°52'E.)

World Port Index No. 54672

1.5 The port of Weipa is primarily engaged in the export of bauxite and generally only ore vessels enter to load.

Weipa is also a center of the shrimp industry and a fleet of trawlers is stationed here.

North Queensland Bulk Ports Corporation

http://www.nqbp.com.au/

Winds—Weather.—Albatross Bay is generally calm for the greater portion of the year. Strong SE winds will raise a chop in the bay that is difficult for boats. From May to August an occasional swell from SW enters the bay caused by strong S winds at the head of the gulf. From November to March, a W swell occasionally up to 3m high enters the bay and breaks heavily on the shallow banks. During the Northwest Monsoon the visibility may sometimes be reduced by heavy rain squalls.

Tides—Currents.—Mean spring tides rise 2.3m and mean neaps rise 1.8m. The Northwest Monsoon, when blowing with strength from the W, has raised tide levels as much as 4.3m.

During the Northwest Monsoon, when water levels are higher, the ebb currents may reach 4 knots at springs off Lorim Point. The flood attains rates of 2 or 3 knots at springs, but is considerably less at neaps.

The currents flow generally in the direction of the channels, except at the outer portion of the dredged South Channel, where the flood current sets in a NE direction, diagonally across the channel. Care must also be taken at the inner end of the dredged channel off Urquhart Point, as the currents set strongly across the channel entrance.

At the berth at Evans Landing, both the flood and ebb currents set perpendicular to the berth towards the shore. Off Lorim Point, both the flood and ebb currents set parallel to the berth.

Depths—Limitations.—South Main Channel is dredged (2002) to a depth of 10.8m. Cora Bank, with a least depth of 0.6m, divides the harbor into two channels. The main channel on the N side has a depth of 10.8m, and Cora Bank Channel on the S side has a depth of 7.3m.

Export Wharf, off Lormin Point, is equipped for bulk loading of bauxite. The wharf consists of 13 caissons lying parallel to the shore, and can accommodate vessels up to 256m long at each berth, in a depth of 12.3m. The center of the wharf is connected to the shore by a bridge structure. There are mooring dolphins about 50m off each end of the wharf. Vessels berth heading NW, at high water slack.

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Lorim Point

Evans Landing, with a depth alongside of 9.6m, can accommodate vessels up to 30,000 dwt, and up to 191m in length; it is used for the discharge of petroleum products. The bottom at this berth is soft silt. Two conspicuous oil tanks are situated close NE of the berth.

Humbug Point Wharf, designed to receive heavy equipment, has a length of 130m and a depth alongside of 9.5m. The berth

will accommodate vessels up to 137m in length. The bottom at this berth is mainly sand.

Vessels up to 92,800 dwt and 259m in length have entered the port. Drafts to 10m can be taken in or out on most high waters. The deepest draft accommodated to date is 12.8m. Arriving vessels must have an underkeel clearance of 0.6m; departing vessels must have a clearance of 0.9m.

The swinging basin off Lorim Point has a width of 487m and it is dredged to a depth of 9.6m.

Evans Landing swing basin has a diameter of 335m and a least depth of 9.6m.

Aspect.—The ore storage pile inland of the Export Wharf is conspicuous.

Lighted beacons, marking the N and S sides of the entrance to South Channel, stand 1 mile ENE of Fairway Lighted Beacon. Eight additional pairs of lighted beacons mark the N and S sides of the channel, which has a bottom width of 106m.

Range lights are established for South Channel and, in line bearing 078°, lead through the center of the fairway.

The inner channels are marked by lighted beacons and buoys.

An aeronautical radio beacon is situated about 5 miles E of the river entrance.

Pilotage.—Pilotage is compulsory for vessels greater than 35m long. Pilots must be requested 48 hours prior to arrival and amended or confirmed 24 hours prior to arrival. If, after the 24-hour notice, the vessel's ETA changes by more than 1 hour, the vessel's agent shall notify the pilots. The request message should include the following information:

1. Vessel name.
2. ETA and ETD.
3. Draft fore and aft.
4. LOA and beam.
5. Gross tonnage.
6. Whether propeller is fixed or variable pitch.
7. Whether vessel has an operable bow thruster.
8. Preferred side alongside.
9. Whether line launch has been ordered.
10. Whether pratique has been granted.
11. Pilot ladder boarding arrangements.

Vessels should contact Weipa Harbor 2 hours and 1 hour before arriving at the pilot boarding position, on VHF channel 12 or 16, to confirm the vessel's ETA and to obtain the pilot boarding position.

Deep-draft vessels usually sail from Weipa 2 hours before high water. Priority is given vessels loading ore.

The pilot boards 2 miles SW of Fairway Lighted Beacon in position 12°43.0'S, 141°40.0'E.

Regulations.—There is a speed limit of 10 knots W of a line joining Gonbung Point and No. 19 Beacon, and of 8 knots E of that line.

Inbound vessels must call Weipa Harbor on VHF channel 16, as follows:

1. When entering South Channel—upon passing Fair way Lighted Beacon.
2. When secure at a berth.

Outbound vessels, or vessels changing berths or anchorages, must call Weipa Harbor on VHF channel 16, as follows:

1. When leaving a berth.
2. Upon securing to the new wharf.
3. When passing Fairway Lighted Beacon.

There is a ship safety exclusion zone which extends 50m from the Lorim Point Export Wharf; this exclusion zone includes the access jetty and mooring dolphins. Vessels which are not involved in port operations are prohibited from entering this area.

Vessel Traffic Service.—There is a Vessel Traffic Service (VTS) that has been established in the waters around Weipa and this service provides the following two levels of service within the area of responsibility:

1. **Information Service.—**The VTS at the request of a vessel, will transmit essential and timely information to assist the on-board decision making process, which may include: position, identity and intentions of other traffic, hazards and other factors which may affect a vessel's transit.
2. **Traffic Organization Service.—**The VTS will forward planned vessel movements to prevent congestion and provide for safe and efficient movement of traffic. The VTS will identify and manage potentially dangerous traffic situations and provide essential and timely information to assist the onboard decision making process and may advise, instruct, or exercise the authority to direct movements.

Note: Weipa VTS does not provide a Navigational Assistance Service.

The following reporting points for the VTS have been established for inbound and outbound vessels:

1. **Inbound Reporting Points:**
   a. Two hours prior to arrival.
   b. Time when entering South Channel on passing the Fairway Lighted Beacon.
   c. Time when secure at a berth, including the name of the wharf.
2. **Outbound Reporting Points:**
   a. Upon departure from berth.
   b. If shifting berths, then upon securing at new berth, confirming the name of the wharf.
   c. If departing the port entirely, then time when passing the Fairway Lighted Beacon.

Weipa VTS Contact Information	
Call sign	Weipa VTS (provided from Cairns VTS)
VHF	VHF channels 8, 12 and 16
Telephone	617-40527470
Facsimile	617-40527460
E-mail	vtscairns@msq.qld.gov.au

Anchorage.—Vessels waiting for the pilot should anchor in the designated areas N and S of the approach fairway, remaining clear of the prohibited anchorage. There is good holding ground in this area, mud and shells, with a depth of about 11m.

There is good anchorage at the E end of Jackson Channel, N of Urquhart Point, and clear of the range line, in depths of 15 to 20m, sand. There is an emergency anchorage, marked by lighted buoys, situated S of Jessica Point, in depths of 7 to 15m, sand and mud. Permission to use the anchorage should be obtained from the harbormaster.

Anchorage is prohibited in South Channel and in the fairway between Urquhart Point and Evans Landing. Vessels are prohibited from anchoring or remaining at anchor, between sunset and sunrise, within 1 mile of the lighted aids marking South Channel or Cora Bank.

Weipa —Port Contact Information	
Pilots	
VHF	VHF channels 12 or 16
Harbor Control	
VHF	VHF channels 8, 12, and 16
Telephone	617-40527470
Facsimile	617-40527460
Port Authority	
Telephone	617-40697749
Facsimile	617-40697518
E-mail	info@nqbp.com.au
Web site	http://www.nqbp.com.au

Boyd Point to Point Burrowes

1.6 **Boyd Point** (12°55'S., 141°38'E.) lies about 17 miles SW of the entrance to the Embley River. The intervening coast is generally low, sandy, and tree-covered, with some red bauxite cliffs about 5 miles NE of Boyd Point; shoals and reefs extend up to 2 miles from the coast.

Pera Head (Para Head) (12°57'S., 141°36'E.), the center of a headland about 7 miles wide, is formed with Boyd Point to the N and Thud Point to the S. The head is conspicuous because it consists of a rocky point with red bauxite cliffs, about 21m high, on either side. A mission is charted on the summit.

A rock, with a depth of less than 1.8m, lies about 2.25 miles NNW of Pera Head. Another rock, with a depth of less than 1.8m, lies about 4 miles SW of Pera Head. In 1972, a detached reef, with a depth of 0.6m and which sometimes breaks, was reported to lie 1 mile SW of Pera Head.

False Pera Head (13°05'S., 141°37'E.), about 9 miles S of Pera Head, is so named from its resemblance to the latter. False Pera Head is S of Thud Point and should not be visible from Albatross Bay.

The coast from False Pera Head to the Archer River, 15 miles SSE, is low, sandy, and covered with scrub. The river is available only to boats.

Caution.—Between Pera Head and the Nassau River (15°55'S., 141°23'E.), numerous shoal patches and obstructions lie within 20 miles of the coast. A depth of 10.3m was reported in 1985 to lie about 25 miles SW of Thud Point and about 22 miles from the coast.

1.7 The coast S of Pera Head to the head of the Gulf of Carpentaria has not been fully surveyed and vessels are recommended not to approach within 20 miles of the shore without local knowledge.

Cape Keerweer (13°55'S., 141°28'E.), about 48 miles S of Para Head, has no prominent features to distinguish it from the low sandy coast to the N and S.

Extensive shoaling and shallow depths have been reported in the area extending 30 miles S and SW of Cape Keerweer. A 13.3m shoal lies 12 miles NW of the cape.

An obstruction has been reported to lie in approximate position 14°43.0'S, 141°25.5'E.

1.8 The **Mitchell River** (15°13'S., 141°35'E.) discharges about 75 miles S of Cape Keerweer and has an entrance about 1 mile wide. Sand banks lie across the approach and the river probably has no access except to boats. The coast in this vicinity is lower than that to the N and numerous tributaries discharge N and S of the main branch. There is a mission on the shore of the river about 3 miles from the sea.

Shoals, with depths of 4.6m to 10.1m, extend about 20 miles seaward from the coast NW of the entrance to the Mitchell River. A dangerous wreck, the position of which is approximate, is reported (1987) to lie about 28 miles SSW of the river entrance and about 3 miles from the coast.

The **Nassau River,** 44 miles SSW of the entrance to the Mitchell River, is narrow and joins Rocky Creek just inside its mouth; only boats should attempt to enter.

The coast S of the entrance to the Nassau River continues low and marshy with several rivers entering the sea amidst the surrounding mangroves. The coastal bank, with depths of less than 5.5m, extends from 4 to 10 miles offshore and prevents close approach to the coast except by light-draft vessels with local knowledge. The mouths of the Staaten River and the Gilbert River, both available to boats, discharge 30 and 39 miles, respectively, S of the Nassau River. A 12.5m shoal lies 26 miles W of the mouth of the Staaten River; another shoal, with a depth of 14.6m, lies 32 miles SW of the river mouth, about 14 miles offshore.

Point Burrowes (16°58'S., 140°58'E.), low and sandy, is backed by lowlands and tidal flats. Van Diemen Inlet is entered close N of the point, but is available only to boats and small craft as it is fronted by a bar with a depth of 0.6m. Within the entrance the depths increase to about 3m, but the river quickly becomes narrow and tortuous and can be navigated only by boats.

Caution.—A dangerous wreck is charted about 12 miles NW of Point Burrowes. A depth of 4.6m, mud, lies about 7 miles WSW of the point and numerous patches of 5.5m and less lie within a radius of 4 miles to the entrance of Van Diemen Inlet. A dangerous wreck is charted 6 miles NW of the entrance to Spring Creek (16°48'S., 141°05'E.).

Head of the Gulf of Carpentaria

1.9 The coast between Point Burrowes and the **Norman River** (17°30'S., 140°50'E.), about 30 miles S, is sandy throughout for its first 17 miles; the river entrance has few landmarks from which a vessel's position can be obtained by a stranger. The coast is low and covered with mangroves and from a distance appears as much of the head of the gulf. The W side of the river entrance, named Alligator Point, is covered with high thick mangroves, but the E side is low and sandy, with has several houses on it.

Karumba (17°40'S., 141°05'E.) (World Port Index No. 54690), a small river port, is situated on the E side of the river about 1 mile within the entrance. Zinc slurry is piped 300km to the port from the Pasminco Century Mine, and loaded onto transfer vessels, which take the product to ships in the anchorage area. Other facilities in the port provide for general cargo, fuel, fisheries products, and the export of live cattle.

Port Corporation of Queensland

http://www.pcq.com.au

Tides—Currents.—The tidal experience at Karumba is diurnal with an exteme range during spring tides of up to 4.7m. Tidal currents can attain a rate of 4 knots at springs.

Tidal currents in the river attain rates of 2 knots at springs and 1 knot at neaps.

Depths—Limitations.—The approach channel lies between sand banks extending about 5 miles offshore, where it is crossed by a bar with a depth of 3.5m (2002). Depths of less than 5.5m lie up to 10 miles offshore NW of Alligator Point and 12 miles offshore WNW of the same point.

There are only small piers in the port, along with a wharf and mooring dolphins for coasters.

The river above Karumba can be navigated by vessels with drafts up to 3m as far as Double Island, about 11 miles upstream.

The town of Normanton, 17 miles above Double Island, can be reached by small craft on most tides.

Aspect.—Lighted buoys and a lighted range mark the approach channel.

Landfall Light is shown from a water tower 2 miles SE of Alligator Point. Another light is shown close SE of a conspicuous boat shed on the E entrance point.

The tower of the pilot signal station near the E entrance point is conspicuous.

Pilotage.—Pilotage is compulsory for all foreign vessels 35m long and over and is available 24 hours. Pilots come from Cairns and must be requested a minimum of 72 hours in advance. See Pub. 127, Sailing Directions (Enroute) East Coast of Australia and New Zealand, for further information.

Pilots contact the vessel on VHF channel 16 about 30 minutes prior to boarding. Pilots board about 1 mile WNW of Fairway Lighted Buoy (17°22'S., 140°40'E.).

Regulations.—Vessels intending to enter or depart the port are required to announce their intentions on VHF channel 16. Vessels must monitor VHF channel 16 throughout the entire transit of the Norman River entrance channel.

Anchorage.—Vessels may anchor in Karumba roadstead, 14 miles NW of Fairway Lighted Buoy (17°26.0'S, 140°45.5'E), in depths of 9 to 11m, mud. An anchorage for small vessels lies on the NW side of the river and is marked by special lighted buoys and Lighted Beacon No. 25.

Directions.—Vessels should approach the channel with the water tower, SE of Alligator Point, ahead bearing 123°. Lighted Buoy No. 2, Lighted Buoy No. 4, and Lighted Buoy No. 6 are passed to port.

On passing Lighted Buoy No. 6, alter course to 085° and leave Lighted Buoy No. 1 to starboard, then steer ESE for the river entrance, leaving Lighted Buoy No. 8 to port.

1.10 The coast trends SW from Alligator Point and forms a long shoal bight which extends W to Gore Point. Depths of less than 5.5m extend in places up to 15 miles off this coast and surveys in the area are imperfect and incomplete.

Several rivers enter the gulf at its head but they are all small, with depths in their approaches limited to 0.6 to 0.9m. The shores are low, lined with mangroves, and difficult to identify from any distance off the coast. Large tidal flats, which cover on most high waters, extend nearly across the entire head of the gulf and change the contour of the land between high and low water.

Caution.—Dangerous wrecks, the positions of which are approximate, lie about 28 miles WNW and 43 miles NW of Alligator Point.

1.11 **Gore Point** (17°38'S., 139°56'E.), about 52 miles WSW of the entrance to the Norman River, may be identified by a particularly bare sand hill, about 12m high; there is no other similar hillock on this coast.

Disaster Inlet, entered immediately S of Gore Point, has a remarkable quoin-shaped clump of mangroves on its S entrance point. The inlet is of no commercial importance and the bar across its entrance is barely passable by boats.

The coast W of Gore Point is sandy for the first 6 miles and forms a conspicuous mark when viewed from offshore because of the break in the mangrove trees. About 9 miles WNW of Gore Point, near the mouth of the Leichhardt River, the mangroves again resume, some with considerable height that are visible for some distance offshore.

The **Albert River** (17°34'S., 139°45'E.), entered between Kangaroo Point on the E and Stokes Point, 1 mile to the W, can be identified by an odd-shaped clump of trees on the first-mentioned point. A light is shown from Kangaroo Point. The coast E of Kangaroo Point is sandy and backed by straggling trees, while that to the W is covered with mangroves. The land behind the coast is very low, with few identifying marks.

Drying and shoal banks extend for a considerable distance offshore, constant sounding is required to safely make the entrance. Depths of 5.5m and less extend 20 miles N and 9 to 13 miles NE of the river mouth.

The bar off the entrance to the Albert River lies about 3 miles NNE of Kangaroo Point and has depths of 0.9 to 1.5m. Its position and the depths over it are subject to change as it consists of shifting sand. The channel is often visible because of breakers on the coastal banks or discoloration over the shoals.

An obstruction, consisting of a large stranded tree which dries 0.9m, lies 5 miles NE of Kangaroo Point.

The Albert River extends to **Burketown** (17°44'S., 139°32'E.) (World Port Index No. 54680), about 30 miles above the entrance. Small vessels or coasters can proceed up the channel on most high waters. The least depth to Truganini Landing, just below Burketown, is 1.4m. Pilots are not available.

1.12 The coast from Stokes Point to Tarrant Point, about 22 miles WNW, is low and covered with thick mangroves. Several rivers flow to the gulf along this stretch of the coast. Shoal water extends up to 15 miles off the shore and drying mud flats lie up to 2 miles seaward of Tarrant Point.

Point Parker (17°02'S., 139°09'E.), about 25 miles NW of Tarrant Point, is wooded and rises to a hillock about 9m high. It is fringed by rocky ledges which extend 1 mile SE, and there is a sandy beach, clear of mangroves, on the S side of the point. The long bight formed between Tarrant Point and Point Parker is covered with mangroves in its S part, but rises slightly farther inland when closer to the latter.

Anchorage.—Small vessels can take anchorage between Point Parker and Allen Island, about 3 miles E, where there are depths of 4.6 to 8.2m, with the point bearing 259° at about 1 to 2 miles. Vessels should approach from S of Bentinck Island and then steer NW for Point Parker, passing 3 miles SW of Creffild Point, the SE extremity of Allen Island, until clear of the islet, when course may be altered NNW for the anchorage.

Tidal currents set SE with the rising tide and NW with the falling tide.

Bayley Point (16°55'S., 139°02'E.), about 9 miles NW of Point Parker, is low and covered with mangroves. Tidal flats lie behind the point, and the shore between the points is intersected with creeks and streams.

Forsyth Island lies directly off Bayley Point and is included under the Wellesley Islands in paragraph 1.19.

The Wellesley Islands

1.13 The **Wellesley Islands** (16°45'S., 139°30'E.) lie off the W side of the head of the Gulf of Carpentaria, and include Mornington Island, the largest of the group, the Bountiful Islands, Sweers Island, the Bentinck Islands, and Forsyth Island. The area between this group and the adjacent coast between Tarrant Point and Bayley Point has not been thoroughly examined, but the depths are recorded to be mostly under 5.5m and there appear to be many dangers.

In the NW approach to the Wellesley Islands, a bank, with a least known depth of 9.1m, lies about 32 miles NW of the W extremity of Mornington Island. Two banks, with depths of 16.5 to 18.3m, lie about 16 miles to the NE of the 9.1m bank.

Manowar Islet (16°17'S., 139°16'E.), the N extremity of the Wellesley Islands, is small and rocky, and lies about 11 miles NNW of Halls Point, the NW extremity of Mornington Island. There is a stranded wreck on the S point of the islet.

Rocky Islet (16°19'S., 139°17'E.) lies about 2 miles SSE of Manowar Islet and is somewhat larger, being 1 mile long in a N-S direction and about 0.5 mile wide. Deposits of guano have been found on the island and a ree,f which dries and is often covered with birds, lies about 0.5 mile off the NE point.

There is good anchorage during the Southeast Monsoon, in a depth of 7.3m, about 0.35 mile off the W shore of Rocky Islet.

Caution.—There is a channel between Rocky Islet and Mornington Island, however, numerous coral heads and depths of less than 11m are reported to lie up to 6 miles off the coast of Mornington Island and vessels should keep fairly close to the islet to avoid them.

A 12.5m patch lies 8 miles ENE of Rocky Islet. A 7.9m patch lies 8 miles E, and a 1.8m patch lies close NE, respectively, of Rocky Islet.

1.14 **Mornington Island** (16°35'S., 139°25'E.), the main island of the Wellesley Islands, is about 32 miles long and up to 15 miles wide. It is in general surrounded by shoal water and reefs; the waters to the N, W, and S are not completely surveyed.

Cape Van Diemen (16°32'S., 139°43'E.), the E extremity of Mornington Island, appears to be foul with rocks and breakers extending up to 7 miles to the S and E. Lingnoonganee Island lies close offshore, about 2 miles N of the point, and foul ground extends about 6 miles NE from it.

Pisonia Islet (16°30'S., 139°48'E.) lies approximately 5 miles ENE of Cape Van Diemen and is formed of a high sand bank on a coral foundation. A reef lies close N of the islet and a dangerous rock is charted about 2 miles to the E.

Watson Patch (16°23'S., 139°42'E.), existence doubtful and with little water over it, extends a little over 1 mile and lies, apparently isolated, about 9 miles N of Cape Van Diemen.

Halls Point (16°28'S., 139°19'E.), bordered by reef to a distance of 1 mile, forms the NW extremity of Mornington Island and is located about 3 miles W of the Sandalwood Place River. The coast hereabouts is low and wooded, but becomes sandy farther E, and backed by low, white cliffs near the N extremity of the island.

Depths of less than 9.1m extend up to 5 miles NW of Halls Point; a depth of 4.9m lies about 5 miles WNW of Halls Point.

Brookes Reef, reported in 1979, lies about 1 mile offshore, 8 miles SW of Halls Point. This area is not fully surveyed and numerous coral heads have been reported in the vicinity.

1.15 **Denham Island** (16°43'S., 139°10'E.) is about 4 miles in length and covered with vegetation and grazing land. It is separated from Mornington Island by Apple Channel, which is suitable for vessels with local knowledge drawing up to 3.7m. The channel is marked by beacons, but the approaches are difficult unless a local seaman can be obtained.

There is a mission station on Dubbar Point, at the W entrance to Apple Channel, which serves the entire Wellesley Islands.

Midbagar Point, the S extremity of Denham Island, is foul with Andrew Islet located close S. A shelf of dangerous submerged rocks lies up to 6 miles SE of this point.

Anchorage.—Anchorage can be taken, with good holding ground, about 2.4 miles, 197° from **Gee Wee Point** (16°38'S., 139°09'E.), the W extremity of Mornington Island. The approach to this anchorage appears clear from the N, but a line of dangers extends about 11 miles NW of the S extremity of Denham Island and caution is necessary. A channel leads to the mission station where there is a boat jetty.

1.16 **Sydney Island** (16°41'S., 139°28'E.), the largest of the islands off the SE coast of Mornington Island, lies about 17 miles SW of Cape Van Diemen. The island is fringed with dangers and two drying patches lie about 2 miles to the E. The coast of Mornington Island to the NE and SW of Sydney Island is composed of shallow bays which dry at their heads. Numerous dangers lie off this coast, and the area and its approaches has not been fully surveyed.

The **Bountiful Islands** (16°40'S., 139°52'E.) lie approximately 10 miles SE of Cape Van Diemen and form the E group of the Wellesley Islands. The NE and largest island is low, with some cliffs of ironstone formation on the SE side. The crests of the island consist of red sandstone and the N and E points are fringed by reefs with several rocks above water.

The SW island is small and surrounded by coral reefs which extend up to 2 miles to the W. Rocks which cover and uncover have been reported to lie in approximate position 16°42.2'S, 139°50.8'E.

A stranded wreck lies on the NW side of the largest island.

Anchorage can be found, in 5.5m, about 0.5 mile NNE of the N point of S Bountiful Island.

1.17 Sweers Island (17°06'S., 139°37'E.), the SE of the Wellesley Islands, lies about 17 miles NNE of **Tarrant Point** (17°22'S., 139°25'E.) and is separated from the larger Bentinck Island to the W, by Investigator Road. Inspection Hill, 32m high, rises on the S extremity of Sweers Island, and being the highest land in the vicinity forms a good mark from nearly all directions. The E side of the island is fringed by rocky ledges extending up to 1 mile from the shore, and the S side by similar ledges also extending up to 1 mile offshore.

Macdonald Point, fringed by reef, forms the SW extremity of Sweers Island, and Inscription Point, 1.25 miles to the N, is low, white, and sandy. Red cliffs form a third point 1 mile NE of Inscription Point, with a shoal bay between.

Locust Rock, 3m high, lies nearly 2 miles SSE of Inspection Hill, with foul ground between the shore and the rock. A reef, which dries at low water, lies 0.5 mile ENE of the rock, and shoal water extends with a least depth of 1.8m about 1 mile to the S. A lighted beacon has been established in the S part of the island.

Bentinck Island (17°04'S., 139°30'E.) lies with Raft Point, its E extremity, about 1 mile NW of Inscription Point. Raft Point is wooded and easily identified, but Bentinck Island as a whole is only slightly elevated and covered with grass, scrub, and trees. Most of the island is fringed by reef and rocks and shoals extend up to 3 miles off Oaktree Point, its N extremity.

The W side of Bentinck Island is fringed by shoals and tidal flats and the waters to the W are unsurveyed. Four islets, known as Albinia, Margaret, Bessie, and Douglas, extend NNW for 8 miles from the W extremity of the island, with Douglas, the outermost islet, lying on a ledge of rocks. A rocky ledge, with an above-water rock lying on its outer end, extends about 2 miles S from Kirk Point, the S extremity of the island.

Fowler Island (17°07'S., 139°33'E.) lies 2 miles SSW of Raft Point, but is not easily distinguished from a distance. There is a clump of trees near its S extremity which is a good mark when fairly close in. The E side of the island is fringed by rocks and foul ground to a distance of 0.75 mile offshore.

1.18 Investigator Road (17°07'S., 139°35'E.) lies between the S part of Sweers Island and the E side of Fowler Island, and is the only secure anchorage for ocean-going vessels at the head of the Gulf of Carpentaria. It is sheltered from the prevailing winds by Sweers Island to the E and Fowler Island and the Bentinck Islands to the W. All but small craft must enter from the S as shoal water and reefs extend across the road from Raft Point to the N part of Sweers Island. The roadstead is spacious, having a broad and clear passage leading to it, with depths of 7.3 to 10.1m throughout the S part.

It should be noted that a drying rock lies in mid-channel 1 mile ENE of Raft Point.

Tides—Currents.—Spring tides in the vicinity of Investigator Road rise about 2.6m. The tidal currents set S on the flood and N on the ebb. The ebb current usually commences from 2 to 3 hours before HW and attains a maximum of 2 knots; however, the rate and duration of the set are considerably influenced by the wind.

Anchorage.—Vessels of moderate draft can take anchorage in Investigator Road, nearly 1 mile SW of Inscription Point, with the red cliffs on the W side of Sweers Island just open to the NW. The depth here is 9.1m, over a bottom of sand and coral. Caution is necessary to avoid closing Sweers Island, where coral heads may extend nearly 0.25 mile offshore.

A mooring buoy is situated about 1.5 miles SSW of Inscription Point.

Directions.—Vessels should enter from the S. Pass Locust Rock at a distance of 1.5 miles. When Raft Point, which is wooded and easily identified, opens W of Macdonald Point, steer on the clump of trees on the S extremity of Fowler Island bearing 313°, which leads to the entrance of the roadstead. When Inscription Point, a low sandy spit, is in line with the NW extremity of Sweers Island, course may be altered NNE for the anchorage bearing about 030°.

Caution.—Fowler Island does not show up well against Bentinck Island.

1.19 Allen Island (17°02'S., 139°14'E.) lies between the W extremity of Bentinck Island and the mainland coast at **Point Parker** (17°03'S., 139°11'E.). The island is low and fertile, being covered with grass, small trees, and shrubs, but iron cliffs face the SE end. Creffild Point is the SE end of the island and Greenaway Point, 4 miles NW, forms the opposite extremity.

There is a channel between Allen Island and the mainland NW, but the charted depth is only 2.1m and local knowledge is recommended.

Horseshoe Island, along with several islets and above-water rocks, lies off the NE side of Allen Island; it is known to be enclosed by reefs, but the area has not been closely examined.

Forsyth Island (16°50'S., 139°07'E.), surrounded by islets, rocks, and reefs, lies between the SW extremity of Mornington Island and the mainland coast at Bayley Point (16°55'S., 139°02'E.). Bayley Island and Pains Island lie 3 and 2 miles, respectively, SW of Forsyth Island and are low and fairly small. These islands are generally covered with vegetation and trees; although the climate is pleasant in winter, during summer they are hot and humid with hordes of poisonous sandflies which cause considerable discomfort to unprotected personnel.

There is a channel between Forsyth Island and Pains Island with a least depth of 5.5m. Numerous shoals lie close to the edge of the channel and local knowledge is recommended.

Caution.—The area in the vicinity of Mornington Island and Forsyth Island is not completely surveyed and vessels should attempt navigation only in good light, with proper lookouts and at reduced speed. During the Southeast Monsoon, visibility may be reduced by haze to about 5 miles and a vessel without local knowledge may have considerable difficulty in fixing its position.

Bayley Point to the McArthur River

1.20 From **Bayley Point** (16°55'S., 139°02'E.) to Tully Inlet, 53 miles W, there are numerous shoals, with depths of

less than 1.8m, up to 6 miles offshore. Discoloration of the water gives no positive indication of the depths, as numerous muddy streams discharge to the sea through the sandy beach along this coast.

The **Calvert River** (16°16'S., 137°45'E.), approximately 40 miles NW of Tully Inlet, is more than mile wide at its entrance, but at times has a drying sand bar extending right across the approaches. Within the bar there are depths of about 1.8m, and the river is wide but mostly shallow. The E side of the entrance is marked by a projecting point with a hillock on it.

About 4 miles E of the Calvert River entrance there is a coral reef, and numerous shoals lie in the entire area, with depths of 5.5m or less extending up to 6 miles offshore.

Shoals with depths of 20m and 11m were reported in 1980 to lie about 42 miles N and 26 miles NNE, respectively, of the mouth of the Calvert River. A depth of 4m was reported in 1985 to lie about 18 miles NE of the river mouth.

The **Robinson River** (16°02'S., 137°16'E.) flows to the sea approximately 32 miles WNW of the Calvert River, and had a depth of 1.2m over the bar a number of years. Immediately inside the entrance the river divides into three parts and then joins again 2 or 3 miles upstream. There are depths of 6 to 9m about 2 miles above the entrance; the river is available to vessels drawing about 1.8m at HW.

About midway between the Calvert River and the Robinson River are numerous cuts and inlets, within which are small rivers and lagoons. The coast between these two rivers consists of tidal flats, with mangroves along the banks of the small rivers. The depths along this coast are shoal with many banks and rocks off the inlets.

Caution.—A wreck, best seen on chart, with a least depth of 7m, lies 20 miles NE of the Robinson River entrance.

1.21 From 1 to 5 miles W of the Robinson River entrance the 5.5m curve extends up to 5 miles offshore; from there to Pelican Spit, about 13 miles farther WNW, the coastal area has not been adequately surveyed.

From Pelican Spit to the McArthur River entrance, 19 miles W, the coast is fringed with mangroves, has no distinctive features, and is reported to be fronted by shoal water and drying banks extending up to 6 miles offshore.

The **McArthur River** (15°50'S., 136°47'E.) is shoal in its approach and the entrance changes after every freshet. It has been reported able to accommodate vessels with drafts up to 2.4m at HW, however, vessels with drafts to 3.4m have been known to enter. The channel is reported to be marked by buoys and beacons, but any such aids are not to be depended on. Borroloola, a town in which there is a mission, lies on the W bank of the river about 35 miles above the entrance; there is an airfield and the mission is equipped with radio.

The Sir Edward Pellew Group

1.22 The **Sir Edward Pellew Group** (15°40'S., 136°52'E.) consists of five principal islands surrounded with numerous islets and rocks lying off the approaches to the McArthur River.

The islands are moderately high and composed mostly of hard sandstone, with a small mixture of quartz and iron. They are mostly covered with trees and scrub, and game and birds abound.

Vanderlin Island, the largest of the group, lies farthest E and is separated from the W islands by Addison Channel. Lake Eames, in the middle of the N half of Vanderlin Island, contains an unlimited supply of fresh water. The main islands on the W side are arranged to the compass points and consist of North Island, Centre Island, Southwest Island, and West Island.

Vanderlin Island (15°43'S., 137°02'E.) lies approximately 20 miles ENE of the entrance to the McArthur River and is very prominent, especially from the E in the morning. The island attains a height of approximately 150m and is skirted by rocks and islets concentrated along its E shore. Cape Vanderlin, the N extremity, is 46m high, steep-to on its W side, and composed of hard sandstone boulders; Vanderlin Rocks, which dry 2.4m, lie 2 miles NE of the cape and appear steep-to, as they are not always marked by breakers. Refuge Cove, which provides good shelter for boats, lies at the N end of the island close E of Cape Vanderlin.

Turtle Island, 5m high, lies 1 mile W of Cape Vanderlin and is located on the N end of Middle Shoal, which extends in a SSW direction for 3 miles and terminates in David Islet at its S extremity. Middle Shoal carries depths of less than 3m over most of its length, and Steven Rocks, consisting of sandstone boulders 3m high, lie off the N end of this shoal close N of Turtle Islet. Turton Rock and Marsden Shoal, close W of David Islet, are just covered at high water and then are marked by tide rips. A rock, with depths less than 1.8m, lies close E of the same islet.

Wheatley Islet, 25m high, lies about 1 mile SW of Cape Vanderlin and is composed of sandstone boulders on which grow a few trees and prickly grass. Disaster Reef, with a depth of 0.3m, lies about 1 mile SW of Wheatley Islet on the edge of a bank with depths of less than 5.5m; no sign of this reef shows even when there is a strong tidal current over it. A submerged rock lies close S of Wheatley Islet.

Barbara Cove, entered between Kedge Point, about 3 miles SSW of Cape Vanderlin, and Symonds Bluff, 1.25 miles further SW, is shoal and available only to boats at HW

1.23 **Charles Point** (15°41'S., 136°55'E.), the W extremity of Vanderlin Island, is a long narrow finger of land which lies about 7 miles SW of Cape Vanderlin. Geranium Bay, shoal and rocky, lies close N of Charles Point and is dangerous to enter. Brown Islet, on the SW end of a reef about 1.25 miles long, lies 3 miles SW of Charles Point and is a good mark in daylight. An islet, approximately 10m high, is located 3 miles ENE of Brown Islet. A shoal, with a depth of 4m, lies about 0.5 mile N of Brown Islet.

Clarkson Point (15°50'S., 137°02'E.), marked by a conspicuous house, forms the SW extremity of Vanderlin Island and lies about 12 miles SE of Charles Point, with several unsurveyed coves and two islets between. General depths at 3 miles off this coast run from 3.7 to 4.6m, but a 1.8m patch was reported (1964) to lie 3 miles NW of Clarkson Point.

Goat Point (15°51'S., 137°04'E.), the S extremity of Vanderlin Island, lies about 2.25 miles ESE of Clarkson Point, with Little Vanderlin Islet, not completely examined, about 0.75 mile to the S. The E coast of Vanderlin Island, to the N of Goat Point, is strewn with rocks and has not been surveyed. The 5.5m curve appears to lie up to 2 miles off the shore in

some places and vessels are recommended not to approach this side of the island within a distance of 3 miles.

A depth of 2.1m has been reported (1988) to lie approximately 13 miles ENE of Goat Point.

Three Hummocks Point (15°38'S., 138°04'E.), the NE extremity of Vanderlin Island, is about 34m high and formed of a steep-sided islet lying close offshore, with numerous rocks extending up to 1 mile to the E.

Investigator Bay is entered between Three Hummocks Point and Mesley Point, 2 miles NW, and gives shelter in S and W winds. The head of the bay is shoal and a 3m patch lies 1.5 miles N of Three Hummocks Point.

1.24 North Island (15°35'S., 136°52'E.) lies with Red Bluff, its E extremity, 5 miles W of Cape Vanderlin and is separated from Vanderlin Island by Addison Channel and Hyde Channel. Cape Pellew, the NE extremity of the island, lies 5 miles N of Red Bluff with the coast between being mostly rock. Bald Hill, 38m high and devoid of vegetation, stands 1.25 miles S of Cape Pellew with low ground to the W and SW. North Hill, 3 miles S of Cape Pellew, is 66m high and wooded. Red Bluff is a 26m high conspicuous headland composed of massive red sandstone boulders.

Islets and rocks, with intermediate foul ground, lie from 2 to 5 miles E of Cape Pellew and include Pearce Islet, 13m high, and Urquhart Islet, 7m high.

North Rock, 24m high, lies close off Cape Pellew and is a good mark from NW and SE.

Observation Island (15°37'S., 136°54'E.), 22m high, lies on the edge of the 5m curve about 1.5 miles S of Red Bluff and is composed of red sandstone boulders. An obelisk, 5m high, stands on the islet and is a good mark. Rocky spits, usually marked by the tide rips, extend 0.25 mile N and SE, respectively, from the island; a 3.7m patch lies 0.5 mile to the NE.

Walker Point, the SE extremity of North Island, lies 3 miles SW of Red Bluff with Cabbage Tree Cove, shoal and fronted by boulders, lying between.

1.25 Phil Point (15°39'S., 136°51'E.), the S extremity of North Island, is bordered by reef which extends along the shore immediately to the NE and NW. The W coast of the island to the N of Phil Point is indented by small shoal coves which have not been surveyed. Skull Island and Watson Island lie about 1 mile off this shore, but neither have been completely examined.

Paradice Bay (15°32'S., 136°51'E.), at the N end of the W shore of North Island, affords good anchorage for small vessels seeking shelter from the Southeast Monsoon. The mud bottom 0.3 mile offshore. The best approach appears to be from NW, and the beach area, at the head of the bay, is a good landing place. A depth of 8.4m was reported to lie approximately 2 miles NW of Paradice Bay.

Centre Island (15°42'S., 136°46'E,.) separated from North Island by Centre Channel, lies with Rocky Point, its NE extremity, about 1.5 miles SW of Phil Point. The E side of Centre Island is fronted by a bank, with depths of less than 5.5m, extending up to 1.5 miles offshore. A large shallow bay occupies much of this same side of the island, but is only available to boats at HW. A dangerous wreck, with masts showing, lies about 1.25 miles SE of Rocky Islet, which is located close E of Rocky Point.

Ataluma Point (15°45'S., 136°49'E.), the SE extremity of Centre Island, is the outer end of a small irregular peninsula which extends a little over 1 mile from the shore. The 5m curve lies about 0.35 mile off the point and is steep-to, with depths of 12.8m close seaward. The S shore of the island is foul up to Labu Islet, which lies close off the SW extremity.

Gould Point, the NW extremity of Centre Island, is fringed by a reef, with Red Island close SW.

The N coast of Center Island, between Gould Point and Rocky Point, forms the S side of Centre Channel, and is bordered by reef. Crab Rocks, one of which is above water, lie about 0.5 mile offshore midway between the points.

1.26 Southwest Island (15°44'S., 136°40'E.) lies close W of Centre Island and is practically connected to the mainland SW by mangrove swamp. The island has not been closely examined.

Buchanan Bay (15°40'S., 136°43'E.) lies between the NE side of Southwest Island and the W side of Centre Island, and has depths of 3.7 to 4m across its entrance. The head of the bay is shoal but leads to Georges Channel, separating the two islands, which is available to boats at HW.

The **Craggy Islets** (15°36'S., 136°41'E.), consisting of Black Islet, the larger, and White Islet, lie about 4 miles N of Southwest Island and have not been closely examined.

West Island (15°35'S., 136°33'E,.), the westernmost of the Sir Edward Pellew Group, lies 3 miles NW of Southwest Island and is connected to both the mainland and the former by extensive mud flats. The island has not been thoroughly examined, but a dangerous reef is known to exist about 2 miles off its NE end. A depth of 3.7m was reported in 1965, 7 miles NE of the N point of West Island.

Channels.—Addison Channel forms the main approach to the anchorages available in the Sir Edward Pellew Group. It is the favored channel for vessels of any size as it has a least charted fairway depth of 7.6m. It should be noted, however, that because the water between the islands is never clear and since the bottom in the vicinity of the shoals cannot be seen, caution is required.

Bruce Channel leads between Pearce Islet and Urquhart Islet, but is only recommended to small vessels with local knowledge. It should be approached from the NE with Pearce Islet ahead, then steering S when the W extremity of Urquhart Islet bears 158°.

Hyde Channel leads between Middle Shoal and the NW side of Vanderlin Island. It has a least charted depth of 6.1m in the fairway, but is not recommended without local knowledge. Middle Shoal and Disaster Reef usually do not show even under good conditions, and are dangerous to any size vessel.

Centre Channel, with a least depth of 4.9m, leads between North Island and Centre Island, and can be run by small vessels, with Skull Point ahead bearing 308°.

Anchorage.—There is good anchorage, according to the shelter required, at numerous places between the E side of North Island and the W side of Vanderlin Island. Depths generally run from 8 to 11m, mud bottom, with swinging room for moderate sized vessels.

Small vessels can anchor close off Cape Vanderlin, in depths of 7 to 10m, but clear of the spit extending N of Wheatley Islet.

Geranium Bay affords excellent shelter from all E winds to small vessels, in depths of 4 to 6m, thick mud. Local knowledge is recommended.

Paradice Bay, on the NW coast of North Island, provides good anchorage for small vessels during SE winds, in depths of 4.6 to 6m.

1.27 Bing Bong Offshore Bulk Cargo Loading Berths (15°26'S, 136°31'E.) lie N of West Island and are best seen on the chart.

Tides—Currents.—During local springs, low tides can cause delays of about 4 hours before the barge can leave the loading berth.

Winds—Weather.—Frequent dense morning fog reduces visibility to less than 100m at the anchorage; this occurs mostly in winter, between June and September, and may cause delays of up to 5 hours.

Depths—Limitations.—Vessels of up to 46,000 dwt are allowed to partially load; vessels of 28,000 dwt can be fully loaded. The cargo is zinc/lead concentrate that is transported by a 3,300 dwt barge from Bing Bong (15°36'S., 136°24'E.).

Pilotage.—Although not compulsory, pilots are available, as follows:

1. Approaching from NW—Gove, Northern Territory.
2. Approaching from a port on the E coast of Australia—from that last port of call.
3. Pilots can also be flown in from the Torres Strait and board from the barge.

Pilot arrangements should be made 5 days in advance.

http://www.mim.com.au/mcarthur.html

Bing Bong

Regulations.—Port clearance, customs, and quarantine formalities are handled by the Master or the Chief Officer of the barge. There are no medical facilities at Bing Bong; emergency cases may be airlifted to Darwin, 600 miles away.

At the anchorage, vessels are required to maintain a freeboard of 9.5m at all times before, during, and at completion of loading. This freeboard is measured to the height above the bulwark or the hatch combing, whichever is higher.

Anchorage.—Five designated anchorages, charted as BB1 BB2, WD1, WD2, WD3, lie N of West Island and are best seen on the chart. The anchorages are in depths from 10 to 15m, good holding ground. Vessels are recommended to use the starboard anchor.

Directions.—Bing Bong Anchorage BB2 is approached from position 15°20'S, 136°32'E; from this position steer S for 3 miles and anchor 16.5 miles NNE of Bing Bong Light (15°38'S., 136°23'E.) by keeping E of a 9.3m shoal.

Bing Bong Anchorage BB1 is approached from position 15°20'S, 136°32'E. From this position, steer S for 4.5 miles by keeping E of the 9.8m patch, then alter course to 216° and steer on it for 2 miles until in position to drop the starboard anchor 13.25 miles NE of the light.

Limmen Bight

1.28 From a position S of **West Island** (15°35'S., 136°33'E.), the coast trends NW for approximately 60 miles to the entrance of the Limmen Bight River and is generally featureless, with mud flats extending up to 5 miles offshore. A shoal, which breaks and has depths of less than 1.8m over its central part, lies about 8 miles NW of West Island. A rocky outcrop extends 1 mile offshore,about 15 miles WNW of the same island. A dangerous submerged rock, with depths less than 2m, was reported in 1986 to lie about 9 miles W of Labyrinthian Shoals.

Labyrinthian Shoals (15°12'S., 136°07'E.) are a group of sand banks, with some rocky heads, having depths of less than 1.8m, centered about 31 miles NW of West Island and up to 8 miles off the mainland coast; part of these banks have been reported above water, with some bushes growing on the driest areas. Vessels are recommended to give these shoals a wide berth, passing to the NE and not proceeding into depths of less than 13m in their vicinity.

Limmen Bight (14°45'S., 135°40'E.) is formed by the coast between a point on the shore, about 17 miles WNW of West Island, and **Rantyirrity Point** (14°11'S., 135°54'E.), about 75 miles NNW. The shores of the bight are generally low and sandy, being backed by low level country only broken by an unnamed range of hills about 20 miles inland. The bight is not well surveyed, especially in the NW part, and several dangers, marked position doubtful or position approximate, are situated here.

The **Limmen Bight River** (15°06'S., 135°43'E.) enters Limmen Bight on the SW shore about 55 miles NW of West Island but is blocked by nearly drying mud flats extending up to 3 miles offshore. Mount Young, an isolated hump, 65m high, rises about 2 miles S of the entrance, and Beatrice Islet, with a rock NE, lies on the edge of the mud banks about 4 miles NE of the river mouth.

1.29 Maria Island (14°52'S., 135°44'E.) lies near the middle of Limmen Bight, about 12 miles N of the entrance to the Limmen Bight River. It is approximately 61m high and consists of stony soil covered with brushwood; the E and S sides are relatively steep-to, but the W side is shoal and indented by Eagle Bay. A rock, with a depth of less than 1.8m, lies about 1 mile W of the NW extremity of the island. Depths in the passage between the island and the mainland run from 5.5 to 7m from 2 miles S to 4 miles W of the SW extremity.

Anchorage.—Anchorage can be taken during the Southeast Monsoon with the SW extremity of Maria Island bearing 118°, and during the Northwest Monsoon with the same point bearing 320°. Small craft may anchor in 5m depth with the N entrance point of Eagle Bay bearing NE at a distance of 1.25 miles.

Caution.—Meikleham Reef, with a depth of less than 1.8m, lies approximately 7 miles NE of Maria Island. Another reef, the position of which is doubtful, lies charted 11 miles E of the island.

Low Rock, two above-water rocks on a rocky shoal, lies about 13 miles NNE of Maria Island and appear to be isolated.

Considerable caution is required in the approach to Maria Island because of the above dangers and unsurveyed areas lying to the N and SE.

1.30 The **Roper River** (14°45'S., 135°25'E.), entered about 20 miles WNW of Maria Island, may be identified by Gulnare, a remarkable buff 41m high, terminating in a range of hills N of the river. The depth over the bar is charted at 1.2m, but the depths change with the seasons and the channel is known to shift. Within the bar the depths increase gradually to 9.1m, this being carried for some distance, with the river being navigable for about 100 miles by small craft with local knowledge. There is a town 10 miles above the entrance and a mission station, equipped with radio, is situated 30 miles farther upstream.

Tides on the bar of the Roper River are not well-established but MHHW rises about 1m.

The mud flats fronting the coast N and S of the entrance to the Roper River dry up to 6 miles offshore. They generally terminate at Warrakunta Point, about 10 miles NE of the river mouth, where the shore becomes reef-fringed and rocky.

1.31 **Edward Islet** (14°30'S., 135°37'E.) lies on the outer edge of the mud flats about 10 miles NE of Warrakunta Point and 1 mile offshore. It is 3m high and fringed by reef on its SE and SW sides. Lamparrinya Reef lies 1 mile SE of the island and Wilipili Islet lies 1 mile S.

Sandy Islet (14°26'S., 135°53'E.), standing in the middle of a large area of drying sand banks, lies about 15 miles NE of Edward Islet, with the surrounding waters mostly unsurveyed. A reef and a small islet lie about 3 miles E of Sandy Islet, with a drying spit nearly connecting the two.

Rantyirrity Point (14°11'S., 135°54'E.), about 14 miles N of Sandy Islet, is wooded, as is the shore S to Edward Island. To the SW of the point shoal flats extend up to 8 miles offshore reaching their greatest distance adjacent to Sandy Islet.

Minintirri Islet and Ammarrity Islet, the latter being rocks that dry 0.9m, lie close offshore about 4 miles SW of Rantyirrity Point. Nungkanangka Islet lies in the entrance of the Rose River, about 11 miles SW of the Rantyirrity Point.

Alagna Shoal (14°06'S., 136°03'E.), with a depth of 1.8m, lies about 11 miles NE of Rantyirrity Point and appears isolated. The waters N of this shoal are incompletely surveyed.

The coast N of Rantyirrity Point is described beginning in paragraph 1.42.

Groote Eylandt

1.32 **Groote Eylandt**, the outermost of the group extending E from Cape Barrow (13°40'S., 136°04'E.), is the largest island in the Gulf of Carpentaria and lies with its NE extremity approximately 53 miles off the W shore.

Central Hill is approximately 183m high and is the highest land bordering any of the shores in the gulf. Some of the ridges descending from Central Hill are wooded, but the island is mostly barren rock, with densely wooded flats in the lowlands. The S half of the island is higher than the N half, but the latter is bordered by numerous islets and indented with several bays.

Cape Beatrice (14°18'S., 136°58'E.), the SE extremity of Groote Eylandt, is fronted by islets and rocks which extend up to 3 miles offshore. The coast between the cape and South Point, the SW extremity of the island, 37 miles to the W, is also fronted by numerous islets and rocks, some of which lie up to 5 miles offshore.

The coast W of Inamalamandja Point, midway between Cape Beatrice and South Point, has not been closely examined and should not be approached.

Cumberlege Reef (14°28'S., 136°53'E.), which dries about 2m and on which the sea has been seen to break, lies about 10 miles SSW of Cape Beatrice. A 7m patch lies about 1 mile NW of the reef; an 11m patch lies 5 miles NW of the reef.

South Point (14°15'S., 136°19'E.) is the S extremity of a narrow sandy peninsula which forms the SW end of Groote Eylandt. Tasman Point, the N extremity of the above peninsula, lies about 1 mile N of South Point and has a sand hill on it; an above-water rock lies close off the peninsula at Tasman Point.

The tidal currents meet off Tasman Point and heavy tide rips are encountered hereabouts. The soundings off the point are irregular, with depths of 7.3m apparently extending up to 3 miles to the W and SW.

Groote Eylandt—West Coast

1.33 The W coast of **Groote Eylandt** extends N from the inner end of the peninsula forming the islands SW extremity, and is bordered by irregular depths and foul ground. Several areas along the S part of this shore are unsurveyed and caution is advised.

Angurugu Creek (13°58'S., 136°25'E.), 15 miles NNE of Tasman Point, is the largest of a number of creeks which discharge along the W coast of the island. There is a boat landing within the entrance of the creek, but only small craft with local knowledge can approach as an area of unsurveyed rocky shoals lying from directly off the mouth to a distance of approximately 2.5 miles offshore. At the head of the creek, about 3 miles inland, there is a mission station with an airstrip and radio equipment. A conspicuous group of buildings stands about 2 miles ESE of the mouth of the creek.

Rutland Shoal (14°00'S., 136°21'E.), with a least depth of 3.9m, rock, lies 4 miles WSW of the entrance to Amgurugo Creek and is marked by eddies and tide rips on both the ebb and flood.

North West Bluff (13°50'S., 136°25'E.), the NW extremity of Groote Eylandt, rises to a height of 75m and is predominantly cliffs on its N side. A conspicuous yellow patch is located on the

side of the cliff forming the NE extremity of the bluff and can be identified from a considerable distance seaward.

The town of Alyangula and the ore port at Milner Bay are situated about 1 mile SSE of North West Bluff.

Bartalumba Bay (13°48'S., 136°30'E.) is located between Winchelsea Island and North West Bluff. An inlet lies about mile ESE of the conspicuous yellow patch on North West Bluff. A jetty used by shrimp boats is situated on the NE entrance point to the inlet. A below-water rock was reported (1984) to lie off the jetty and a dangerous wreck, with masts showing, was reported (1986) to lie about 0.4 mile NE of the head of the jetty.

Anchorage may be obtained, in a depth of about 10m, about 0.4 mile NE of the conspicuous yellow patch, but except for the anchorage area the bay has not been surveyed.

Approaches to Milner Bay

1.34 Brady Rock (13°41'S., 136°27'E.), small and steep-to, lies about 9.25 miles NNE of North West Bluff and is marked by a light shown from a white hut, 3m high.

Winchelsea Island (13°43'S., 136°30'E.), barren and rocky, lies with its NW extremity, Winchelsea Rock, about 2 miles SSE of Brady Rock. Numerous submerged rocks and an unnamed islet lie up to 1 mile N of the island, and no attempt should be made to closely approach its shores without local knowledge. The S end is thickly covered with mangroves and a narrow boat channel leads between this shore and the mainland. North West Bay, on the E side of the island, has not been closely examined and should be avoided.

Bustard Island (13°42'S., 136°24'E.), 32m high, with a ridge on its N part, lies about 3 miles SW of Brady Rock with Arruwa Islet close WSW of it. The waters surrounding Bustard Island are unsurveyed and several dangers are known to exist up to 2 miles SW of it.

Hawknest Island (13°38'S., 136°25'E.), low and sandy, lies about 4 miles NW of Brady Rock and has depths of 7.6 to 10m off its S side. Because of its low height, Hawknest Island will probably not be sighted from the NE before Bustard Island.

1.35 Connexion Island (13°50'S., 136°21'E.), high and wooded, lies 2.25 miles W of North West Bluff (13°50'S., 136°25'E.), and is separated from Groote Eylandt by Connexion Channel. The latter, which has a least known depth of 10.8m in the fairway, is encumbered by an 8.2m unexamined shoal at its N end and therefore, because of this and the strong tidal currents, local knowledge is recommended.

The waters around Connexion Island are not completely surveyed and vessels are cautioned not to closely approach its shores, especially to the N or S. Burley Shoal, with a least known depth of 5.5m, lies 1 mile S of the island, but has not been surveyed to its N limits.

Connexion Island Light is shown from a metal post on the W extremity of the island. The light is obscured by the island between the bearings of 219° and 344°.

Hand Islet, small and rocky, is located about 4 miles NW of Connexion Island Light and close off Bickerton Island.

Bickerton Island (13°45'S., 136°14'E.), about 80m high, lies about 4 miles NW of Connexion Island and is the largest of the islands between Cape Barrow and Groote Eylandt. It is roughly 12 miles in width and the same in length, with two large bights, known as North Bay and South Bay, penetrating the W part of the island toward its hilly interior.

The island, which is skirted by rocks, has not been closely examined and only partly surveyed in South Bay, where there is anchorage for small vessels with local knowledge, seeking shelter from the Northwest Monsoon.

Bickerton Island Light is shown from a 3m high white hut on a point close WSW of Hand Islet.

Woody Islet, 1 mile W of the SW extremity of Bickerton Island, lies on the outer edge of a shoal connecting it to that island.

Warwick Channel (13°48'S., 136°19'E.), surveyed over a width of about 2 miles between Connexion Island and Bickerton Island, has a depth of 29m in its center, however, depths in the N approaches run from 16 to 20m between Connexion Island and Bustard Island.

Milner Bay (Alyangula) (13°52'S., 136°25'E.)

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1.36 Milner Bay, a port of entry, is situated on the W coast of Groote Eylandt just S of North West Bluff, the island's NW extremity. There is one berth for the loading of manganese ore which extends from the shore close S of the town; several tanks mark the area. The port, which is sheltered by Connexion Island, must be approached from the NE as the S approaches are not adequately surveyed or marked.

Winds—Weather.—During the dry season, from May to October, the prevailing winds are from the SE. The winds can blow strongly during the day, but subside after sunset.

During the wet season, from November to April, the predominate NW winds can bring heavy rains and moderate seas.

In June and July, heavy morning fog has been known to last until 1000 or 1100.

Tides—Currents.—Tidal rises in Milner Bay area are variable, with springs rising from 1 to 1.3m and neaps from 0.3 to 1m.

In the vicinity of the loading berth the currents, which are parallel to the pier, attain a rate of approximately 2 knots on both the flood and the ebb; the latter sets to the N.

Due to the uneven bottom in the approaches to Milner Bay, tidal streaks and eddies are common near the edges of the channel.

Depths—Limitations.—Warwick Channel has a depth of 29.1m in the approaches to the port. Connexion Passage may also be taken and is a shorter, though shallower passage. In transiting Connexion Passage, care must be taken to avoid the 5.5m patch off North West Bluff, as well as the 8.2m patch approximately 3 miles NE of Connexion Islet.

The ore-loading berth has a length of 345m between the outer dolphins, but the loading conveyor is fixed and vessels must shift to load various hatches. The depth alongside is 12.5m. Vessels of up to 63,000 dwt, with lengths up to 225m, beams up to 32m, and drafts up to 12.5m, have been accommodated at the port.

A small cargo wharf, with a depth of 4.6m alongside, lies on the N side of the root of the pier; shoal water lies close NNW

Milner Bay Wharf

of this wharf. A rock ledge which dries extends about 90m WSW from a position on the shore about 135m N of this wharf.

Aspect.—In addition to the lights on Brady Rock, Bickerton Island Light, and Connexion Island, the conspicuous oil tanks that mark the port area assist in the approach.

Pilotage.—Pilotage is compulsory and is available during daylight hours only. The pilot normally boards about 1.5 miles W of the pier, but will board in the vicinity of Brady Rock if prior arrangements are made. Tugs are available to assist in berthing.

Standard ETA and quarantine messages are required to be transmitted to the port radio station. The vessel's ETA should be sent 7 days, 48 hours, and 24 hours in advance. Vessels should request berthing instructions 4 hours prior to arrival at the pilot boarding position.

The port may be contacted on VHF radio; the calling frequency is VHF channel 16, while the working frequencies are VHF channels 6 and 67. Vessels should maintain a listening watch on VHF channel 16 when in the port approaches and at anchor.

Anchorage.—There is good anchorage about 1.5 miles W of the pier head, in a depth of 12m, sand, good holding ground. The bottom farther offshore is uneven and rocky in places, and caution is recommended when attempting to anchor in the outer approaches.

Directions.—Vessels approaching Milner Bay from the NE steer SW to pass 1 mile SE of Brady Rock, and then when about 1 mile SE of Bustard Island, alter course to SW with Bickerton Island Light dead ahead. When approximately 2 miles from Hand Islet, course should be altered to pass through the center of Warwick Channel, SW of Connexion Island, and then ENE with the towers at Milner Bay ahead.

Groote Eylandt—North Coast

1.37 Chasm Island (13°40'S., 136°35'E.) lies about 1 mile N of the E entrance point of North West Bay. A stranded wreck lies on the SW end of the island.

Chasm Shoal, with a depth of 7.6m, lies about 1 mile NNE of the E extremity of Chasm Island.

North Point Island (13°38'S., 136°42'E.), which is actually two islands, lies 1 mile offshore, about 6 miles ENE of Chasm Island. The outer island, lying to the N, is the larger of the two and rises to a height of 35m.

Several rocky islets and smaller rocks lie scattered up to 1 mile offshore and up to 2 miles E of North Point Island.

Pinnacle Rock, with a least known depth of 10.4m, lies unexamined about 3 miles NNE of Jagged Head. A 2.4m patch lies about 1 mile W of this rock.

Jagged Head (13°42'S., 136°45'E.), a conspicuous headland about 35m high, is actually an island which lies close to the coast about 5 miles SE of North Point Island. The seaward sides of this headland are formed of broken rock rising nearly to the summit; numerous above and below-water rocks lie close offshore. An islet lies on a shoal about 0.5 mile ENE of the headland.

Woodhouse Rocks, 6m high, lie about 1.5 miles NE of Jagged Head and are connected to it by a shoal ridge. The outer rock is awash.

1.38 Port Langdon (13°48'S., 136°46'E.), entered between Jagged Head and Scott Point, about 6 miles SE, has general depths of 11 to 13m over its greater part and provides good anchorage, especially in SE winds. The shores of the port are covered with thick scrub, except at Jagged Head, which is barren. On the E and S sides are sand hills, but the W shore is mostly rocky and unsurveyed. Baird Cliff, at the head of the port, lies approximately 8.5 miles S of Jagged Head and is red, conspicuous, and about 10m high. A spit, which dries in places, extends nearly 1 mile N from the face of the cliff. McComb Point, 24m high and fringed with foul ground, lies 4 miles NNW of Baird Cliff and divides the W shore into two bays, the N of which is Hempel Bay; both bays are unexamined.

Spit End, 6 miles SSW of Scott Point, is the end of a narrow, shelving spit, 3 miles in length, which encloses Little Lagoon to the E. Although this lagoon is about 3 miles in length and has depths of 5 to 8m in its central part, the entrance channel S of Spit End is shoal and available only to a small craft possessing local knowledge. An iron pipe, situated 0.5 mile E of Spit End, marks the N side of the inner end of the channel to Little Lagoon.

1.39 Central Hill (13°58'S., 136°39'E.), described in paragraph 1.32, bearing 207° and just open E of McComb Point, leads through the entrance of Port Langdon between Jagged Head and Cody Shoal in a least depth of 14.9m. When Baird Cliff bears about 185°, course is altered to the S until McComb Point bears W or NW, when a heading for the anchorages can be taken.

Two white triangular beacons are situated on the shore about 2.25 miles ESE of Baird Cliff and, when in line bearing 148°, lead small craft between the reefs to a landing place at the head of Port Langdon.

Anchorage.—Good anchorage can be obtained on the E side of Port Langdon, in a depth of 11m, mud and sand, W of the spit enclosing Little Lagoon. There is also sheltered anchorage in the SE corner of the port, in a depth of 9 to 10m, mud, NW of Spit End. Caution is necessary when proceeding between the anchorages off the above spit as a dangerous rock is charted about 0.35 mile offshore midway along its length.

Laycock Hill, 46m high, stands close within the NE corner of Little Lagoon and forms a good mark from the anchorage.

Caution.—Central Hill is not always visible. In such instances, vessels should steer in on McComb Point.

1.40 Scott Point (13°45'S., 136°51'E.), the W extremity of the broad peninsula which forms the NE end of Groote Eylandt, is low, sandy, and fringed by rocks. The point rises to a conspicuous pink sandhill close S and shoal water extends about 1 mile offshore to the W.

North East Islet (13°38'S., 136°57'E.), the outer extremity of a group of islets off the NE end of Groote Eylandt, lies, along with Lane Islet and Hawk Islet, on a coral reef extending up to 10 miles NE of Scott Point. There are numerous submerged dangers and above-water rocks close about these islands, and also between them and the shores of Groote Eylandt to the S and W.

North East Islet Light is shown from a white hut situated at an elevation of 62m on the summit of the islet.

Moresby Rock, with a least depth of 14.8m, lies about 2 miles N of North East Islet Light. Heavy tide rips are formed between this rock and the islet and vessels are advised not to close the shore within 4 miles when rounding this danger.

A rocky ledge extends 1 mile NW from the reef between North East Islet and Hawk Islet. Several rocks, with depths of less than 1.8m, lie up to 2 miles W of the W extremity of Hawk Islet, and a rock, which dries 1.8m, lies 1 mile NW of the same point.

Two islets, one 29m high and the other 6m high, with rocks awash N and S, lie close together about 3 miles SSE of Hawk Islet.

A ridge of shoal water, terminating in an unexamined 4m patch, extends about 4 miles S of North East Islet. Two rocks lie on the N end of this ridge about mile S of North East Islet.

Cody Bank, with depths of 1.2 to 4.2m, extends about 7 miles SW of Hawk Islet and shows light in color during daylight. There is an unexamined channel, with a charted depth of 6.4m, between Cody Bank and Scott Point, but it is not recommended.

Groote Eylandt—East Coast

1.41 The E side of Groote Eylandt, from a point about 6 miles SE of Scott Point to Cape Beatrice, 32 miles S, is deeply indented by two bays.

Alexander Hill, 57m high, rises about 7 miles S of Scott Point; the hill is the S extremity of a line of prominent white sand hills.

Mamalimandja Point (13°55'S., 136°52'E.), about 2 miles S of Alexander Hill, is the N point of an unnamed bay which is unsurveyed and completely open to the SE. Reefs front the point and extend SW and over 2 miles NE from it; the NE reef is named Rocky Islet. A depth of 4.6m lies charted about 5 miles NE of the point, but the area has not been completely examined and lesser depths may exist.

Dalumba Bay (14°07'S., 136°49'E.), entered between Ilyungmajda Point, the S point of the previously-mentioned unnamed bay, and **Ungwariba Point** (14°08'S., 136°55'E.), about 9 miles SE, has not been completely examined, but depths of 18 to 22m were found in the approaches. The entrance to the inner part of the bay, about 9 miles W of Ungwariba Point, is obstructed by an islet and a reef with depths of 9.1m between them. Several islets lie up to 4 miles S of Ilyungmadja Point, but the depths in the vicinity are not well charted.

Bombard Shoal (14°04'S., 136°59'E.), with a depth of 7.9m, lies close to the 35m curve and is about 6 miles NNE of Ungwariba Point.

The coast between Ungwariba Point is rocky, with reefs and dangers extending up to 2 miles offshore. Groote Reef, with a least known depth of 5.5m, lies unexamined 3 miles offshore about 8 miles NNE of Cape Beatrice, and is the most seaward charted danger along this part of the coast.

Limmen Bight to Cape Shield

1.42 The coast from Rantyirrity Point, the N entrance point of Limmen Bight, to Cape Barrow, about 30 miles NNE, consists of sandy hummocks and sand hills, with low and level country inland. This section has not been thoroughly examined, but apparently shoal flats and foul ground extend some distance from it.

Blue Mud Bay (13°30'S., 136°15'E.) is entered between North Point Island (13°38'S., 136°43'E.) and Cape Shield, about 28 miles NW. The S side of the bay is formed by the N sides of Groote Eylandt and Bickerton Island while the N side is formed by the mainland W of Cape Shield.

The bay has not been completely surveyed and the N and W shores are difficult of access because of the extensive shoals which occupy large portions of that part of the bay.

Lowrie Channel (13°45'S., 136°05'E.), the S approach to Blue Mud Bay, lies between the mainland and the W side of Bickerton Island. There are depths of 5.5 to 11m charted in the fairway, but it has not been fully examined and local knowledge is advisable.

The **Walker River** (13°35'S., 135°50'E.) flows through the W shore of Blue Mud Bay, about 15 miles WNW of Cape Barrow (13°40'S., 136°04'E.). The intervening shore and that to the N has not been closely examined; vessels approaching this part of the coast should bear in mind the possible existence of uncharted dangers. Mount Ranken, a high point of the Bath Range, rises above the N bank of the Walker River about 15 miles inland and is a fairly good mark in clear weather. A peninsula, fringed by foul ground, extends about 15 miles into the bay from a point 10 miles N of the river entrance.

1.43 Grindall Point (13°19'S., 136°03'E.), located in the NW part of Blue Mud Bay, is a narrow projection extending S for 5 miles and forming Jalma Bay to its W and Grindall Bay to its E. Mount Grindall, a hill, is located on the E side of the peninsula about 3.25 miles NNE of the point.

Round Hill Islet, 69m high, lies on a shoal ridge extending from the E side of Grindall Point to Woodah Island. Several submerged rocks lie up to 1 mile E of the islet and limited depths lie to the S. A large rock lies above-water about 2 miles SW of Round Hill Islet.

Point Blane (13°17'S., 136°10'E.), 8 miles ENE of Grindall Point, is a narrow tongue of land projecting 3 miles SSE from the N shore. Grindall Bay penetrates approximately 10 miles inland between Round Hill Islet and Point Blane, and has

depths of 5.5 to 7.3m on the E side of the entrance, but appears shoal at its head.

Myaoola Bay (13°08'S., 136°20'E.), entered between Point Blane and Cape Shield, about 10 miles ESE, is extensive in its outer part with depths of 5.5 to 7.3m, but the inner part is shoal and has not been completely examined.

Woodah Island (13°27'S., 136°09'E.), the largest of the islands in Blue Mud Bay, lies with its S extremity 6 miles NNE of Cape Barrow and is generally low compared with the adjacent islands. Its S half is quite low and sandy but terminates in a rocky irregular point; the E side of the island is similar in appearance except the rocks lie submerged farther offshore.

Nichol Islet stands on the outer edge of a shoal ridge extending about 4 miles E of the E extremity of Woodah Island. Numerous rocks, some above-water, lie on the above ridge S and W of the islet.

1.44 Burney Island (13°36'S., 136°14'E.), about 4 miles SE of the S extremity of Woodah Island, lies surrounded by foul ground extending up to 1 mile off its shores. There is a cove on the NW side of the island which may be convenient for boats. In 1984, a rock with a depth of 1.2m was reported to lie midway between Burney Island and the N coast of Bickerton Island; an obstruction was reported to be situated about 1.25 miles SW of Burney Island.

Amagbirra Islet, low and sandy, lies about 1 mile E of Burney Island, and Wedge Rock, with above and below-water rocks to the N and W, lies about 3 miles farther E.

Morgan Islet, 66m high and partially covered with trees, lies approximately 1.5 miles W of Woodah Island, with no passage between. Meringa and Marinnan are two small islets on the N edge of the shoal on which Morgan Islet lies. An above-water rock lies about 0.5 mile S of the latter islet.

Anchorage.—Small vessels can obtain fairly-sheltered anchorage, in a depth of 7.3m mud, from 1 to 2 miles S of Morgan Islet. Moderate-sized vessels can anchor, in depths of 13 to 24m, mud, from 1 to 2 miles SW to W of the S extremity of Woodah Island.

Caution.—The NE approach to the above anchorages is between Nichol Island and Burney Island, and the S approach through Lowerie Channel. Vessels navigating in the above waters should bear in mind that these areas are not completely surveyed and additional dangers may exist in addition to those shown on the chart.

Cape Shield to Cape Arnhem

1.45 Cape Shield (13°20'S., 136°21'E.), 34m high, is the S end of an irregularly shaped peninsula which extends nearly 7 miles SW from the mainland. The shores are generally sandy, but numerous rocks lie submerged on the shoal ground which surrounds the cape to a distance of 1 mile. Gooninnah Islet lies approximately 2 miles E of Cape Shield on a reef which extends nearly 2 miles offshore.

Burns Shoal, with a least depth of 4.9m, lies off the entrance to Blue Mud Bay, about 16 miles E of Cape Shield. A dangerous wreck lies charted about 9 miles SE of Burns Shoal.

Point Arrowsmith (13°15'S., 136°28'E.), 8 miles NE of Cape Shield, is 22m high and rocky, but the coast between forms a shallow bay which has not been examined.

Wardarlea Bay, between Point Arrowsmith and Bagbiringula Point, about 7 miles NNE, apparently is also shoal and likewise has not been examined; both bays afford little shelter.

Trial Bay (13°02'S., 136°34'E.), located about 22 miles NE of Cape Shield, is entered between Bald Point on the S and Guyuwiri Point to the N. The bay is not completely examined and is generally encumbered with rocks and reefs. A reef on which the sea breaks extends up to 2 miles SE of Bald Point.

St. Davids Bay and Wonga Bay, both unexamined but rocky, lie W and E, respectively, of Guyuwiri Point.

Cape Grey (13°00'S., 136°40'E.), 46m high and rocky, is the E extremity of a narrow peninsula extending about 3 miles SE from mainland; it is bordered by reefs and shoal water extending up to 1 mile to the E and S. Doyle Rock, 1m high, lies with a submerged rock close S, about 2 miles SSW of the cape; a dangerous wreck lies sunk about 1 mile ENE of Doyle Rock.

1.46 Caledon Bay (12°51'S., 136°35'E.), entered between Cape Grey and Point Alexander, extends in a NW direction for about 14 miles to Middle Point, where it is divided into two smaller bays, the northern being known as Grays Bay. Mount Caledon, 11 miles WNW of Cape Grey, is composed of granite and has a spur extending NE from the coast for a distance of about 2 miles, forming a point at the sea.

The SW side of the bay, from Cape Grey to the above point, is fringed by rocks and shoals extending up to 2 miles offshore, with an above water rock lying about 2 miles SE of the same point. Within the latter point the bay has not been closely examined, but the inner part W of Middle Point is shoal and poorly sheltered. Grays Bay, on the W side of Point Alexander, although not completely examined, affords good anchorage to vessels able to enter.

A line of dangers extends approximately ESE from Point Alexander for 11 miles to Dudly Shoal, which has a depth of 10.3m. Three islets, named McNamara, Bridgland, and Dudly, and several above and below-water rocks lie in this area; caution is required to clear it. Regan Shoal, about 2 miles S of Dudly Islet, is the southernmost of these dangers and has a depth of 7.9m. A rock, awash, lies about 4 miles SSE of Point Alexander, and about 1 mile NE of the track recommended for entering.

Anchorage.—Vessels seeking shelter can obtain good anchorage in Grays Bay, in depths of 6 to 13m, mud. One of the best anchorages is in a depth of 7.3m, gray mud, about 0.7 mile E of an islet located N of Middle Point. The least charted depth in the approach is 7.9m.

Directions.—To enter Caledon Bay, steer 300° to pass midway between the dangers N of Cape Grey and the dangers SE of Point Alexander, with the point extending from Mount Caledon slightly on the port bow. Care should be taken not to confuse this point with the red sandy point in the W part of the bay.

When Middle Point bears 330°, alter course for it and round McNamara Island. When Grays Bay is open fully, course should be altered to 000° for the anchorage.

Caution.—Caledon Bay should be entered during daylight hours only. Vessels with a draft of greater than 6m should not enter the bay. Cape Gray and Mount Caledon should be identified before attempting to enter the bay.

1.47 Mount Alexander (12°42'S., 136°41'E.), 99m high and visible over 20 miles in clear weather, rises close to the coast at the inner end of a small peninsula located approximately 9 miles NNE of Point Alexander. The outer end of this peninsula, known as Wanyanmera Point, is fronted by rocks, some lying nearly 3 miles offshore. Three Hummocks, a group of three islets, with a maximum height of 47m, lies about 4 miles S of the point.

Port Bradshaw (12°33'S., 136°43'E.), entered about 10 miles NE of Mount Alexander, affords good anchorage for small vessels with local knowledge, in depths of 5.5 to 9.1m. The channel, between Binanangoi Point to the S and Gwapilina Point to the N, is somewhat obstructed by islets and rocks, but once inside there is good protection from SE winds. The W side of the port is backed by a range of hills from 122 to 150m high, consisting mostly of granite.

The coast to the N and S of Port Bradshaw has not been completely examined, but is known to have reefs and rocks extending up to 1 mile offshore. Between the entrance to Port Bradshaw and Cape Arnhem, about 16 miles NNE, the shore is sandy with low white sand hills within. Several above-water rocks lie close offshore. Sir Roderick's Rocks, an extensive group of above and below-water dangers, lie from 5 to 8 miles ENE of the entrance to the port.

1.48 Cape Arnhem (12°21'S., 136°59'E.), the W entrance point of the Gulf of Carpentaria, is a grassy projection rising gradually to a height of 45m. The cape is fringed with reef and has some low cliffs on its S side. Within the N shore it forms Dalywoi Bay, shoal and open to the NE. There are strong tide rips for a distance of about 1 mile off the cape and irregular depths extend up to 2 miles offshore.

Arnhem Rock, 2m high, lies about 1 mile S of Cape Arnhem and there is an unexamined 9.8m shoal about 1 mile SW of the rock. Arnhem Shoal, with a least known depth of 6.9m, lies, also unexamined, from 1 to 2 miles N of Cape Arnhem and is approximately 1 mile in diameter.

Approaches to Gove Harbor

1.49 Mount Dundas (12°13'S., 136°52'E.), flat-topped and covered with trees, rises to a height of 70m, close within the coast about 10 miles NW of Cape Arhem. The low barren land along the shore here accentuates this hill and in clear weather it can be seen from a considerable distance offshore. A conspicuous red and white cliff is located about 2 miles WNW of Mount Dundas, and a radio mast stands 2 miles W of the cliff.

Yirrkala Mission Station, situated at the head of a sandy bight about 2.25 miles SE of Mount Dundas, is marked by several buildings and a conspicuous tower, 57m high. There is an air strip about 4 miles WSW of the station, and the two are connected by road. Miles Islet lies close off the coast about 1.25 miles SE of the above tower.

Cape Wirawawoi (12°10'S., 136°47'E.), low and sandy, lies about 6 miles NW of Mount Dundas.

Mount Saunders (12°11'S., 136°47'E.), 71m high and more or less flat except for its peak at the SE end, rises about 1 mile SSW of Cape Wirawawoi. Two radio masts showing red obstruction lights stand on Mount Saunders; another radio mast stands near the shore about 1 mile ESE.

Caution.—Lone Rock, awash, lies on the edge of foul ground about mile offshore N of Mount Dundas. This rock is isolated and steep-to on its seaward side, making it dangerous to approach.

Foul ground fills the bight which extends between Cape Wirawawoi and Mount Dundas, and a rock, which dries 2.1m, lies on the edge of this foul area, about 3 miles SE of the cape, with drying sand banks between.

A shoal, with depths of 3.6 to 4.6m, lies from 1 to 2 miles NW to NNW of Cape Wirawawoi.

1.50 Bremer Island (12°07'S., 136°49'E.), the SW extremity of which lies about 1.75 miles NNE of Cape Wirawawoi, is the largest of the group known as the Bremer Islets, and is low and sandy, with a maximum height of 28m near its NE end. The island is almost entirely fringed by reef and rocks, with depths of less than 5m extending up to 1 mile SSE of the S extremity. A dangerous submerged rock, with depths of less than 2m, lies about 0.75 mile NNW of the N extremity of the island and a bank, with a least depth of 3m, lies close off the NW side of the island. A preferred route for shallow draft vessels leads between Bremer Island and the mainland, and is shown on the chart.

Higginson Islet, 16m high and conspicuous, is the northeasternmost of the Bremer Islets, and is located about 4 miles NE of that extremity of Bremer Island.

Bremer Rock, North East Bremer Islet, Forlsche Rock, and East Bremer Islet form a line of islets and rocks extending from a position 1 mile NW of Higginson Islet, S for about 6 miles. The largest of these, East Bremer Islet, attains a height of 20m and has a line of above-water rocks extending 1 mile S from it. In 1985, it was reported that rocks, with depths of less than 2m, lie midway between East Bremer Islet and Bremer Island.

Veronica Islet (12°03'S., 136°47'E.), 14m high, is small and rocky and lies 3 miles NW of the NE extremity of Bremer Islet. A rock, 1m high, lies mile SSE of Veronica Islet. A light has been established on the islet.

Sykes Shoal, unexamined, with a least known depth of 6m, lies about 2 miles NE of Veronica Islet. An 8.4m patch lies about 1 mile SSE of Sykes Shoal.

Caution.—Most of the waters within the Bremer Islets have not been surveyed and, with the exception of the S end of Bremer Island, vessels should give them a berth of at least 3 miles.

1.51 Truant Island (11°40'S., 136°50'E.), at the NE extremity of The English Company's Islands, is 46m high and marked by a light shown from a metal framework tower, 39m high.

Anchorage, in depths of 6.2 to 10m and protected from NE through S winds, can be obtained off the NW part of the island, with the light bearing 122°, distant 0.9 mile. A marine farm has been established directly off the N shore.

Truant Bank, extending from 3 to 6 miles in an ENE direction from Truant Island, has general depths of less than 30m. The least depth on the bank is 2.7m over **Buccaneer Rock**, about 4 miles NE of Truant Island Light. Barbette Shoal,

with a depth of 8.4m, lies on the E end of the bank, about 6 miles ENE of the same light.

Barricade Shoal (11°43'S., 136°49'E.), with a depth of 11m, lies about 3 miles SSW of Truant Island Light.

Attack Shoal (11°43'S., 136°43'E.), with a least depth of 9.9m, lies about 7 miles WSW of Truant Island Light and is steep-to, especially on the S and E sides.

Truant Island Passage (11°42'S., 136°45'E.), leading between Truant Island and Attack Shoal, is frequently used by vessels approaching Gove Harbor from the N. The center of the passage has depths of 36 to 50m, but there is a 16.1m patch on the E side about 3 miles SW of Truant Island Light. The latter depth can easily be avoided by deep-draft vessels. Recommended tracks are shown on the chart.

1.52 Melville Bay (12°05'S., 136°40'E.), entered between Cape Wirawawoi and Cape Wilberforce, about 19 miles NW, lies encompassed by Bremer Island to the E, Gove Harbor to the S, and the mainland to the W. The shore of the bay from Cape Wirawawoi to Wargarpunda Point, 6 miles WSW, is low and sandy, heavily wooded, and generally foul. A group of conspicuous silos stand on Wargarpunda Point. East Woody Islet, small, rocky, and connected to the mainland by a sand spit, lies 2 miles W of the cape.

West Woody Islet, small, rocky, and heavily wooded lies about 0.5 mile W of **Wargarpunda Point** (12°11'S., 136°41'E.), with foul ground and dangerous rocks between. A rocky spit extends about 0.35 mile SSW from the islet and a detached rock, with less than 1.8m, lies nearly 0.75 mile S of the S extremity.

A shoal, with a depth of 9m, lies about 0.75 mile W of West Woody Islet. An 8.2m shoal lies nearly 1 mile SW of the same islet.

Mount Bonner (12°06'S., 136°34'E.), about 66m high, rises on the W side of Melville Bay and extends out to a rocky point about 2 miles NE. The latter point, which is located about 7 miles NW of West Woody Islet, is foul with two small islets offshore, the NE being conspicuous. A reef extends NE of these islets, ending in a 1m high rock about 2 miles NE of the point.

The coast S of Mount Bonner is low and sandy except for Shepherd Bluff, about 5 miles SSE.

About 7 miles NNW of Mount Bonner there is another rocky point, forming the S entrance point of a shallow unsurveyed bay. A ridge of hills, rising to Mount Bonner, extends SSE from this point.

1.53 Cape Wilberforce (11°55'S., 136°35'E.), formed of cliffs up to 70m high, is the extremity of a narrow peninsula extending about 7 miles ENE from the mainland. The waters S of the cape have not been surveyed and discolored water has been reported to the E. Numerous dangers exist of the N side of the peninsula.

Bromby Island (11°50'S., 136°40'E.), the largest of the Bromby Islets, lies with its E extremity about 8 miles NE of Cape Wiberforce and is about 58m high and cliffy. The entire chain, which extends about 10 miles NE of the cape, terminates in Bromby, a rocky islet with a reef extending N from it. The inner islets are surrounded by reef.

Gove Harbor (12°12'S., 136°40'E.)

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1.54 Gove Harbor is located in the vicinity of Dundas Point, about 1 mile SW of Wargarpunda Point. The port handles bulk alumina, bulk bauxite, and bulk liquids.

Winds—Weather.—The climate is directly affected by the monsoons. The prevailing wind during the dry season from May to October is SE to S, usually easing with nightfall. Strong winds up to 30 knots occur at times during this period.

The prevailing winds during the Northwest Monsoon from November to April are light and variable, blowing mainly from the NW. Cyclones which occur occasionally during this period bring gale force winds.

Average annual rainfall over 1,300mm, occurring predominantly during the Northwest Monsoon season, when heavy downpours of short duration are experienced.

Tides—Currents.—Mean high water springs rise up to 3.2m and mean neap tides rise 2.2m.

Tidal currents in the harbor reach a maximum of 3 knots, but usually are much less. The flood sets SSE through the entrance and the ebb sets NNW. Docking before half-flood tide is recommended, as the tidal current is reported to set off the Bulk Cargo Wharf after that time.

Depths—Limitations.—Depths in the approach to Gove are deep. The least depth in the direct approach to the Bulk Cargo Wharf W of Dundas Point is 13.7m, and to the General Cargo Wharf E of Dundas Point is 7.3m. A depth of 10.3m lies about 0.5 mile W of the Bulk Cargo Wharf.

The Bulk Cargo Wharf, which is 305m long, has a depth of 14m alongside. The Tanker Berth, which is attached to the S end of the bulk berth, also has a length of 305m; the depth alongside is maintained to 13.7m. Two vessels of 60,000 dwt can berth simultaneously. A minimum UKC of 10 per cent of the draft is required for berthing and unberthing at the Bulk Cargo Wharf.

The General Cargo Wharf extends about 0.2 mile offshore on the E side of Dundas Point and is 94m long. There are two berths, extended by dolphins, at its head. Vessels up to 20,000 dwt, with a maximum length of 183m, can be accommodated, although vessels up to 30,000 dwt can berth under suitable tidal conditions. Alongside depths at each berth are maintained at 13.5m.

Perkins Wharf, with a berthing length of 73m, is situated about 0.25 mile N of Harbour Islet. There are depths alongside of 4.3m and the wharf is mainly used for the refueling of fishing boats. There is a concrete ramp on the E side of this wharf, used by the ro-ro barge that operates a weekly service to Darwin. A stranded wreck lies 220m W of the wharf. A water intake for the power house is situated 440m E of Perkins Wharf.

Aspect.—Dundas Point, about 1 mile S of West Woody Islet, is a low sandy spit which forms the N entrance point of Gove Harbor. Parfitt Point, also low and sandy, forms the S entrance point and lies about 2 miles SW of Dundas Point. Within the entrance, the Drimmie Peninsula, high and rocky, extends 2 miles S from the shore about 2 miles ENE of Dundas Point and forms the E side of the harbor; it is connected to the mainland by a causeway which covers at high water. The SE part of the harbor consists of a series of low tree-covered points with shoal

Gove Harbor

water between and rocks off-lying. The Granite Islands, about 1 mile S of Dundas Point, mark the outer limits of the shoals extending to the shore on the S. Half Tide Rock, which dries 2.4m, lies about 1 mile ESE of Dundas Point. Harbour Islet lies 1 mile NNE of Dundas Point.

Fairway Lighted Buoy is moored about 2 miles NW of Dundas Point.

A 3m shoal, marked by a lighted buoy, lies about 0.2 mile SE of Dundas Point and a 5.2m shoal lies about 0.3 mile SSE of the same point. Five Fathom Lighted Beacon stands about 0.25 mile SSW of Dundas Point. A lighted beacon stands on Half Tide Rock.

An aeronautical radio beacon is situated at the airstrip about 10 miles SE of Gove Harbor.

Pilotage.—Pilotage is compulsory for vessels using the main berths. The pilot boards 1.5 miles W of West Woody Islet. Vessels should report, through Darwin, their ETA in GMT, together with draft forward and aft, 10 days before arrival, and confirming the arrival time at 48 hours and 24 hours prior to arrival. The port office at Gove can be contacted on VHF channel 16; the working frequencies are VHF channels 6 and 12.

Anchorage.—No. 1 Anchorage lies 2.1 miles WNW of West Woody Island, in a depth of 15m, mud and shingle.

No. 2 Anchorage lies 2.3 miles NW of West Woody Island, in a depth of 18m. This anchorage is also used by laden tankers awaiting a berth.

Small vessels seeking shelter can anchor according to draft, in depths of 6 to 9m, sand and mud, SW of Half Tide Rock.

Two lighted mooring buoys, 180m apart, lie 800m ENE of the General Cargo Wharf, in a depth of 7.5m.

Directions.—Preferred routes lead into Melville Bay and can best be seen on the chart. Deep-draft vessels pass to the N of Bremer Island and shallow draft vessels may pass to the South.

The English Company's Islands

1.55 Truant Island (11°40'S., 136°50'E.), previously described in paragraph 1.51, forms the NE extremity of The English Company's Islands, which then parallel the coast for approximately 50 miles to the SW. The island is marked by a light. Shoals extend up to 7 miles to the NE.

Anchorage, in 6.2 to 10m, protected from NE, E, SE, and S winds, can be found off the NW part of the island, with Truant Light, bearing 122°, distant about 0.9 mile.

Wigram Island (11°47'S., 136°34'E.) lies with its E extremity about 12 miles WSW of Truant Island and is about 8 miles in length. The E end is low, with an islet close offshore, but the SE extremity is formed by a high cliff rising inland to a height of 63m. The SW end of the island, also cliffy, is nearly as high but shoal water is reported to extend nearly 1 mile off this shore.

Miller Islet, small, low and apparently steep-to, lies about 2 miles ENE of the E end of Wigram Island; a rock lies close E of the islet and a shoal, on which stands two above-water rocks, lies between Miller Islet and Wigram Island.

Cotton Island (11°51'S., 136°29'E.), immediately SW of Wigram Island, is 126m high and rocky. There is a high cliff at the S end about 7 miles from the N extremity and most of the E shore is steep. Depths of as little as 8m have been found in the channel between Wigram Island and Cotton Island, where strong tidal rips were reported in 1983. A small islet, 33m high, stands off the W side of the island and a depth of 3m was reported in 1985 to lie about 1 mile NNW of this islet.

Pobassoo Island lies close off the S end of Cotton Island and is connected to it by a reef. This island is 69m high; Herald Islet lies 0.5 mile to the W.

Astell Island, about 1 mile NW of Pobassoo Island, with shoal water between, is 76m high and rocky. A reef, with a depth of less than 1.8m and a least depth of 0.5m at its outer end, extends 3 miles W from Herald Islet, and parallels with the S side of Astell Island up to 1 mile offshore; depths of 7.3 to 9.1m are charted between this reef and the shore. Several rocks lie off the N end of Astell Island and a reef extends a little over 2 miles to the N.

1.56 Inglis Island (12°02'S., 136°14'E.), the largest of The English Company's Islands, lies 5 miles SW of Astell Island, with Bosanquet Islet close off its NE extremity. The latter is separated from the main island by a narrow passage which is partially restricted by a smaller islet. Several rocks lie about 2.5 miles WNW of Bosanquet Islet; a 3m patch lies 1.5 miles W of the islet. Shoal depths of 8.2m and 15.8m lie 0.5 mile and 1 mile E and NE, respectively, of Bosanquet Islet.

The N side of Inglis Island is indented by a large open and shoal bay, with shoals, drying patches, and two islets off it; the N islet is 29m high. A 0.3m shoal lies about 1 mile NNE of the NW extremity of the island; a 5.5m patch lies about 1.25 miles further NNE.

Maiyayigur Point, the W extremity of Inglis Island, is rocky and 28m high. Hummocky Islet, 22m high, lies 1 mile SW of the point and is conspicuous from the N and S. The dangers in this vicinity are described with Pera Channel, in paragraph 1.57.

Caution.—A 0.3m shoal has been reported (1990) to lie about 2 miles ENE of Bosanquet Island.

Malay Road (11°50'S., 136°25'E.) and Nalwarung Strait, its continuation SW, bordered on the S by the Bromby Islets and the mainland and on the N by Wigram Island, Cotton Island, and Inglis Island, are from 1.25 to 6 miles wide, but the reef fringing the shores in the narrow areas of the channel restricts navigation to small vessels with local knowledge. There are general depths in the fairway of 7.3 to 30m, but numerous dangers restrict the channel S of Cotton Island and at the W end of Nalwarung Strait.

Anchorage.—Anchorage can be taken under the lee of the various islands in Malay Road, although the shoal water S of the W half of Wigram Island must be avoided. Large vessels are cautioned that surveys are not complete in many areas of The English Company's Islands and great care must be exercised in approaching shore.

Small vessels have taken anchorage S of Bosanquet Island, E of Inglis Island, in depths of 9 to 13m.

Arnhem Bay

1.57 Pera Channel (12°00'S., 136°04'E.), the main approach to Arnhem Bay, lies at the SW extremity of The English Company's Islands and leads between Inglis Island and Flinders Point, about 4 miles to the W. The channel is restricted by several rocks, islets, and shoals, but the fairway, which requires precise navigation, carries a least depth of 20m to the bay.

Flinders Point (12°04'S., 136°03'E.), low but with a stony hillock on its extremity, is the NE end of a long narrow peninsula separating Arnhem Bay and Buckingham Bay. The point rises to a distinctive knoll, 46m high, about 1 mile within, which, being close to the S shore, shows well from NE. Shoal water and irregular depths border the shore N and E of Flinders Point and cause heavy tide rips especially on the rising tide.

Caution.—A rock, which dries 2.7m, lies about 1 mile WSW of **Hummocky Islet** (12°05'S., 136°06'E.), and in the fairway of Pera Channel. A sand cay, which dries 1.8m, lies about 2 miles N of Hummocky Islet, and another rock, which dries 2.7m with an islet close by, lies 2 miles farther NE. A 1.8m patch lies about 2 miles SSE of the same islet. Patches, with depths of 6.4m and 7.9m, lie 2 miles NW and 1 mile N, respectively, of Flinders Point.

Note.—Buckingham Bay, entered N of Flinders Point, is described in paragraph 1.60.

1.58 Probable Island (12°08'S., 136°02'E.), 91m high, lies 2 miles S of Flinders Point and attains its maximum elevation near its center. The E side of the island is indented by numerous small sandy bays separated by prominent bluffs. The area fronting this coast has not been examined to a distance of 1 mile, but surveys of the channel indicate a shoal shelf on which tide rips and overfalls were seen extending up to 1 mile off the center of the island.

Gwakura Island, close S of Probable Island, is formed of a narrow ridge 61m high. The passage between these two islands appears to be foul, with strong tide rips on the flood.

Rekala Island, about 0.75 mile S of Gwakura Island, is small and low, with scrub and a few trees. The passage between these two islands has not been examined.

Tides—Currents.—In Pera Channel, off Hummocky Islet, the tidal currents attain a rate of 4 knots at springs. To the N of the islet, near the sandy cay, the ebb current sometimes attains a rate of 6 knots. At the entrance to Arnhem Bay, W of **Mallison Island** (12°11'S., 136°07'E.), the maximum rate of the tidal currents at springs is from 3 to 5 knots, being strongest near the island. In the bay itself the maximum rate is 2 knots at springs, again strongest near Mallison Island; it rarely exceeds 1 knots in any other part.

Spring tides rise up to 4.6m and neaps rise approximately 4m.

1.59 Everett Island (12°15'S., 136°04'E.), actually the NE extremity of a broad peninsula extending from the mainland, lies about 10 miles S of Flinders Point and can be identified by the high distinctive red cliffs on its N and E sides. The cliffs rise directly to the trees above, the tops of which have a height of about 40m, and form a good mark from the entrance of Pera Channel.

Hardy Island, close S of Everett Island, is low, rocky, and of ironstone formation. It is covered with bushes and small trees, and fringed by a rocky ledge which extends right to the shore on the W.

Arnhem Bay (12°19'S., 136°11'E.) is entered using Pera Channel, between the SW extremity of Mallison Island and the NE end of Everett Island, about 4 miles SW. Arnhem Bay is broad with deep water in its N part. The NE side of the bay from Cape Newbald is generally low, sandy and foul, with Rhodes Point, low with red banks, 2 miles SE of the latter and forming a small foul bay between.

Cliffy Point (12°22'S., 136°18'E.), on the E side of Arnhem Bay and about 14 miles SE of Cape Newbald, is composed of red cliffs, 9m high, which are conspicuous in the afternoon. A low wooded islet lies close off this point.

1.60 Low Islet (12°23'S., 136°10'E.), about 7 miles W of Cliffy Point, lies in the S central part of Arnhem Bay and is covered with bushes and small trees, the tops of which are about 12m high. A reef extends 1 mile E from the islet, and shoal water, with depths of 3 to 5.5m, extends nearly 2 miles N and 2 miles NE of the islet. A spit, with depths of less than 11m and with a 4.9m patch near its N end, extends 5 miles N from the same islet.

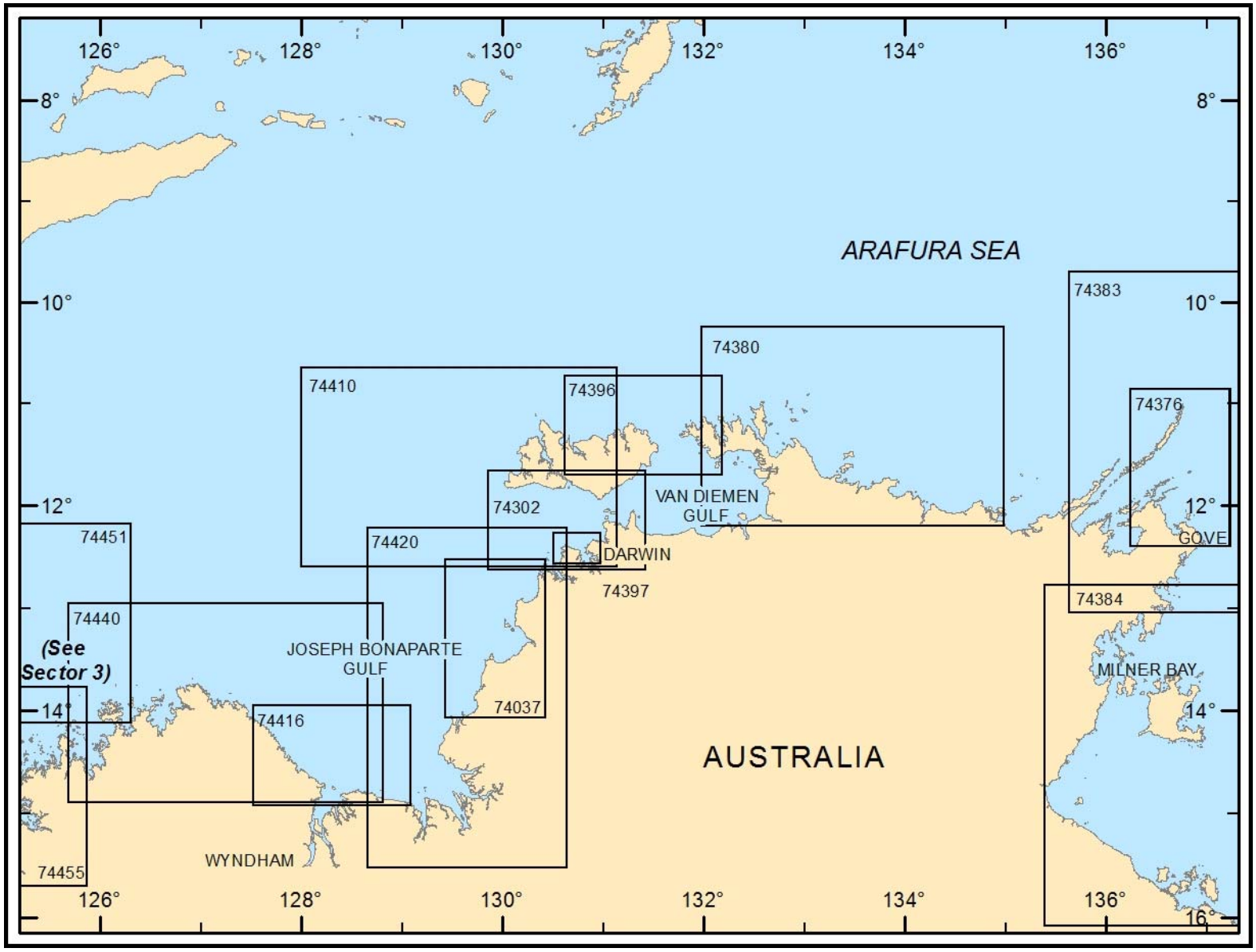
Rippling Shoal (12°18'S., 136°07'E.), which is narrow and sandy, extends 5 miles SE from a position about 2 miles E of Hardy Island, and is steep-to on its E side, with tides rips along most of its length. The shallowest part, with a depth of 0.9m, lies E of the S end of Hardy Islet and at times is marked with discolored water.

A large sand bank, which dries 3m, lies about 5 miles WNW of Low Islet, with reefs in the vicinity. The waters W of Rippling Shoal and S of Low Islet have not been examined but appear dangerous and shoal-encumbered.

Anchorage.—Arnhem Bay affords anchorage for a large number of vessels. The best anchorage is on the E side of the bay, where a vessel proceeding in as far as its draft will allow can obtain shelter from SE winds which blow with considerable strength at times. Depths of less than 11m extend up to 5 miles off this coast, but depths of 6.7m are charted at a distance of 2 miles from shore.

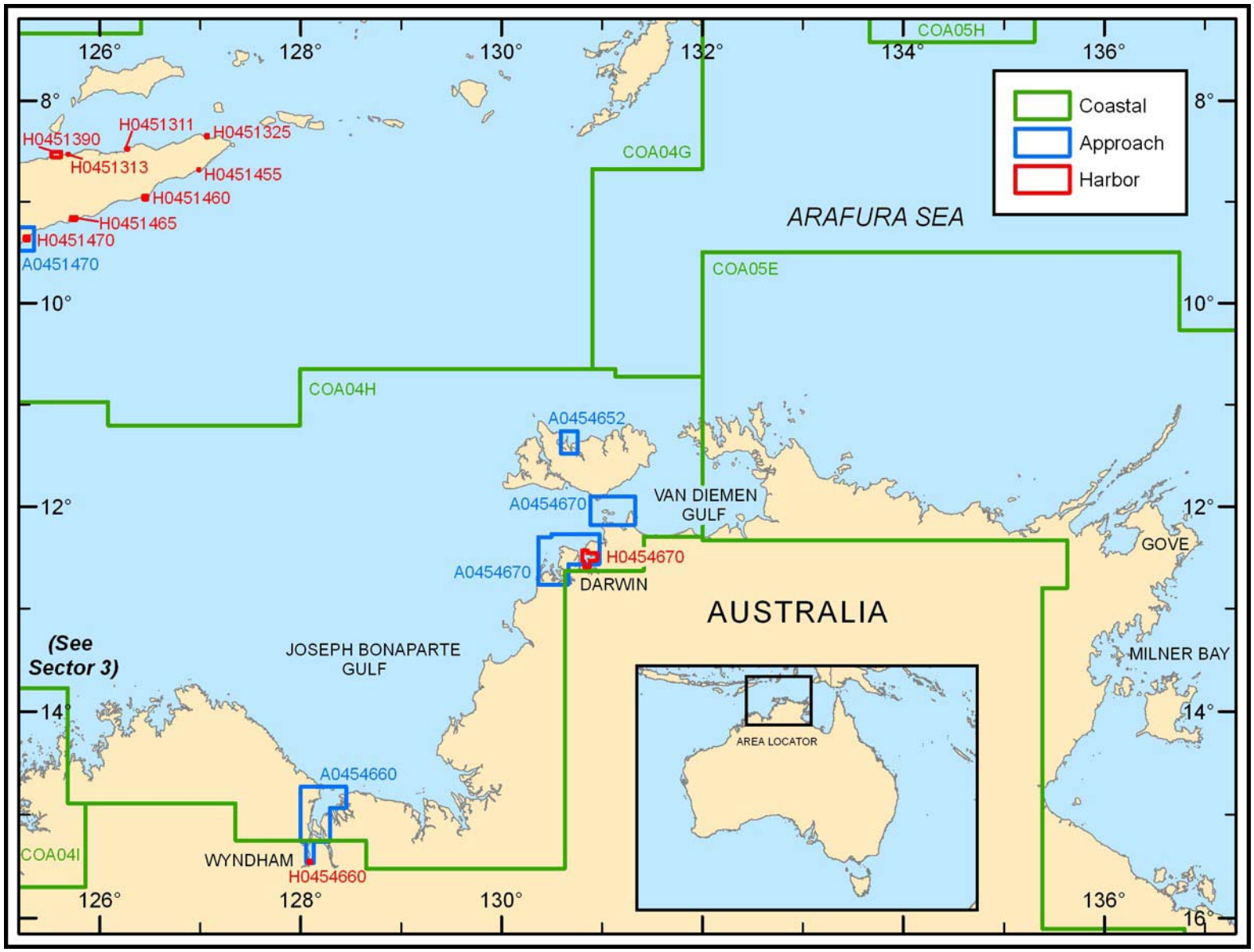
There is good anchorage for large vessels SW of Cape Newbald in the lee of Mallison Island, in depths of 13 to 22m, mud or sand.

Buckingham Bay (12°05'S., 135°55'E.), entered between Flinders Point and Napier Point, the cliffy extremity of the Napier Peninsula, 10 miles NW, is rocky in character with numerous cliffy points along both shores. The bay has not been surveyed but it appears shoal on its S side. A vessel entering Buckingham Bay should give Flinders Point a berth of at least 3 miles. Islets are located as far as 2 miles offshore from the SE side of the bay.



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

SECTOR **2** — CHART INFORMATION



Additional DNC library coverage may be found in NGA DNCs 4 and 5 (Limited Distribution) disc within the README\GRAPHICS folder.

SECTOR 2 — DNC LIBRARY INFORMATION

SECTOR 2

NORTH COAST OF AUSTRALIA—CAPE WESSEL TO CAPE LONDONDERRY

Plan.—This sector describes the N coast of Australia from Cape Wessel W to Cape Londonderry and includes Van Diemen Gulf, Melville Island, Bathurst Island, and Joseph Bonaparte Gulf. The outlying dangers, which are located N and W of this coast, are described in proper sequence after the main associated features.

General Remarks

2.1 Winds—Weather.—The Northwest Monsoon becomes well-established over the area described in the sector by early in January, bringing clouds, rain, and thunderstorms. Tropical depressions frequently occur during the period from December to April and vessels should be prepared for them.

The Southeast Monsoon is accompanied by fine weather, usually from May to September, but may reach force 5 to 7 over the open sea. A full description of the monsoon seasons is contained paragraph 1.1.

Tropical storms, known as "Willy Willies," in which the wind may reach hurricane velocity, affect the coastline during the summer season. The typical storm moves SW across the Arafura Sea and the Timor Sea and then recurves off the NW and W coasts of Australia, thereafter moving SE towards the Great Australian Bight, located along the S coast of Australia. However, almost as many of these storms continue to follow the coast within a distance of 200 miles, and later recurve over the SW portion of Australia. Gale to hurricane force winds, circulating in a clockwise direction, are liable to be encountered over an area varying in diameter between about 20 and 130 miles.

The average speed of these storms is about 12 knots The maximum frequency of these storms usually one to two per year, occurs from January through March; the storm tracks are generally erratic. the approach of a "Willy Willy" is heralded by a falling barometer, freshening winds from the E, unusual sultriness, and persistent overcast skies and rain. After the storm passes, clouds quickly give way to clear skies.

Fog is very rare and in coastal waters is virtually unencountered. Haze, on the other hand, is a problem during the winter months, especially close to land, often reducing visibility to approximately 3 miles. during the summer, visibility is usually good, except during heavy rains or gales.

Tides—Currents.—During the period from December to April, the Northwest Monsoon causes an E current along the N coast of Australia, usually attaining a rate of about 0.5 knot. An offshoot of this current sets S to SW, at a rate of about 0.5 knot, into Joseph Bonaparte Gulf and towards the entrance to Cambridge Gulf.

The offshore currents in the region are highly variable. For further information, see paragraph 1.1.

Directions.—Vessels proceeding E or W from or to Torres Strait should fix their position on the recommended track to pass approximately 10 miles N of Cape Wessel and then 25 miles NNW of **Cape Van Diemen** (11°10'S., 130°23'E.). From the latter, the track line (062°/242°) leads to a position approximately 5 miles N of **Penquin Shoal** (13°05'S., 125°58'E.) and then on the charted course (063°/243°) to a position 5 miles S of **Browe Islet** (14°06'S., 123°33'E.). The least charted depth on this track is 18.3m, however, depths of 16 to 17.5m lie within 3 miles of the track in some cases; deeper draft vessels may wish to keep farther offshore.

Caution.—Offshore dangers are a definite threat to navigation, especially in regard to deep-draft vessels proceeding off the N and NW coasts of Australia. The recommended tracks should be closely adhered to, varying from them only when safe navigation permits.

The Wessel Islands

2.2 The Wessel Islands consist of a chain of islands extending about 76 miles NE from the mainland at **Napier Point** (11°57'S., 135°55'E.). The SE and E shores of these islands consist mostly of rocky cliffs which rise abruptly from the sea, but the opposite sides are mostly low and sandy.

The waters around these islands are only partially surveyed and caution is required when standing into their immediate vicinity.

When the Wessel Islands are approached on the normal E-W track line, which is charted approximately 10 miles N of Cape Wessel, they may not be clearly seen during the summer months, when the Northwest Monsoon causes the coastal features to be somewhat obscured by haze. Radar returns off the E coast of Marchinbar Island may be received before those from the cape itself and caution is recommended.

Cape Wessel (11°00'S., 136°45'E.), the NE extremity of Rimbija Island, the northernmost of the Wessel Islands group, is formed of a perpendicular cliff from 12 to 15m high. It has been reported to give good radar returns up to 14 miles. A light is shown from a black, metal framework tower situated on the cape; a racon is situated at the light structure.

Discolored water and tide rips occur N of Cape Wessel and foul ground extends up to 2 miles NW of the cape.

2.3 Marchinbar Island (11°14'S., 136°38'E.), the largest of the Wessel Islands, is separated from Rimbija Island by a narrow foul channel encumbered by numerous below-water rocks. Emu Islet lies at the W end of this channel and is formed of rock; another rock lies about 0.5 mile NNE.

Sphinx Head, with conspicuous cliffs 67m high, lies on the E side of Marchinbar Island, about 10 miles SSW of Low Point, the island's NE extremity. The land rises S of the head to form two flat-topped hills with a maximum height of 79m; however, the entire E coast is predominantly high and sheer cliffs. The island should not be closely approached to its SE shore, which is not fully surveyed and known to have a reef, which breaks, extending 1 mile S. Two rocks, awash, 5 miles farther SSW lie about 1 mile offshore.

A large bay containing two islets lies 3 miles SW of Sphinx Head. There is anchorage, in 20m, sheltered from all but strong E winds, W of the N islet. The anchorage may be approached on a NW course, passing midway between the two islets, in a depth of 9m.

An unnamed bay, located between 1 and 2 miles NE of the S end of Marchinbar Island, is unsurveyed and unsuitable as an anchorage. The NE part of the bay is encumbered with rocky outcrops, and while there is apparently deeper water in the SW part of the bay, it is however exposed.

2.4 **Two Island Bay** (11°35'S., 136°24'E.), on the W side of Marchinbar Island, is located 5 miles SSW of Cape Wessel, between Mort Point and Auster Point. The bay contains North Island and South Island, with rocks 0.5 mile W of the W end of South Island.

Trafalgar Bay (11°07'S., 136°42'E.) is the next bay SW of Two Island Bay; it is entered between Auster Point and Thumb Point. The shores of the bay are reported to be foul. Sheltered anchorage can be found, in 13m, about 0.5 mile WNW of the W of the two small islets in the center of the bay.

Jensen Bay (11°08'S., 136°42'E.), formed between Jensen Islet and Shark Point, about 3 miles SSW, has depths of 7 to 11m over most of its width, but is fringed by a dangerous reef with only 0.6m over it at the center of its head. The bay, which lies directly opposite Sphinx Head, would appear to provide reasonably good anchorage during the Southeast Monsoon, but is completely open to the NW.

Gedge Point (11°12'S., 136°38'E.), on the W shore near the middle of the island, has a conspicuous clump of casuarina trees on it, and landing is reported possible on a sandy beach at the S end of Temple Bay, close E of the point. Shark Point, about 2 miles NE of Gedge Point, is high, cliffy, and prominent and forms the W side of Temple Bay.

Red Point, about 5 miles SSW of Gedge Point, is formed of cliffs about 12m high. Near its S end, the island rises to a height of 79m.

Caution.—A 0.3m shoal has been reported (1990) to lie about 6 miles WNW of Southwest Point (11°27'S., 136°28'E.).

2.5 **Guluwuru Island** (11°31'S., 136°26'E.), separated from Marchinbar Island by Cumberland Strait, is high and cliffy, rising to a height of 99m in its S part. The waters around the island have not been closely examined, but a reef is known to border the NW shore to a distance of about 2 miles.

Tides—Currents.—The tidal currents along the W side of Marchinbar Island and Guluwuru Island attain up to 2 knots at springs, with the flood setting down on the shore. Tide rips are formed in Cumberland Strait, with rates of up to 12 knots at springs reported in 1987; because of this and several dangerous rocks, it should only be attempted by small craft with local knowledge.

Raragala Island (11°35'S., 136°17'E.), close SW of Guluwuru Island, has high cliffs on its SE side and rises to a height of 42m at its SW end. The island is very irregular in shape and has not been surveyed, but it is almost entirely fringed by a reef, with numerous rocks and islets along the NW shore. A passage, about 120m wide, runs between Raragala Island and Guluwuru Island. It has depths of about 9m, but the tidal current runs strongly through the passage, attaining rates of 12 knots at springs with strong eddies. The passage is usable near slack water.

Anchorage may be found, in a depth of 9.4m, mud and sand, 0.5 mile W of the N extremity of Raragala Island.

Islands off the Napier Peninsula

2.6 The **Cunningham Islands** (11°45'S., 136°06'E.), consisting of Jirrgari Island, Sumaga Island, and Warnawi Island, 33m, 24m, and 18m high, respectively, lie in a line immediately SW of Raragala Island, with a reef between. They are all fringed by rocks and there is no safe passage among them. A spit, with a depth of 1.8m on its outer end, extends 5 miles SSE from the N extremity of Sumanga, the center island; other shoals may exist in the area. A light is shown from a white hut structure at the SW end of Warnawi Island. A 0.6m patch lies about 1.5 miles E of the light.

Alger Island (11°53'S., 135°58'E.), the innermost of the Wessel Islands, is 42m high and separated from Point Napier by a shoal passage nearly 3 miles wide. Reefs and rocks extend nearly 2 miles S of the island, with a sand cay on the outer extremity, and thus reduce the navigable width of this passage to less than 1 mile.

There is a deep channel charted between Alger Island and Warnawi Island, with a navigable width of approximately 2 miles. The soundings are from old surveys and caution is advised. A depth of 17.1m was reported (1983) to lie about 1.5 miles NE of Alger Island. A depth of 15.8m was reported 7.5 miles SSE of the N point of Alger Island in 1983.

Stevens Island (11°33'S., 136°06'E.) is the northeasternmost of a chain of islands and rocks extending 46 miles NE from the coast immediately W of the Napier Peninsula. The island is 30m high, with rocks and foul ground extending up to 2 miles to the NE and SE.

A dangerous submerged rock of unknown depth lies about 6 miles NE of Stevens Island; another dangerous rock, the existence of which is doubtful, is charted about 4 miles N of the same island. Several rocks and reported shoal patches lie up to 13 miles NE of Stevens Island. A light is shown from the NE end of the island.

Burgunngura Island (11°36'S., 136°05'E.), 21m high and surrounded by foul ground, lies 2.5 miles SW of Stevens Island. This island is low lying with thick vegetation and expanses of white sand beaches.

2.7 **Drysdale Island** (11°41'S., 136°00'E.), 43m high, lies 6 miles SSW of Stevens Island, with a drying reef which has several islets and rocks that obstruct the channel between Drysdale Island and Burgunngura Island. On this reef is Yargara Islet, 30m high, which lies close off Dale Point, the NE end of Drysdale Island.

A rock, awash, lies off the W side of the island, 5 miles W of Dale Point.

Graham Island, 29m high, lies close S of Drysdale Island, with a small craft channel between. The passage should not be attempted without local knowledge. Reefs fringe the N end of Graham Island and caution is required.

Brown Strait (11°40'S., 136°05'E.), with a navigable width of 3 miles and with depths of 16.5 to 38.4m in the fairway, separates the islands of the Wessel group from Stevens Island,

Burgunngura Island, and Drysdale Island, and leads S to Cadell Strait or the passage between Alger Island and Cunningham Island.

There is a detached shoal, with a depth of 1.8m, lies 1.5 miles SE of the S end of Stevens Island. A depth of 7.9m lies about 5.5 miles NE of Alger Island.

Tides—Currents.—In Brown Strait, the tidal currents set S on the flood and N on the ebb at rates of up to approximately 4 knots.

2.8 Elcho Island (11°55'S., 135°45'E.), the largest island of the above group, lies adjacent to the Napier Peninsula, with Cadell Strait between. Point Bristow, the SW extremity of the island, lies nearly 29 miles from its NE end; several conspicuous tanks are situated about 2 miles to the N. A large mission station, which is the principal timber-cutting center for missions in the Northern Territory, is located between Point Bristow and the above tanks. There is a small hospital and air service is available with Darwin.

Anchorage.—Light-draft vessels can obtain good anchorage during the Southeast Monsoon in the bay off the mission station. Approach can be made from the NE by steering for Abbott Islet (Sandy Islet), 3 miles off the W end of Elcho Island, until the NE point of Howard Islet can be made for bearing S. The best anchorage is abreast the mission station, in a depth of 5.5m, about 0.2 mile offshore.

Caution.—This area is not recommended during the Northwest Monsoon.

The Napier Peninsula to Cape Stewart

2.9 Cadell Strait (12°00'S., 135°45'E.) separates the NW side of the Napier Peninsula from the SE side of Elcho Island and is less than 1 mile wide near its middle part. The NE entrance is obstructed by a bar with a depth of 0.6m, but general depths within run from 2 to 8m.

Small craft are reported able to navigate Cadell Strait in either direction by timing the passage to clear the bar at the NE entrance at high water. There is good anchorage for small vessels at the W entrance.

Abbott Islet (Sandy Islet) (12°02'S., 135°30'E.), 3.5 miles NW of Point Bristow, is a rocky islet lying on the S edge of a sand bank. It is a good mark, having a moderate covering of trees 4 to 8m high.

Howard Island (12°08'S., 135°24'E.), separated from the mainland by a narrow boat channel, lies SW of Elcho Island and forms with that island the SW entrance to Cadell Strait. The island is 21 miles long and 6 miles wide at its widest point. It has three hills on its E half, the northeasternmost of which forms a good mark in the approach to Cadell Strait or the mission station on Elcho Island. The W coast consists of a series of sandy beaches, separated by rocky headlands and fronted in many places by fringing rock reefs. Large sand dunes predominate behind the beaches. Parts of the island are heavily wooded, particularly the SW end.

Castlereagh Bay (12°07'S., 135°09'E.), entered between the NW extremity of Howard Island and Mjrungga Island, about 17 miles WNW, has not been thoroughly examined, but has depths of 9.1 to 24m in its middle between the dangers which extend from its shores.

Loosli Shoal (12°02'S., 135°16'E.), with a least depth of 1.1m, lies 10 miles ESE of Mjrungga Island and nearly in the middle of the entrance to Castlereagh Bay. Foul ground extends up to 6 miles from the W side of the bay and 2 miles from the E side. The shores are wooded, with low hills within.

The **Woolen River** (12°14'S., 135°10'E.) discharges into the head of Castlereagh Bay, about 4.5 miles WSW of Guy Point, the W extremity of Howard Islet. The channel has depths of 2.7 to 11m in the lower reaches, and river craft are reported to be able to navigate up to 14 miles upstream.

The **Crocodile Islands** (11°44'S., 135°11'E.), consisting of three islands and several islets and rocks, extend nearly 20 miles NE from the coast between Castlereagh Bay and Cape Stewart, about 15 miles NW. Surveys of these islands are not complete, along with discolored water having been reported in several areas in the approach; because of their low nature with surrounding coral reef, considerable caution is required in this vicinity.

2.10 North Crocodile Reef (11°36'S., 135°10'E.), which dries 0.6m, and a shoal patch of 6.4m lying 3 miles N, are the outermost of the known dangers and lies 17 miles NE of Cape Stewart (11°56'S., 134°44'E.). Caution Reef and NE Crocodile Islet lie 7 miles SW and 11 miles SE, respectively, of North Crocodile Reef, with breakers and discolored water between. The NE Crocodile Islet, with trees on it about 24m high, was reported to lie 2 miles farther N in 1984. Discolored water was reported in 1937 about 11 miles SW of NW Crocodile Islet. NW Crocodile Islet was reported to lie about 1.75 miles ENE in 1984.

Mjrungga Island (11°57'S., 135°05'E.), the largest of the Crocodile Islands, lie about 18 miles E of Cape Stewart, with coral reef extending up to 8 miles to the N. The island is low and covered with vegetation and cannot be easily identified from a distance. In 1984, the island was reported to lie 1 mile N of its charted position.

Yabomma Island, about 7 miles SW of Mjrungga Island, is low and wooded. The N shore of the island is ridged with sand dunes up to 18m high, and Hellier Point, the W extremity, is fringed with reef to a distance of 0.3 mile. Numerous coral reefs lie N and W of Hellier Point, with a narrow channel leading between; the channel between Yabomma Island and Mjrungga Island is foul, with dangerous rocks, having a depth of 1.8m, approximately in the middle.

Millingimbi Island lies about 2 miles SW of Yabomma Island, with Boojairagi Islet between. Millingimbi Island, low and wooded, is separated from the mainland by a narrow channel available only to boats. A mission station, marked by two aluminum oil tanks and a wooded pier, is situated on the SE end of the island and is in communication with Darwin by radio and air.

Millingimbi Inlet, the narrow passage between Yabomma Island and Millingimbi Island, is entered 1 mile N of Yabomma Island and E of the reefs off Hellier Point. The channel carries a least depth of 2.1m and is available to small coasters with local knowledge. Mean neap tides rise about 3m, but the channel is intricate, with sharp turns between the reefs, and caution is required.

Cape Stewart to Cape Cockburn

2.11 Cape Stewart (11°56'S., 134°45'E.) separates Castlereagh Bay and the Crocodile Islands from Boucaut Bay to the W. The point is low, wooded, and fringed by reefs. False Point, about 4 miles W, is low, sandy, and bordered by a reef which extends in a ledge 3 miles NNW to Sand Islet, small, low, and surrounded by coral.

Caution.—A historic wreck lies in position 11°41.5'S, 134°36.7'E and is surrounded by a circular restricted area with a radius of 0.43 mile. A wreck, with a depth of 12.2m over it, was reported (2001) to lie 18 miles NW of Cape Stewart. A dangerous wreck, depth 10m, lies in the Arafura Sea, about 38 miles NW of Crocodile Island.

Boucaut Bay (12°00'S., 134°29'E.), entered between False Point and Skirmish Point, about 24 miles W, has a low sandy shore with patches of mangroves scattered on the W part. There are general depths in the bay of 5.5 to 11m, but a 3m patch and a 4.6m shoal lie nearly in the middle of the bay about 13 miles W of False Point. Submerged ledges extend up to 4 miles NNW of Skirmish Point and the sea breaks on the outer portion.

The **Liverpool River** (12°00'S., 134°12'E.), the estuary of which is entered between Skirmish Point and Point Hawkesbury, 23m high and thickly wooded, about 11 miles NW, provides good anchorage for small vessels seeking shelter from the Southeast Monsoon. Although there is a government settlement within the entrance, the estuary and river channel have not been surveyed for a considerable length of time; the channels are not marked or buoyed, and since the tidal currents set across the entrance at rates up to 2 knots, caution is required on entering. Local knowledge is recommended.

Haul Round Islet, the outer islet of the Liverpool Estuary and marked by a light, is a small sand cay about 1.2m high, which is located on the S end of a coral reef about 5 miles E of Point Hawkesbury.

A shoal, with a least depth of 3m, lies about 2 miles SSW of Haul Round Islet, and a shoal area about 2 miles long in a N-S direction, with a least depth of 2.7m, lies midway between the islet and Point Hawkesbury.

Entrance Island, about 4 miles S of Haul Round Islet, is conical in shape and 20m high. It is connected to North East Point, about 2.5 miles SE, by shoal water.

Caution.—Only small vessels should proceed beyond Entrance Island.

2.12 West Point (11°57'S., 134°11'E.), low, sandy, and fringed by reefs, lies about 1.75 miles W of Entrance Island, with the entrance channel between. South West Point, 4.5 miles SSE of West Point, narrows the river entrance and rises to a wooded hummock, 54m high and 0.75 mile within.

Mangrove Bluff (12°05'S., 134°12'E.), fringed with mangrove trees, lies about 2.75 miles S of South West Point and rises about 1 mile within to moderately-high land covered with grass and woods. A conspicuous tower stands 2.5 miles ENE of the bluff.

The main channel lies between Haul Round Island and the extensive shoal area 1.5 miles W, and then between Entrance Island and the reef off West Point. It then leads about 0.85 mile E of South West Point, to which a least charted depth of 5.5m can be carried. It appears the channel can best be run on a course of about 173°, passing 0.5 mile off the W extremity of Entrance Island.

Above **Mangrove Bluff**, the river is narrowed by Bat Island and becomes shoal and tortuous, with the channel generally following the E bank. The mangroves are so thick that landing is not practical and fallen trees make navigation difficult.

Anchorage.—Well-protected anchorage can be taken by small vessels off the S side of Entrance Island, in depths of 5.8 to 9.1m, about 0.2 mile offshore. Depths shoal S of this anchorage and caution is required.

Moderate-size vessels can take anchorage in the channel W of Entrance Island where there are depths of 13 to 20m, mud; the tidal currents reach 2 knots hereabouts and a good watch is required.

Small vessels can anchor about 0.5 mile NE of South West Point, in a depth of 4.6m, or about 1.25 miles SSE of the point, in a depth of 5.5m, mud. The latter anchorage lies about 0.75 mile NW of the government settlement which is in radio and air contact with Darwin.

Caution.—Dangerous wrecks lie about 17 and 41 miles NE of Haul Round Islet. There are two dangerous wrecks, one lying 17 miles NNE of Point Hawkesbury, with a least depth of 18.6m over it, the other 26 miles NE of the same point, with a least depth of 12.2m over it.

2.13 Rolling Bay (11°54'S., 134°06'E.), entered between Hawkesbury Point and a rounded point 3.25 miles WNW, is shoal and foul, with a ledge of rocks and submerged dangers extending out for a distance of 3 miles through the center of the bay. The outer part of this ledge breaks and vessels without local knowledge are recommended not to attempt to enter.

Junction Bay (11°50'S., 133°57'E.), entered between the point W of Rolling Bay and Braithwaite Point, about 10 miles farther NW, has general depths of less than 5.5m except for its center part. The SE side of the bay is moderately elevated and wooded, with some red cliffs, and a stretch of sandy beach which is fringed by rocks to the E and W. There is a projection, in the middle of the NW shore, from which the land close behind rises to a height of 35m. Immediately SW of this projection the land is low and swampy.

Braithwaite Point (11°46'S., 133°56'E.), low and wooded, is heavily fringed by reef. Hall Point, 2.5 miles NW, has a rocky spit extending about 1.5 miles N from it. Rocky ledges fringe the shore across the head of a small bay between Hall Point and Cuthbert Point, about 5 miles W. The land between these points is low, sandy, and continues to SW of the latter point.

Caution.—A depth of 9.1m was reported in 1941 about 57 miles NE of Braithwaite Point; another 9.1m patch lies 6.5 miles SSW of the first patch. The bottom here is irregular and large vessels are recommended to give the area a wide berth.

A line of shoals, with rocks, breakers, and coral heads, extends about 14 miles NE of Braithwaite Point; the outer dangers have not be examined and should be given a wide berth.

A patch, reported in 1999, with a depth of 11.9m lies 13 miles N of Cuthbert Point.

Paxie Shoal (11°26'S., 134°09'E.), with a least depth of 9.4m, coral, lies about 23 miles NNE of Braithwaite Point.

A large shoal area, which breaks near its outer limits, extends 6.5 miles N of Cuthbert Point with several dangers on it having depths of less than 1.8m. The limits of this area extend to Hall Point, about 5 miles E, with depths on the inner part of less than 4m. Shoaling has also been reported (1991) to extend up to 8 miles N of Hall Point. Other dangers NE and E of Hall Point, and up to 25 miles N through NW of Cuthbert Point, may best be seen on the chart.

2.14 Guion Point (11°46'S., 133°40'E.), about 11 miles WSW of Cuthbert Point, is fringed by reefs and has a few rocks N of it. The point, which is wooded, extends W from the coast for about 1 mile and forms the entrance of a sandy bay located between itself and a point about 4 miles SW. The bay has general depths of 3.7 to 5.5m, but a 3.7m shoal lies in the middle of its entrance and a rocky ledge extends about 2 miles N of the W entrance point.

Turner Point (11°45'S., 133°32'E.), about 8 miles W of Guion Point and forming the NW entrance point of the King River, is fringed with rocks and has depths of less than 5.5m extending up to 1 mile to its N.

The **King River** has depths of 5.8 to 7.3m at its mouth, with a depth of 5.5m for about 3 miles within. It trends S and SW with heavily wooded shores, but is narrow, difficult, and only available to boats over most of its length.

The Wellington Range, which attains an elevation of 174m, commences about 8 miles SW of Turner Point and extends about 20 miles W, giving the coast a distinctive rocky appearance in contrast with the low land E of the King River.

Tor (11°56'S., 133°08'E.), an isolated pyramidal rock, 221m high, is located about 19 miles SW of Ross Point and forms a good mark in clear weather.

Barclay Point (11°44'S., 133°24'E.), 7.5 miles W of Turner Point, is the extremity of a low peninsula which extends from the coast to form a small bay on either side. The E bay is encumbered with rocks and has not been fully examined. Anuru Bay, on the W side, had depths of 1.8 to 3m over its greater part, although there is a deeper area on the W side of the entrance. The SW part of the bay dries for a distance of about 0.5 mile offshore and the head of the bay is formed of cliffs.

2.15 Ross Point (11°41'S., 133°21'E.), about 12 miles WNW of Turner Point, is the NE extremity of a range of hills, about 30m high, that forms the NW entrance point of Anuru Bay. Submerged ledges extend about 0.25 mile from the N and S sides of the point.

White Point (11°42'S., 133°18'E.) lies about 3 miles W of Ross Point, and between it and Brogden Point, 16.5 miles NW, there is a bay which has not been closely examined. The shore from about 2 miles SW of White Point is low and sandy with White Rocks, above-water and submerged, extending about 1 mile offshore, about 4 miles SW of the point. A rock, awash, lies about 0.5 mile NW of White Rocks and a little over 1.5 miles off the coast.

Brogden Point (11°31'S., 133°05'E.), 61m high, can easily be identified because of its higher character in relation with the rest of the shore and the cliffs on its S side. The coast between Brogden Point and De Courcy Head, a cliffy projection, 36m high, is not completely examined, but is rocky and reef-fringed.

Cape Cockburn (11°20'S., 132°52'E.), 3 miles W of De Courcy Head, is low and rocky, with drying ledges extending nearly 0.5 mile offshore. A rock, which dries 1.8m, lies 1.25 miles NNE of Cape Cockburn. The cape is wooded to within a short distance of the shore, but is not as conspicuous as De Courcy Head.

The Goulburn Islands

2.16 North Goulburn Island (11°30'S., 133°26'E.), located about 9 miles NNE of Ross Point, is about 7 miles long in an E-W direction and generally low in character, but with a ridge along its N and W shores. It is fringed by rocks in places, mostly along the N shore. A shoal, with a depth of 4.3m, was reported in 1980, 2.5 miles E of the NE extremity of the island. A number of dangerous shoals exist within 9 miles to the NE of the NE extremity and may be seen on the chart.

Mullet Bay, formed between Cone Point and Sand Point at the W end of North Goulburn Island, affords good anchorage sheltered from the Southeast Monsoon, in depths of 11 to 13m, mud, about 1 mile offshore. A rock and a shoal, both with a depth of 1.8m, lie in the S part of the bay; caution is advised.

South Goulburn Island (11°37'S., 133°25'E.), about 2.5 miles S of North Goulburn Island, is generally low and sandy, with a mission station on its S end. The passage between the two islands has depths of 9.1 to 12.8m in its fairway, but a 7.3m patch lies 3 miles SW of Sand Point. This passage has not been completely surveyed, and it has been reported that the coastline and positions of the two islands are not accurately charted, making it difficult to fix a vessel's position when passing through.

South West Bay, on the W side of South Goulburn Island, has a sandy beach backed by cliffs, about 12m high, that are stratified by red and white clay. Bottle Rocks, which are above water, are separated from the N entrance point of the bay by a narrow channel, with a depth of 3.7m; a 5.5m patch lies 1.25 miles WSW of these rocks.

Sims Islet, which lies in the approach to South West Bay, about 3 miles WNW of the S extremity of South Goulburn Island, is formed of large course sandstone with rounded masses over the N part of the island, on which is Sansom Head, 18m high. A 6.4m patch lies about 1 mile SSE of the island.

Aspect.—A mission station is situated on the E side of the S end of South Goulburn Island and is in radio and air communication with Darwin. The station can be reached by a trail from South West Bay.

Anchorage.—Good anchorage can be obtained in South West Bay, in depths of 9 to 11m, about 1 mile offshore. Small vessels can anchor closer to shore in a depth of 5.5m, about 0.25 mile off the beach.

Small craft can anchor in the bay E of the mission station, but local knowledge is required to proceed through the reef which fringes the approaches off the E side of South Goulburn Island.

2.17 Macquarie Strait (11°42'S., 133°25'E.), separating South Goulburn Island from the mainland, is narrow and incompletely surveyed in the approaches. It has a reported depth of 3.7m in the middle of the fairway and a depth of 7m was reported in the E approach in 1968. Tidal currents run at a

rate of about 2 knots, setting SSE on the flood. Only small vessels with local knowledge should attempt this passage.

Islands and Dangers North of Cape Cockburn

2.18 New Year Island (10°54'S., 133°02'E.) lies at the NE extremity of the group of islands and islets that extends up to 27 miles N of Cape Cockburn. It is wooded and fringed by reefs, with deep water within 0.5 mile offshore except at its SW end.

New Year Island Light is shown from a round metal framework tower situated about 0.5 mile W of the E extremity of the islet.

Caution.—Vessels running the offshore track are recommended to pass not less than 6 miles N of New Year Island because of the extent of Bramble Rocks, about 16 miles W.

2.19 Hogmanay Shoal (10°59'S., 133°09'E.), with a least depth of 8.2m, lies 8 miles SE of New Year Island and is about 3 miles long in a N-S direction. Depths in excess of 18.3m lie close N, E, and S of this shoal, with the 20m curve about 1 mile off in all directions.

The Oxley Islets, two in number, lie on a bank about 12 miles WSW of New Year Island and about 20 miles NNW of Cape Cockburn. The N islet, which is low and wooded, is connected to the S islet by a spit which uncovers at low water. A submerged rock lies 1.25 miles E of the S end of the N islet, while a 10.9m shoal lies 1.25 miles W of the S end of the S islet. A depth of 11.9m lies 3.5 miles S of the S islet.

Between the Oxley Islets and New Year Island, surveys are not complete, but irregular depths of 7.6 to 16.5m, coral, with overfalls in places, have been reported in the area from 3 to 10 miles E of the S Oxley Islet.

Bramble Rocks (10°53'S., 132°46'E.), with a least charted depth of 3.6m, lie off the N end of the bank on which the Oxley Islets lie. The northernmost rock is located about 6.5 miles NNW of the N islet and has a charted depth of 4.9m. These rocks lie N of the parallel of New Year Island and are dangerous because of their proximity to the shipping lanes.

McCluer Island (11°04'S., 133°00'E.), 42m high, lies 11 miles SE of the Oxley Islets and is the highest of the islands N of Cape Cockburn. Its N side is heavily fringed by reefs, with a wooded islet located on a spur extending about 1 mile off the NW extremity. The E side is also fringed by a reef extending about 1 mile offshore, but several islets, formed of dead coral, lie close offshore. The SW side of the island is sandy, with depths of 3 to 4m extending up to 1 mile off the beach.

2.20 The **Lawson Islets** (11°04'S., 132°52'E.), two in number, lie about 6 miles W of McCluer Islet, with the N islet on a reef which extends about 0.5 mile from the N and W sides and 1.5 miles from the E side. The S islet, which is smaller, low, and wooded, is located about 2 miles to the SE, but the waters around, and between it and the N islet, have not been completely surveyed. A shoal, with a depth of 10.5m, was reported in 1980 to be 1.5 miles SW of the SW extremity of the Lawson Islets.

Grant Island (11°09'S., 132°55'E.), 32m high, lies about 10 miles N of Cape Cockburn and is the southernmost island in the group. The island is nearly surrounded by a reef and rises to a peak at its NW end, but is low and wooded at the E and SE shores. Depths of less than 5.5m lie up to 1.5 miles S and SE of Grant Islet, with foul ground in this vicinity. In 1988, a shoal with a least depth of 10m was reported 5 miles W of the S end of Grant Island.

Depths between the Lawson Islets and Grant Island are irregular and not fully surveyed; however, soundings of 7 to 8.2m have been taken.

The passage between Cape Cockburn and Grant Island and between the Oxley Islets and Croker Island is wide, deep, and clear with a navigable width of about 6 miles between the 11m curves. Depths of 12.8m and 14.6m were reported on the E side of the passage in 1968. A 10.3m shoal patch lies mid way between Templer Islet and Grant Island.

Money Shoal (10°21'S., 132°44'E.), with a least depth of 3.6m, lies approximately 39 miles NNW of New Year Island and N of the recommended track laid off the N coast of Australia. This shoal is generally formed of coral heads and extends in a NW- SE direction over a distance of about 4 miles.

During the Southeast Trade Wind season, Money Shoal has been observed to break. On the rising tide in the general neighborhood the current sets WNW at rates up to 1 knot and may combine with the coastal currents to set a vessel, which may already be too far N of the recommended track, in the direction of this danger.

Cape Cockburn to High Point

2.21 Mountnorris Bay (11°22'S., 132°43'E.), entered between Cape Cockburn and Darch Islet, about 14 miles NW, affords shelter to small vessels during both monsoons, however, large vessels are recommended not to use it as surveys are reported to be incomplete. Templer Islet, 17m high, lies in the middle of the entrance to the bay, about 8.5 miles WNW of Cape Cockburn, and is surrounded by reef. Depths of 4.6m and 5.9m were reported in 1984, 3 miles NNE and 3.5 miles NE, respectively, of Templer Islet. Cowlard Islet, small and located on a reef, lies nearly midway between Templer Islet and the cape.

Malay Bay (11°23'S., 132°53'E.), on the E side of Mountnorris Bay, is entered between Cape Cockburn and Annesley Point, about 4 miles SSW, and affords good anchorage for small vessels, in depths of 5.5 to 7.3m, for about 2 miles within the entrance. A reef extends nearly 1 mile N of Annesley Point and caution is required.

Valentia Islet (11°23'S., 132°48'E.), 49m high and heavily wooded, lies 2.5 miles W of Annesley Point, with no safe passage between. Reefs and rocks lie along the N shore of the islet and extend about 0.75 mile from the SE extremity.

2.22 Copeland Island (11°29'S., 132°44'E.), 38m high, near the head of Mountnorris Bay, lies 8.5 miles SW of Annesley Point and has a distinctive perpendicular yellow cliff on its N side. The island is surrounded by reefs, and there is no safe passage between it and the mainland, except for boats.

The head of Mountnorris Bay consists mostly of sandy beaches separated by rocky points, but rocks and shoal water extend up to 4 miles offshore on the W side of the bay and only small vessels with local knowledge should proceed in this far.

The land backing the S shore rises on both sides to heights of 89m, and Bay Hill, with a height of 74m, rises directly behind the head of the bay and is conspicuous.

2.23 Croker Island (11°10'S., 132°33'E.), about 23 miles long from Cape Croker to its S extremity, lies separated from the mainland by Bowen Strait, about 16 miles NW of Cape Cockburn. The E shore of the island is generally rocky and backed by hills reaching elevations of up to 41m, but the W side is mostly low and in places sandy. The S end attains the greatest elevation and is heavily wooded.

Cape Croker (10°58'S., 132°36'E.), the N extremity of Croker Island, is a wooded point backed by a conspicuous hummock, 24m high, about 0.75 mile inland. Drying reefs extend nearly 1 mile N of the cape and a 4.3m patch lies about 1 mile farther seaward. The cape is marked by a light.

Britomart Shoal (10°54'S., 132°33'E.), with a depth of 5.5m, lies 5.5 miles NNW of Cape Croker and is the seaward extremity of a spit extending from the cape.

Caution.—During the period from October to December, a strong current sets toward the land in the vicinity of Cape Croker and vessels should make allowance for it.

2.24 Mission Bay (11°10'S., 132°37'E.), located approximately in the middle of the E shore of Croker Island, is entered between a point backed by a 28m high red sandhill on the N, and a rocky point about 2.5 miles S. A rock, which dries 0.9m, lies 0.75 mile NNE of the latter point and breakers were reported in 1961 about 1 mile farther N. There is a mission station at the head of the bay.

Anchorage can be obtained in Mission Bay, in depths of 4.9 to 12.8m, sand, during the Northwest Monsoon, however, caution is recommended during the Southeast Trade Wind season when the sea is driven directly across the entrance.

Darch Islet lies about 14 miles SSE of Cape Croker and 2.5 miles SE of the entrance to Mission Bay. It is thickly wooded and surrounded by reefs which extend up to 1 mile seaward of its E extremity, One Tree Point. A rock lies on the N side which covers and uncovers. In 1988, a shoal with a least depth of 7.9m was reported 2 miles NNE of One Tree Point.

There is a narrow channel, with depths of 8.5 to 12.8m, between Darch Islet and Croker Island, but it has not been closely examined.

2.25 Point David (11°22'S., 132°35'E.), the S extremity of Croker Island, is low, narrow, and stony, with a spit having depths of less than 5.5m extending 3.5 miles ESE from it. The SW coast of the island, between David Point and Adjamarrugu Point, about 13.5 miles NW, also forms the E side of Bowen Strait and is stony and mostly covered with brush.

Palm Bay (11°08'S., 132°29'E.), entered between Adjamarruga Point and a point about 6 miles NNE, affords good anchorage during the Southeast Trade Wind season, in depths of 7.3 to 9m. The NE part of the bay and the area about 2 miles NW of Adjamarrugu Point are fouled with rocks and a reef; caution is required. There is a sandy beach in the SE part of the bay which apparently provides good landing.

Sommerville Bay (11°01'S., 132°30'E.), on the N side of Croker Island, is entered between the W side of Cape Croker and a low wooded point about 6.5 miles SW, off which extends a reef, with Peacock Islet on its outer end, about 1 mile NW. The bay has general depths of 7.3m to 14m, but its shores are reef-fringed and landing appears difficult.

Bowen Strait (11°15'S., 132°31'E.), between the SW side of Croker Island and the mainland, is encumbered with shoals and has only been partially examined. It is reported to be suitable for small vessels, with drafts up to 4.6m, which possess local knowledge to follow the channel E of the shoals in the middle of the strait; however, the E entrance, which is narrow with offlying shoals, appears to carry a least depth of 5.8m and is difficult.

The coast forming the W side of Bowen Strait has been only partially examined and stretches from Mountnorris Bay about 15 miles NW to High Point.

High Point to Port Essington

2.26 Raffles Bay (11°10'S., 132°23'E.), entered between **High Point** (11°13'S., 132°26'E.) and D'Urville Point, about 3 miles W, affords safe anchorage for small vessels with local knowledge, sheltered from all but N winds, in depths of 5.5 to 7.3m. Both entrance points, as well as the shores on either side of the inner bay, are fronted by ledges and rocks which reduce the navigable width of the entrance channel to about 1 mile. The head of the bay is low and covered with mangroves, but there is a cliff on the E side about 2 miles SW of High Point.

Campbell Reef, rocky with a depth of less than 1.8m, lies about 3.5 miles NW of High Point and in the approach to Raffles Bay.

Danger Point (11°07'S., 132°21'E.), a low, narrow point about 8 miles NW of High Point, is fringed with reef and submerged rocks to a distance of nearly 1 mile. A depth of 7.7m has been reported about 3.5 miles NNE of Danger Point; less depths may exist in the vicinity.

Caution.—Jones Shoal, with a least depth of 7.3m, lies about 11 miles NNW of Danger Point and encompasses an area of about 2 square miles.

2.27 Port Bremer (11°08'S., 132°15'E.), situated between Danger Point and Smith Point, about 11.5 miles W, is entered between Sandy Islet No. 1 and Sandy Islet No. 2. Both these islets are low and reef-fringed; the latter is located about 2.5 miles WNW of Danger Point while the former is located about 3 miles E of Smith Point. A monument, 8m high, stands on Smith Point. A shoal, with a depth of 9.1m, was reported 3 miles NW of this point.

The shores of the outer part of Port Bremer are fringed with reefs, and dangerous rocks and sand banks lie up to 3 miles off the coast in places; an isolated 2.3m patch lies about 2.5 miles SW of Sandy Islet No. 2. Sandy Islet No. 1 is connected to the shore SW by reef.

Edwards Point (11°11'S., 132°16'E.), about 6 miles SW of Danger Point, and Kuper Point, 2 miles W, form the entrance to the inner part of Port Bremer, but the channel is restricted by the outer and inner dangers to a width of less than 0.5 mile, and local knowledge is necessary to enter. There are charted depths of 11 to 12.8m in the channel to Stewart Point, about 2 miles SW of Edwards Point, but the inner part of the port is not adequately surveyed and the waters are used for the culture of pearls therefore caution is required.

Caution.—An isolated 2.4m shoal was reported (1996) to lie in the approaches to the inner part of Port Bremer, 3.5 miles NW of Edwards Point.

Anchorage.—Good anchorage can be obtained in Port Bremer by vessels with local knowledge, in depths of 7.3 to 11m, to the E of Stewart Point, where there is shelter from all but N winds.

Port Essington

2.28 Port Essington is an inlet on the N coast of Australia which was originally used as a naval base in the nineteenth century, but let go as a consequence of the climate and the unproductive character of the surrounding country. It is entered between **Smith Point** (11°07'S., 132°08'E.) and Vashon Head, about 8 miles W, but the land on both sides is very low and the approach is somewhat difficult because of the reefs extending from, and off-lying the entrance points.

The inlet, which is about 18 miles long, is divided into an outer and an inner harbor by a spit of land about two-thirds of the way S from the entrance. Both harbors provide good anchorage, the outer harbor for larger vessels and the inner harbor for small vessels with local knowledge.

The small settlement of Victoria, situated on the W shore of the inner harbor, is the only remnant of the original base and is apparently only occupied at certain times of the year.

Orontes Reef (11°04'S., 132°05'E.), dangerous and difficult to sight, lies on the approach to Port Essington, about 5 miles NW of Smith Point. On its S extremity are several rocky heads with depths of 0.6 to 0.9m, and on the N extremity is a rock with about 4.6m of water over it. The sea seldom breaks on this reef, and the reef itself cannot be seen even when close to, as the discoloration of the water is not confined to its immediate vicinity. The shoal is marked by lighted buoys.

2.29 Outer Harbor.—Smith Point (11°07'S., 132°08'E.), on the E side of the entrance, is low and rocky with reef extending nearly 1 mile NW from its N extremity. Some of the rocks near the outer end of this reef are above water, and a depth of 7.4m was reported in 1965 to lie outside its limits about 2 miles NNW of the point. Another shoal, with a depth of 8.3m, was reported (1979) to lie 3 miles NW of Smith Point. A monument, 8m high, stands on Smith Point.

Vashon Head (11°07'S., 132°00'E.), the W entrance point to Port Essington, is low, wooded, and swampy, rising to a 48m hill about 2 miles within. Reefs and foul ground extend nearly 3 miles NNE of the point, with a 0.1m patch on its E edge, about 1.75 miles NE of the head.

Black Point, 2 miles S of Smith Point, is cliffy and covered with trees on its S side. A conspicuous building stands on the shore close N of the point. Reef Point, about 2.25 miles SSE of Black Point, has reef extending nearly 0.5 mile SW from it.

Walford Point, on the W side of Port Essington, lies 5.5 miles SE of Vashon Head and is the NE extremity of a low tongue of land which forms the SE side of Coral Bay. A detached shoal, in approximate position of 11°11'S, 132°05'E, and with a depth of 1.8m, lies 1 mile E of Walford Point.

Turtle Point, moderately high, is located about 3.5 miles SE of Walford Point, with Low Point and Kennedy Bay between. Turtle Point can usually be identified before either Smith Point or Vashon Head, but may be difficult to identify.

Berkeley Bay, on the E side of Port Essington, is entered between Reef Point and Table Head, a low rocky projection 3.5 miles SSE. A rock, which dries, lies about 0.5 mile W of the latter head, with reefs between; a 3.7m patch lies 0.75 mile N of the same point. The shore of Berkeley Bay is formed of several small cliffs from 6 to 9m high with small marshy coves between; a cliff 1.25 miles NE of Table Head is red in color.

2.30 Record Point (11°19'S., 132°11'E.), a long narrow tongue of land, is partially wooded and separates the outer and inner harbors of Port Essington. It is located about 5 miles S of Table Head, with Observation Cliff between.

Saddle Hill (11°18'S., 132°15'E.), 76m high, rises about 3.5 miles E of Record Point, but is sometimes difficult to identify as the surrounding country is thickly wooded.

Knocker Bay (11°18'S., 132°07'E.), entered between Curlew Point and Oyster Point, is located on the W side of Port Essington about 5 miles SW of Table Head. The shores of this bay are bordered by shoal water and patches of reef, but small craft can enter without difficulty. A 3.7m patch lies a little over 1 mile NNE of Oyster Point, just E of the entrance to Knocker Bay. The waters within the bay are used for the culture of pearls.

Anchorages.—During the Southeast Monsoon, good anchorage can be taken between Smith Point and Black Point, about 1 mile NW of the latter, in depths of 9.1 to 11m.

Coral Bay affords anchorage to small vessels, in depths of 5.5 to 7m, sheltered from E winds by Walford Point.

Small vessels and small craft can also seek anchorage in the S parts of Berkeley Bay and Knocker Bay.

2.31 Inner Harbor.—The inner harbor of **Port Essington** is spacious and nearly landlocked, so as to provide good shelter in all winds. It can be entered by moderate sized vessels, but local knowledge is recommended as the shoals NW of Record Point extend into the channel.

Middle Head (11°21'S., 132°12'E.), 2 miles SSE of Record Point, is a wide cliffy projection which rises to a height of 61m and divides the inner harbor into two bays, namely Barrow Bay to the E and West Bay to the W. A spit, with a rock having a depth of less than 1.8m on its outer end, extends a little over 1 mile NW from Middle Head and another dangerous rock lies about 1 mile farther in the same direction.

Barrow Bay (11°20'S., 132°12'E.), with general depths of about 11m, is entered between Record Point and Middle Head and has generally low shores fronted by mangroves, but with the country inland being higher and thickly wooded; the shores of the bay are fringed with mud flats which extend up to 0.5 mile seaward.

2.32 West Bay (11°23'S., 132°10'E.), a shoal bay with depths of 3 to 5.5m, is entered between Middle Head and Minto Head, a whitish cliff about 14m high, 2 miles to the W. The head of the bay is divided into two coves by Mangrove Point, which has a drying spit extending 1 mile NNW from it and mud flats within. Mangrove swamps fringe the shores here and the land is generally low, except at Middle Head.

Tides—Currents.—The flood current sets SE into the entrance of Port Essington, S past Turtle Point, and then SE again into the inner harbor. There is considerable strength to the flow in the narrow parts of the harbor and into the bays. The ebb current generally follows the fairways and sets strongly past Black Point.

Anchorage.—Ocean-going vessels can anchor in the inner harbor of Port Essington just within the entrance to Barrow Bay, in a depth of 11m, about 0.75 mile SSE of Record Point. Small vessels can anchor 0.5 mile E of Minto Head, off the abandoned settlement of Victoria, in a depth of 5.5m.

Caution.—When steering for the entrance of the inner harbor, care must be taken to avoid the 3.7m patch about 1 mile NNE of Oyster Point and the shoal water extending about 1 mile NNW of Record Point. When past the latter, vessels should pass about 0.25 mile off Record Point to clear the dangers on the W side of the entrance.

Port Essington to Cape Don

2.33 Vashon Head (11°07'S., 132°00'E.), the W entrance point to Port Essington, has been previously described in paragraph 2.29.

Wanaraij Point (Wanary Point) (11°08'S., 131°58'E.), 2 miles W of Vashon Head, is low, sandy, and forms. with Arau Point, about 6 miles WSW, the entrance to Trepang Bay. Arau Point, also low and sandy, is covered with mangroves and surrounded by reef which extends up to 1.5 miles offshore. Midjari Point, reef-fringed and wooded, lies about 2 miles SSW of Wanaraij Point, with a shoal bay between. A dangerous wreck is situated approximately 2.5 miles NE of Wanaraij Point.

Trepang Bay (11°11'S., 131°56'E.) has depths of 9 to 11m across its entrance and shoals gradually towards its head, which consists of mud flats and mangroves. It affords good anchorage for vessels with local knowledge, during the Southeast Monsoon, nearly anywhere outside the fringing reefs. A good berth appears to be in a depth of about 10m, with Arau Point bearing approximately 270°; vessels entering should take care to avoid the 9.4m patch about 3.5 miles NW of Wanaraij Point and the reefs extending from the entrance points of the bay.

Allaru Islet, small and sandy, lies about 1.5 miles NW of Araru Point, with a boat channel between its S shore and the reef extending from the point.

2.34 Blue Mud Bay (11°12'S., 131°51'E.), located between Araru Point and Lingi Point, about 4 miles WSW, is almost entirely encumbered with reefs, except for two arms leading to the SE and SW extremities. The shores of the bay are low and sandy on the E side, but overgrown and wooded along the W shore to Lingi Point. Blue Mud Bay offers secure anchorage to small craft, but caution is necessary on entering as the tidal currents sweep around the outer reefs with a rate of up to 2.5 knots.

Popham Bay is entered between **Lingi Point** (11°16'S., 131°49'E.) and **Ardigbiyi Point**, about 4 miles SSW. The shores of the bay are fringed with reefs, except at its head, which shoals gradually to a low mud-filled mangrove swamp. A 34m hill rises on the E side of the inner part of the bay and provides a good observation spot. Bird Islet, 0.75 mile NNE of Ardigbiyi Point, is low, flat, and covered with grass, but it appears to be surrounded by a reef; a 7.3m patch lies about 1.25 miles WSW of the bay.

Alcaro Bay and Christies Bay, both fringed by a reef, lie between Ardigbiyi Point and Cape Don, about 2.75 mile SW. Alcaro Bay is open to the NW and is of little importance; Christies Bay, through which a narrow boat channel marked by stakes has been cut, is entered close NE of Cape Don and leads to a pier, in ruins, at its head. The pier dries at LW, but at HW there is a depth of about 0.9m at the pier.

Cape Don (11°19'S., 131°46'E.), the E entrance point of Dundas Strait, and the W extremity of the Coburg Peninsula, is a low wooded point fringed by reefs and rising to a rounded hill, 51m high, about 1 mile within. Shoal water, with depths of 4.9m to 10m, extends about 1.5 miles NW of the cape, and foul ground consisting of above-water and submerged rocks, lies about 1 mile to the N; Cape Don should be given a wide berth as the tidal currents are strong.

Cape Don Light is shown from a gray concrete tower, 36m high, close within the cape; the tower shows about 15m above the trees.

Van Diemen Gulf

2.35 Van Diemen Gulf (11°50'S., 132°10'E.) is bounded to the N by the Coburg Peninsula, of which Cape Don is the W extremity; to the E and S by the mainland; and to the W by Melville Island. It is entered from the N by Dundas Strait or from the SW by Clarence Strait, and is frequently used by vessels plying between Torres Strait and Darwin.

The gulf, which is approximately 75 miles long in an E-W direction and has a breadth of 45 miles, is heavily encumbered by reef and shoals. Numerous islands and islets border its perimeter and large areas of the E half are not properly surveyed, thus requiring strict adherence to the charted track lines.

The shores of the gulf are generally low, marshy and reef fringed and are difficult to make out with the exception of Cape Don and the hills on the S side of the Coburg Peninsula, and the cliffs and hills at the E end of Melville Island. The E side of the gulf is intersected by numerous rivers of which the largest are the East Alligator Riverand the South Alligator River, both located in the SE extremity of the gulf.

2.36 Dundas Strait (11°20'S., 131°40'E.), the N entrance to the Van Diemen Gulf, is deep, wide, and clear, with irregular depths of over 37m. It is about 15 miles wide between Cape Don and the E extremity of Melville Island and follows a geographic axis of approximately NW-SE. Navigation is relatively easy through the strait, the main consideration being the tidal currents during poor visibility.

Tides—Currents.—The tidal currents in Dundas Strait run with considerable strength during spring tides and cause strong tide rips and a dangerous race, sometimes attaining a rate of 5 knots, off Cape Don. Through Dundas Strait, the current continues to run for about 2 hours after HW or LW at Port Darwin.

During the rising tide the tidal current enters Dundas Strait from N and sets SE past Cape Don; during the falling tide the tidal current sets NNW out of the strait.

During the rising tide, the tidal currents setting S through Dundas Strait and E through Clarence Strait meet about 30 miles ENE of Cape Hotham (12°03'S., 131°18'E.); the uncertainty of this position, however, sometimes renders navigation in this part of the strait somewhat difficult, but vessels can usually maintain an accurate course by close scrutiny of the current tables on the appropriate charts.

In a position 1.25 miles S of Cape Keith (11°36'S., 131°27'E.), 28 miles NNE of Cape Hotham, the tidal current during the rising tide sets SSW, and NNE during the falling tide; both currents have a maximum rate of about 1 knot, but are irregular in duration, the W current having been observed to run nearly continuously for about 22 hours.

From 1.5 to 3 miles SE of Ant Cliff (11°47'S., 131°11'E.), 20 miles SW of Cape Keith, the tidal current sets NE with the rising tide, with a maximum rate of 1 knot; during the falling tide the current sets SW with the same maximum rate.

At a position close S of Abbott Shoal (11°50'S., 131°31'E.), the currents are mainly rotary and attain a rate of about 2 knots at springs.

Depths—Limitations.—The depths throughout Van Diemen Gulf are very irregular, with numerous dangers across its full width. The recommended track between Dundas Strait and Clarence Strait has been well-surveyed and carries a least depth of 11.9m in Howard Channel, the main passage of Clarence Strait. Numerous shoals lie within distances of 0.5 mile of the track line and accurate navigation is required; however, vessels with drafts up to 10m can be taken through on high water neaps.

The E part of Van Diemen Gulf has not been fully surveyed, but is known to contain numerous dangers. Vessels without extensive local knowledge are recommended to keep clear of this part of the gulf, which may contain many uncharted shoals and reefs, and also less water than charted in the supposedly deeper areas.

Pilotage.—Torres Strait Pilots will take vessels to Darwin via Clarence Strait, providing prior arrangements have been made.

Directions.—Vessels proceeding W from Torres Strait or the Gulf of Carpentaria fix their positions on the track line approximately 6.5 miles N of **New Year Island** (10°54'S., 133°02'E.) and then, if so desired, proceed through Van Diemen Gulf via Dundas Strait and Clarence Straits for Port Darwin. This allows for a considerable saving in distance over proceeding W of Melville Island, which must be rounded well offshore to clear the off-lying shoals.

Van Diemen Gulf—West Side

2.37 Soldier Point (11°28'S., 131°32'E.), about 1.5 miles SW of the E extremity of Melville Island, consists of a conspicuous red cliff about 11m high. A 32m hill rises close to the coast about 1 mile NNE of the point and obscures the point from N.

Caution.—The N coast of Melville Island, NW of its E extremity, has not been properly surveyed and should be given a wide berth.

A line of shoals, consisting of Hinkler Patches, Ommaney Shoals, and Renard Shoals, extends up to 12 miles S of Soldier Point, and with depths of 2.4 to 4m, place a considerable danger to southbound vessels proceeding too far W on the flood tide. Small vessels with local knowledge can proceed between Soldier Point and Hinkler Patches or between Ommaney Shoals and Renard Shoals, and take anchorage in the inner channel or Napier Bay. Caution is necessary in the Southeast Monsoon as the ebb tide then raises a short, steep sea.

2.38 Cape Keith (11°36'S., 131°27'E.), 6m high, lies about 9 miles SSW of Soldier Point, with Napier Bay between. The cape is fringed with mangroves, and rises to a height of 27m about 1 mile inland. Baxendell Reef, which lies centered about 2 miles NNE of the cape, dries 0.9m.

Cobham Bay (11°37'S., 131°24'E.), located W of Camp Point, about 2 miles W of Cape Keith, has depths of 4m in its middle and can only be approached by small vessels. The shore of the bay and the coast SW are low and bordered by mangroves.

Conder Point (11°44'S., 131°17'E.), about 14 miles SW of Cape Keith, is awash at high water and has a distinctive clump of mangroves on its S end; there are some conspicuous red cliffs, about 5m high, 0.6 mile W of the point. Nihill Patch, with a least depth of 2.1m, lies 1.75 miles S of Conder Point.

Ant Cliff (11°47'S., 131°11'E.), a small section of red cliff, lies about 6.5 miles SW of Conder Point, and is about 17m high and prominent.

The coast SW of Ant Cliff is described with Clarence Strait, beginning is paragraph 2.44.

2.39 Abbott Shoal (11°50'S., 131°31'E.), with a least depth of 2.4m, lies about 14.5 miles ESE of Conder Point and is best rounded to the SE by all vessels. Abbott Shoal Lighted Buoy, equipped with a radar reflector, is moored close E of this danger, but it should never be wholly relied upon due to the strong tidal currents in the vicinity.

Several shoals lie between Abbott Shoal and Conder Point. Taiyuan Shoals, a long narrow ridge of coral and sand, has a least depth of 2.4m; the NE part of the shoal is marked by eddies. Beagle Shoals have a least depth of 1.2m; they are always marked by discoloration, and, except at slack water, by tide rips, while in bad weather they are marked by breakers. There are deep passages between these shoals, but they are not recommended without local knowledge as the tidal currents, which are strong at times, set directly across these dangers and precise navigation is necessary to clear them.

Giles Shoal (11°42'S., 131°45'E.), a gravel bank with a least depth of 1.5m, and **Wells Shoal** (11°47'S., 131°39'E.), a bank of coarse sand with a least depth of 7m, lie E of the track line about 19 miles ESE and 16 miles SE, respectively, of Cape Keith. An unsurveyed patch of about 18.3m lies about 4 miles N of Gillis Shoal.

Bill Shoal and Taylor Patches, with depths of 6.1m and 7.9m, lie S of the track line about 8 miles and 12.5 miles NE, respectively, of Cape Hotham. Bill Shoal is marked by eddies.

Dangers W of Taylor Patches are included with Clarence Strait, beginning in paragraph 2.44.

Van Dieman Gulf—North Side

2.40 From **Cape Don** (11°19'S., 131°46'E.), the SW side of the Coburg Peninsula trends about 25 miles SE to Warigili

Point and is indented by several unsurveyed bays which are fringed by reefs, offshore rocks, and other dangers.

Fitzpatrick Shoal, with a least depth of 7.3m, sand, shell, and coral, extends from 4 to 7 miles SE of Cape Don, and is reported to be extending farther SE, with tide rips over its seaward extremity.

Burford Island (11°29'S., 131°57'E.), 21m high and covered with mangroves, lies about 15 miles SE of Cape Don and 3.5 miles offshore; the waters around it have not been closely examined.

Warigili Point (11°33'S., 132°07'E.), the S extremity of a headland that forms the SW end of the Coburg Peninsula, is low and reef-fringed. Mount Bedwell and Mount Roe, two conical hills, 130m and 158m high, respectively, lie about 4 miles NW of the point and form a good mark in clear weather.

The Sir George Hope Islands, five in number, lie S and E of Warigili Point and extend in an E-W direction for about 14 miles. Greenhill Island, the W and largest of the group, lies 1.5 miles SSE of the point and has a conspicuous bluff on its NW extremity, off which lies a 4.6m shoal and a dangerous rock, the position of which is doubtful. The S end of the island is reef-fringed and covered with mangroves; the waters to the S and E are not well surveyed.

There is a passage between the N end of Greenhill Island and Warigili Point which is restricted by reefs extending from both sides, but a narrow channel, available to vessels with local knowledge, leads to a protected anchorage, in a depth of about 11m, N of the Sir George Hope Islands.

Warla Islet, 2 miles NE of the N extremity of Greenhill Island, is surrounded by rocks, with a shoal patch close E.

The remaining Sir George Hope Islands extend up to 4 miles E of Greenhill Island and are surrounded by shoal water and foul ground.

Mataram Shoal (11°35'S., 131°52'E.), with a least depth of 1.1m, sand and rock, lies about 8 miles SW of Burford Island. It has not been completely surveyed, but even in calm weather it is marked by heavy overfalls and tide rips.

Christine Reef, which dries 0.3m, lies about 11.5 miles SW of the SW extremity of Greenhill Island and has not been surveyed. Several shoal patches, the positions of some of which are approximate, lie within a radius of 11 miles of this reef, and Mataram Shoals have been reported to extend an unknown distance to the SE of these patches.

Ann Shoals (11°42'S., 132°12'E.) and **Margaret Shoal** (11°46'S., 132°17'E.) lie 5.5 miles and 11.5 miles SE, respectively, of the SE extremity of Greenhill Island. Ann Shoals, with a least depth of 0.4m, extend 3.5 miles in a NW-SE direction, and Margaret Shoal has a large patch of reef, which dries 3m.

Van Dieman Gulf—East Side

2.41 The E side of Van Diemen Gulf is very low and apparently swampy; it has not been closely examined and is difficult to approach because of extensive coastal shoaling.

Endyalgout Island (11°41'S., 132°34'E.) lies within the shore separated from it by shallow creeks; a dangerous drying reef extends a little over 3 miles from the SW end of the island, and Mogogout Islet lies about 3 miles WNW of the islands NW extremity.

The coast S of Endyalgout Island remains low and marshy, with salt water creeks intersecting the lowlands. Aralay Beach, 14 miles S of Endyalgout Island, provides an open stretch available to boats; the land rises slightly to the S.

Mount Borradaile (12°03'S., 132°54'E.), 138m high, rises inland about 17 miles ESE of Aralay Beach.

Van Dieman Gulf—South Side

2.42 **Field Island** (12°05'S., 132°23'E.), located in the SE extremity of Van Diemen Gulf, is low and mangrove-covered. Reefs and foul ground surround the island and extend 2 miles SW to Barron Island, also low and surrounded by reefs.

Beatrice Reef (11°53'S., 132°12'E.), sand and rock, dries on its W end about 14 miles NW of the NW end of Field Island.

Victoria Shoal (11°54'S., 132°02'E.), unexamined and of unknown length, lies with a drying patch of gray sand about 18 miles WNW of the NW extremity of Field Island.

The **East Alligator River** (12°06'S., 128°15'E.), entered 10 miles E of Field Island, between Point Farewell to the W and the coast 3.5 miles E, has depths of about 2.7m in its entrance decreasing to 0.9m about 7 miles within. The river has been examined for a distance of about 17 miles and is about 200m wide.

The **South Alligator River** (12°09'S., 132°26'E.) is entered between Field Island and Midnight Point, about 1.75 miles SE, via Cunningham Channel, with depths of 7.3 to 12.5m in the fairway. The river is navigable for vessels with drafts from 3 to 4.6m, depending on the season, for a distance of about 17 miles above its mouth. The E side of the entrance is low, but the W side rises to Mount Hooper, a wooded range with three peaks rising to about 61m. The river has been explored for a distance of about 36 miles and has soft mud banks thickly covered with mangroves. The surrounding country is mostly flat grass-covered plain with only a few hills to break the level appearance.

The **West Alligator River** (12°13'S., 132°17'E.), entered about 8 miles SW of Field Island, appears shoal and has not been examined. Two drying patches, the W with some rocks on it, lie between the entrance and Field Island, but there appears to be a channel to the S from which the river could be approached.

Caution.—Crocodiles are numerous in the vicinity of the three Alligator Rivers.

2.43 **Finke Bay** (12°13'S., 132°04'E.), entered between the W entrance point of the West Alligator River and Point Stuart, about 21 miles to the W, is mostly shoal and open to the N. Submerged rocks lie about 4 miles offshore in the E part of the bay and drying mud flats extend up to 2.5 miles E of Point Stuart; the land behind this point is low and apparently thickly wooded.

Chambers Bay (12°12'S., 131°36'E.), entered between Point Stuart and Cape Hotham, about 36 miles WNW, is a broad, open bay mostly shoal at its head. Ruby Island and several patches of reef lie in the NW part of the bay, and shoal water, with depths of 0.3 to 1.8m, extends up to 8 miles ENE of Cape Hotham.

Barbara Shoal (11°53'S., 131°45'E.), with a least depth of 3.7m, lies about 21.5 miles NNW of Point Stuart.

Caution.—Vessels without extensive local knowledge are recommended to give the S shore of Van Diemen Gulf a wide berth.

Clarence Strait

2.44 Clarence Strait, the W entrance to Van Diemen Gulf, leads between **Cape Gambier** (11°56'S., 130°58'E.), the S extremity of Melville Island, and Gunn Point and Cape Hotham on the mainland, 13 miles to the S, and 20 miles ESE, respectively. This passage is heavily encumbered by islands, reefs, and shoals, but is divided into three channels, namely, North Channel, Howard Channel, and South Channel, the middle of which, Howard Channel, is marked and available to ocean-going vessels.

Tides—Currents.—In Clarence Strait, mean spring tides rise about 4.4m and mean neaps rise 3.4m. Mean low water neap tides usually maintain a rise of about 1m above datum. The least charted depth in the fairway of Howard Channel is 11.9m.

The rate of the tidal currents during mean spring tides is about 4 knots. During extreme high water, spring tidal current rates of about 6 knots have been observed. The best time for large vessels to transit the strait is about 2 hours before HW at Darwin, when the rate is about 0.5 knot.

Pilotage.—Torres Strait pilots will take vessels with drafts up to 9.1m, from Torres Strait to Darwin via Clarence Strait.

Caution.—The position of the lighted buoys marking the shoals in the approaches to Howard Channel should never be wholly relied upon because of the strong tidal currents in this area. Both buoys are equipped with radar reflectors and may show on the screen before the surrounding coastal features.

2.45 Cape Hotham (12°03'S., 131°18'E.), a low wooded promontory fringed by a reef, is the SE entrance point of Clarence Strait and forms a good mark when approaching from NE.

Cape Hotham Light is shown from a white metal framework tower, 16m high, situated about 0.6 mile WSW of Cape Hotham.

Caution.—A rocky spit extends about 1 mile N of Cape Hotham, and Howard Knoll, with a depth of 4.1m, lies 1.75 miles N of the cape.

Bill Shoal, Taylor Patches, and the dangers E of Cape Hotham have been previously described in paragraph 2.39.

2.46 Escape Cliff (12°08'S., 131°15'E.), reddish in color and about 8.5m high, rises about 6 miles SSW of Cape Hotham and forms a good mark from NW in clear weather.

Adam Bay (12°09'S., 131°12'E.), centered between Escape Cliff and Point Stephens, about 5.5 miles WSW, is the estuary for **the Adelaide River** and provides shelter and anchorage for small vessels with local knowledge. Vessels up to about 200 tons can enter by steering SW for the low red cliffs on Point Stephens and then pass W of Middle Bank and the shoals NW of it. Vessels may anchor, in depths of 4 to 8.8m, in an area known as Port Daly, 0.1 to 0.2 mile SE of Ayers Point.

The Adelaide River can be ascended by small vessels drawing up to 3m for a distance of about 40 miles to the bridge carrying the Arnhem Highway.

Stephens Bank (12°07'S., 131°11'E.), with a least depth of 3m, extends up to 4.75 miles NE of Point Stephens; it is covered by the red sector of Cape Hotham Light and should be given a wide berth.

Glyde Point (12°10'S., 131°07'E.), about 2.5 miles WNW of Point Stephens, is fringed by mangrove and fronted by a reef to a distance of 0.75 mile. The land behind these points is covered with trees rising only to a moderate height; the point is visible only in good conditions.

Gunn Point (12°10'S., 131°00'E.), the SW entrance point of Clarence Strait, is fronted by Gunn Reef, which extends up to 2.25 miles offshore and dries 4.3m. The point is heavily-fringed with mangroves and the land about 3 miles S of it rises to a height of 55m at the top of the trees.

Foelsche Bank, with a least depth of 0.5m, extends about 3 miles SW from the NW extremity of Gunn Reef, with depths of less than 10m extending 3.25 miles farther W.

2.47 Vernon Island (12°03'S., 131°05'E.), consisting of East Vernon, North West Vernon, and South West Vernon, are three wooded, coral islands, each surrounded by a reef, which lie on the S side of Clarence Strait. The trees on all of these islands reach heights of 18 to 21m and the reefs, which are generally steep-to, are entirely covered at HW. East Vernon Island and North West Vernon Island are completely covered with mangroves, but South West Vernon Island, with trees near its center, is only fringed with this growth.

Knight Reef (12°01'S., 131°06'E.), which dries up to 2.7m, lies close NE of the reef extending 3 miles E from North West Vernon Island. A sand bank on the E end of the reef dries 3.3m and can give a deceptive view of the extent of this danger when just drying out. A shoal, with a depth of 6m, was reported in 1980, about 0.75 mile NW of Ward Point, the W extremity of North West Vernon Island.

East Vernon Island Light is shown from a red metal framework tower on concrete piers close off the S point of the island.

South West Vernon Light is shown from a white fiberglass structure, 3m high and fitted with a radar reflector, on the N extremity of the island.

North West Vernon Island Light is shown from a white hut on a steel pile structure, 9m high, about 0.4 mile NW of Ward Point.

Cape Gambier (11°56'S., 130°58'E.), the S extremity of Melville Island, is low and covered by mangroves, with a reef extending about 1.5 miles to the S and up to 4 miles NW along the coast. An extensive coastal bank, with depths of less than 6m, extends up to 14 miles E of the cape, almost to the meridian of Ant Cliff, and nearly 10 miles offshore. Dangerous reefs and rocks extend SSE from Cape Gambier almost to North West Vernon Island, and with the exception of North Channel, nearly block the N part of Clarence Strait. Hancox Shoal, with a least depth of 3.2m, coral, lies about 5 miles SSW of the cape.

2.48 Howard Channel (12°05'S., 131°05'E.), the main shipping channel through Clarence Strait, leads between East Vernon Island and North West Vernon Island, on the N side, and South West Vernon Island, on the S side; it is deep, and the only channel used by large vessels. It is entered from the E by passing S of Rooper Rock, and from the W by passing N of

Marsh Shoal, and then proceeding on the recommended track. Complete reliance should not be placed on the lighted buoys being in their charted positions.

Rooper Rock (12°04'S., 131°11'E.), with a least depth of 5.5m, lies 5.75 miles E of East Vernon Island Light and on the N side of the recommended track. When the tidal currents are running with considerable force, there is a heavy race over this rock.

A dangerous wreck exists approximately 0.4 mile SE of Rooper Rock. A lighted buoy is moored about 0.3 mile SSE of Rooper Rock.

An extensive shoal, with a depth of 8.2m near its outer extremity, extends about 2.5 miles E of the SE extremity of East Vernon Island; depths of less than 11m extend up to 0.35 mile off the S side of the island and narrow the navigational channel to about 0.65 mile between the 11m curves to the N and S of the track. The center of the fairway has a least depth of 11.9m in this vicinity and requires accurate navigation by deep-draft vessels.

2.49 Henry Ellis Reef (12°05'S., 131°01'E.) and Van Waerwyck Reef, which dry 0.9m and 0.3m, respectively, lie between 0.75 mile and 1.5 miles NW of South West Vernon Island Light. Another drying reef lies between the former and the NW side of the island.

Marsh Shoal (12°06'S., 130°57'E.), with a least depth of 2.1m, is a extensive shoal area centered about 5 miles W of South West Vernon Island Light. The N side of this shoal is generally steep-to, but numerous patches of less than 11m extend up to 3 miles SW.

Lighted Buoy No. 4 is charted about 0.25 mile NW of Marsh Shoal and the recommended tracks pass N and W of it. Vessels are again cautioned to navigate with fixed aids when rounding this shoal.

Wood Rock, with a least depth of 5.5m, lies on the N side of the fairway, about 2.25 miles WSW of Ward Point, the W extremity of North West Vernon Island.

Several patches, with depths of 10.5 to 11m, lie from 5 to 7.5 miles W of Ward Point.

The recommended track SW from Marsh Shoal is continued under the Approaches to Port Darwin in paragraph 2.60.

2.50 North Channel (12°00'S., 131°05'E.) leads between the reefs extending from Cape Gambier, on the N side, and Knight Reef and the reefs off North West Vernon Island, to the S. There are no clearing marks for any of the dangers in the channel and it can only be navigated in daylight, preferably at LW when the reefs can best be seen. In the narrowest part, between Oliver Reef and the reef extending from North West Vernon Island, the fairway has a width of about 0.75 mile between the 11m curves, but the water shoals rapidly within these limits. Prince Knoll, with a depth of 6.4m, lies about 2.25 miles ENE of Oliver Reef and may not be visible even at low water.

North Channel should not be attempted by large vessels; small vessels using it are recommended to have local knowledge as the tidal currents are strong and set across the fairway in places.

South Channel (12°08'S., 131°02'E.) leads between the S side of South West Vernon Island and the coastal reef which extends from Glyde Point to Gunn Point. There are no marks for clearing the reefs when they are covered and the channel is only used by local coasters and small craft.

A line of dangers extends 2.5 miles E from the E end of the reef off South West Vernon Island, and has a least depth of 1.2m near its outer end. The bar S of these dangers has a depth of 7.3m, but local knowledge is required to cross it.

Melville Island

2.51 The coasts of **Melville Island** (11°30'S., 131°00'E.) are generally low and, with the exception of the SE shore, which is described in paragraph 2.35 with Van Diemen Gulf, are unsurveyed or only partially examined. Numerous bays indent the shores, some leading to mangrove-fringed rivers which extend up to 15 miles into the interior of the N shore. The hills within the coast are mostly wooded and terminate in a series of low cliffs, generally in the vicinity of the NW part of the island. The hills near the S and SW shores, 6 to 11 miles within Cape Gambier (11°56'S., 130°58'E.), rise to heights of 76 to 120m, but with the exception of Notch Peak, are difficult to identify.

Point Jahleel (Point Jaheel) (11°11'S., 131°17'E.), the NE extremity of Melville Island, is mostly low, reef-fringed, and covered with mangroves and trees. Elphinstone Reef, with a least depth of 1.2m, lies about 6 miles ESE of Point Jahleel and nearly 3 miles offshore; the flood tidal currents set down on it at a rate of 2.75 knots, and it should be given a wide berth.

In 1971, a depth of 7.9m was reported about 4 miles N of Jahleel Point, and a depth of 8.5m was reported about 9 miles NW of the point. The coast SE of the point, to the E end of the island, is formed by several sandy bays, but has not been surveyed.

Smokey Point (11°15'S., 131°09'E.), about 8.5 miles WSW of Jahleel Point, is reef-fringed and shoal. Breton Bay, E of Smokey Point, leads to the Johnston River, but has not been surveyed and appears dangerous.

2.52 Radford Point (11°18'S., 130°54'E.), about 15 miles WSW of Smokey Point, is rocky with foul ground extending about 1.25 miles from it. Madford Shoals, two drying patches which usually break, lie 3 miles NE and 3.5 miles ENE, respectively, from the point. Shoal water, with a depth of 7.3m on its outer extremity, extends about 20 miles WNW of the same point.

Lethbridge Bay, with depths of 4.6 to 5.5m just within its entrance, lies about 7 miles ESE of Radford Point and is occasionally used during the Southeast Monsoon as an anchorage for small vessels.

Burra-burra Head (11°22'S., 130°42'E.), with conspicuous red cliffs extending up to 1.5 miles SW, lies about 8 miles WSW of Radford Point. Laxton Reef, which dries 5m, and Saunders Patch, with a depth of 2.5m, lie 1.25 miles NW and 3 miles NNW, respectively, of the head.

Cape Lavery (11°20'S., 130°39'E.), the N extremity of a peninsula, lies about 15 miles W of Radford Point and is low and surrounded by shoal water. Karslake Island, 41m high at the tree tops, lies a little over 1 mile N of Cape Lavery, with foul ground extending about 1 mile farther NW.

Snake Bay, entered E of Karslake Island, has general depths of 6 to 8m, but shoals rapidly between Cape Lavery and Brown Point, 4 miles SE.

Anchorage can be found, in 5.5m, good holding ground, about 0.4 mile WNW of Brown Point. A narrow channel, entered over a bar with a depth of 5.2m, lies close E of the peninsula S of Cape Lavery, and leads to an estuary between Curtis Haven. A native welfare settlement is situated on the W shore of the channel about 5 miles S of the cape, but only small vessels with local knowledge can reach it.

Shark Bay, entered between Karslake Island and Purumpenelli Point, about 3.5 miles W, is narrowed in its outer part to a width of about 1 mile by dangerous foul ground. Within the entrance, the bay widens somewhat and has depths of 3 to 5.5m, but it shoals rapidly toward its head.

2.53 Cape Van Diemen (11°10'S., 130°23'E.), the NW extremity of Melville Island, terminates in a low sandy point, from which a spit of sand and rock, with numerous drying sand cays, extends about 6 miles to the NNW.

From the NE extremity of Cape Van Diemen, the coast is formed by a line of low cliffs extending intermittently 8.5 miles SE and terminating in a coastal hill about 34 miles high. Although radar returns may be received from these cliffs by vessels on the offshore track, considerable difficulty would probably be experienced in determining an exact position from them.

Mermaid Shoal (11°09'S., 130°13'E.), an area of foul ground with depths of less than 5.5m and with numerous submerged rocks, extends up to 18 miles W of Cape Van Diemen. The N side of this shoal is steep-to, with overall depths of 7.3 to 18m.

The S side of Mermaid Shoal forms the N side of the approach and entrance to St. Asaph Bay at the N end of Apsley Strait. This area has only been partially examined and less depths than charted may exist.

Off-lying Dangers

2.54 Goodrich Bank (10°42'S., 130°19'E.), with a least depth of 12.8m, gravel, lies about 27 miles N of Cape Van Diemen and about 4 miles N of the recommended track.A depth of 16.1m lies about 21 miles WSW of Goodrich Bank.

Cootamundra Shoal (10°51'S., 129°13'E.), with a least depth of 14.8m, lies about 71 miles WNW of Cape Van Diemen.

Calder Shoal (10°51'S., 129°04'E.), with a least depth of 20.6m, lies about 9 miles W of Cootamundra Shoal. Vessels proceeding to the Philippine Islands from Darwin, or from N of Melville Island, proceed on the recommended track about 5.5 miles SW of this shoal.

Marie Shoal (10°55'S., 130°06'E.), with a least depth of 8.9m, lies about 22.5 miles NW of Cape Van Diemen. The recommended track for vessels proceeding to Port Darwin from NNW of Cape Van Diemen passes 3 miles NW of this shoal. A depth of 16.5m and discolored water were reported (1977) close S of the southernmost recommended track, 4.5 miles WNW of Marie Shoal.

Parry Shoal (11°12'S., 129°42'E.), composed of coral on which the sea occasionally breaks, has a least depth of 10.2m and lies about 40 miles W of Cape Van Diemen.

2.55 Moss Shoal (11°08'S., 129°55'E.), steep-to and with a least depth of 7.6m, lies about 27 miles W of Cape Van Diemen and 4.5 miles E of the recommended track for Port Darwin. Vessels rounding this shoal from NE set their course on 169° to proceed to a position about 8.5 miles NW of Cape Fourcroy (11°47'S., 130°01'E.), and then steer S for the main Darwin tracks.

Mesquite Shoal (11°13'S., 130°01'E.), steep-to on its W side, has a least depth of 5.5m and lies about 21 miles WSW of Cape Van Diemen.

Caution.—Lynedoch Bank (10°02'S., 130°49'E.), with a least known depth of 9.8m, sand and coral, lies about 72 miles NNE of Cape Van Diemen.

Evans Shoal and Franklin Shoal, each with a least known depth of 9.1m, coral, and Flinders Shoal, with a least known depth of 6.8m, coral, lie grouped in an area centered about 95 miles NW of Cape Van Diemen. These shoals and the surrounding waters have not been closely examined and less depths than charted may exist.

Loxton Shoal (9°36'S., 128°43'E.), with a least known depth of 10.3m, coral, lies about 136 miles NW of Cape Van Diemen. Several shoals, including Martin Shoal, Troubadour Shoals, and Sunset Shoal, all lie within a radius of about 23 miles to the E, S, and W of Loxton Shoal. The least depth charted in this area is 7.5m, but the general vicinity has not been closely examined and lesser depths than charted may exist.

Apsley Strait

2.56 Apsley Strait (11°30'S., 130°25'E.), which separates Melville Island from Bathurst Island, can be entered at its N end by small vessels with local knowledge. The S part of the strait is narrow and tortuous with numerous rocks in the channel, and generally only used by small craft.

St. Asaph Bay and Port Cockburn, just within the N entrance to Apsley Strait, are deep and wide and provide good anchorage for vessels able to enter. The land on both sides is generally low and thickly wooded, with numerous palm trees along the shores.

The Narrows (11°17'S., 130°18'E.), at the N entrance to Apsley Strait, is restricted to a width of about 1 mile by the S side of Mermaid Shoal and the N end of a sandy spit extending from Brace Point, the N extremity of Bathurst Island. During daylight, vessels with local knowledge can enter in a depth of about 9.1m by steering for the S wooded extremity of Piper Head bearing 090°, until Luxmore Head, about 5 miles SSE, can be steered for on an approximate SE bearing. Considerable caution is required as there are no channel aids available. A depth of 1.5m lies on the S side of the channel 3 miles NW of Brace Point.

Caution.—When proceeding against the outgoing tide, a wide berth should be given to the sandy spit extending N from Brace Point, as the tidal current sets over it with significant strength when it is covered.

St. Asaph Bay (11°19'S., 130°22'E.), entered between Piper Head and Brace Point, has general depths of 13 to 22m over a width of about 2 miles. Luxmore Head, at the SE end of the bay, consists of a series of rocky points with red cliffs to the S. The whole of the E shore is fronted by a rocky reef, and the land within is generally low and wooded.

The W shore of St. Asaph Bay is fringed by sandy beaches forming small bays where landing can be easily effected. The land rises gently within and several fresh water streams flow from the hillsides.

Caution.—Mariners should navigate with caution due to discolored waters in the approach to St. Asaph Bay.

Port Cockburn (11°22'S., 130°23'E.), immediately S of St. Asaph Bay, extends SSE to Harris Islet about 5 miles from Luxmore Head. The E shore, consisting mostly of steep red cliffs backed by trees, is fringed by shoal water with numerous rocky heads, but the W shore is generally deep and clear of dangers. Garden Point, 4 miles SSE of Luxmore Head, is fronted by a reef which extends nearly 1 mile to the WNW; a mission station equipped with a radio and an airstrip, is situated on the point.

Tidal currents at the W entrance to the narrows set E on the flood and W on the ebb, with a maximum rate of about 2 knots at springs. The rate is about the same in the approach to Port Cockburn but somewhat less in St. Asaph Bay, which is wider and less restrictive.

2.57 The S part of Apsley Strait, from **Harris Islet** (11°26'S., 130°24'E.), takes a SSE direction for about 30 miles with general depths of 7.3 to 26m; it has never been thoroughly examined, and uncharted dangers may exist. Near the S entrance the depths become very irregular, the channel being encumbered with rocks and drying shoals. These dangers, together with the strong tidal currents which sometime attain a rate of 4 knots, render Apsley Strait unsuitable in its entirety except for powerful small craft with local knowledge.

The shores are mostly low and covered with mangroves, with no noticeable features except for the entrances to the various rivers emptying into the strait.

Medina Inlet (11°51'S., 130°35'E.), the S entrance to Apsley Strait, is only about 0.5 mile wide. It attains a NE-SW direction from close off the SE extremity of Bathurst Island. The radio tower on Mission Hill, about 4 miles NW of the SE extremity of Bathurst Island, is prominent. Tidal currents follow the general direction of the channel and can reach 4 knots at springs. Pilotage is not available and local knowledge is recommended. The channel, with a least depth over the bar in 1996 of 3.7m, leads E of the shore of Bathurst Island. A drying ridge extends about 5 miles SW of Buchanan Island and forms the SE side of the channel, but the waters to the W and S are unsurveyed. A mission station is situated off the E end of Bathurst Island where Medina Inlet meets Apsley Strait.

Bathurst Island

2.58 The NW and S coasts of **Bathurst Islet** are unsurveyed, with the exception of the waters about 12 miles N and W of Cape Fourcroy, the SW extremity. The NW shore of the island is formed of a series of bays and inlets and fronted by rocky shoals which extend some distance offshore. The land backing the coast is generally wooded with mangroves thickly formed within the inlets. The N end of the island is mostly low with a few small hills rising above the woodlands, but the S shore is high and cliffy with heights of over 61m closely backing the coast. The island is separated from Melville Island by Apsley Strait, previously described in paragraph 2.56.

Brace Point (11°19'S., 130°20'E.), the N extremity of Bathurst Island, is low and poorly defined. A sandy spit extends about 2.5 miles N of the point and coastal shoaling, the limits of which have not been defined, extends 3 to 4 miles offshore between the point and Rocky Point, 16 miles SW.

Rocky Point (11°29'S., 130°09'E.), the NW extremity of Bathurst Island, is fringed by reefs and fronted by submerged rocks to a distance of up to 3 miles offshore between its S extremity and Caution Point, 4 miles NNE.

Clift Islet lies close to the shore, 4 miles SSE of Rocky Point. The area between the point and this islet and up to nearly 6 miles offshore, has not been examined.

Gordon Bay (11°39'S., 130°07'E.), entered between Clift Islet and Cape Helvetius, about 9 miles SW, affords good shelter during the Southeast Monsoon for small vessels with local knowledge.

Twin Cliffs, with a sandy cove indenting the shore between them, lie on the SE shore of Gordon Bay; there is a sandy beach between them and Cape Helvetius. Port Hurd, an inlet entered about 3 miles NE of Twin Cliffs, is deep and about 0.5 mile wide; however, it is fronted by a bar with a depth of 2.7m.

2.59 Cape Fourcroy (11°48'S., 130°01'E.), the SW extremity of Bathurst Island, is faced by conspicuous dark red cliffs from 9 to 12m high; a sand hill, about 20m high, lies about 1 mile NNE of the cape. Reefs and foul ground extend up to 0.75 mile off the cape and a shoal, with a depth of 5.5m, lies about 2.5 miles to the NNW. A light is shown from a 15m high white metal framework tower on the cape.

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Cape Fourcroy

From a distance Cape Fourcroy and Cape Helvetius, 7 miles NNE, somewhat resemble each other, but the former can be identified by the light and other buildings on it. Caution is required by vessels passing W of the capes during poor visibility, as radar returns from Cape Fourcroy have been reported poor and vessels may find themselves approaching Cape Helvetius, from which shoal water extends nearly 7 miles to the NNW.

The S side of Bathurst Island from Mitchell Point, about 3.5 miles SE of Cape Fourcroy, is formed by a line of prominent

sand hills and cliffs extending about 27 miles E nearly to the SE extremity of the island.

Radar Hill (11°50'S., 130°05'E.), a conspicuous sand hill about 56m high, with a cliff at its base, rises about 2 miles E of Mitchell Point, and, along with Penguin Hill, 69m high and conical, about 1.5 miles E, forms a good mark from S.

Castle Hill (11°48'S., 130°11'E.), about 1.25 miles long in an E-W direction, rises to a height of 61m about 7 miles E of Mitchell Point. A radio tower stands 2.75 miles NE of Castel Hill. Lubra Point, fringed by reefs, is located about 1 mile E of the hill, and a cliff, approximately 30m high and nearly 1 mile long, is located on the shore, about 3.5 miles ENE of the point.

The coast from the latter cliff trends ENE for 3.5 miles, and then 18 miles ESE, to the entrance of Medina Inlet. The shore is closely backed by wooded hills rising to heights of about 105m, with two stretches of cliffs, about 37m and 30m high, located 13 and 18 miles E, respectively, of Lubra Point.

Approaches to Port Darwin

2.60 Beagle Gulf (12°10'S., 130°19'E.), entered between Mitchell Point on the N and **Point Blaze** (12°56'S., 130°08'E.) to the S, forms the W approach to Clarence Strait and Port Darwin. It is generally deep, wide, and clear, but requires caution to avoid the shoals fronting its shores and head. Shepparton Shoal, described below, lies in the middle of the entrance to the gulf and vessels are recommended to keep clear of it, especially in heavy weather.

The coast from **Charles Point** (12°23'S., 130°37'E.), for a distance of 25 miles SW, is fronted by shoals and reefs which extend up to 20 miles offshore in places, and vessels approaching Beagle Gulf from W or SW should steer to round the outer dangers at a distance of at least 6 miles before turning in for the entrance of Port Darwin.

Newby Shoal (11°52'S., 129°11'E.), with a least depth of 12.8m, lies about 50 miles W of Cape Fourcroy and is apparently of coral formation. A bank, with a least depth of 15.8m, lies about 25 miles NE of Newby Shoal.

Shepparton Shoal (12°06'S., 129°53'E.), with a least depth of 11.3m, sand and coral, lies 20 miles SSW of Cape Fourcroy. A heavy swell may build up over this bank during the Northwest Monsoon.

2.61 Afghan Shoal (11°54'S., 130°08'E.), with a least depth of 1.2m, extends 7.5 miles ESE from a position 3.5 miles S of **Mitchell Point** (11°49'S., 130°03'E.). This shoal lies partially outside the arc of visibility of Cape Fourcroy Light, and the early part of the ebb tidal current sets down on it from S.

A shoal, with a least depth of 6.4m, lies about 19 miles E of Afghan Shoal.

The historic wreck of a Japanese submarine lies about 13 miles S of Afghan Shoal and a protected zone, with a radius of 500m, within which unauthorized activities are prohibited, has been established around the wreck.

Lorna Shoal (12°21'S., 130°19'E.), the northernmost of the dangers fronting the shore SW of Charles Point, consists of four patches with a least depth of 3.2m centered about 18 miles W of the point. No attempt should be made to pass S of this shoal as numerous dangers, both drying and submerged, lie to the SE.

2.62 Fenton Patches (12°12'S., 130°43'E.), with a least depth of 13.1m, consist of an area of irregular soundings centered about 12.5 miles NNE of Charles Point. Vessels approaching Port Darwin from Clarence Strait pass SE of Fenton Patches. A wreck, marked on its NW side by a buoy, lies close NW of Fenton Patches; obstructions lie about 1 mile SE and 1 mile S of this wreck and have a least depth of 9m.

Moresby Shoals, Lowry Shoal, and Skottowe Shoal, with least depths of 5.7m, 6.3m, and 8.4m, respectively, are a series of scattered patches centered about 14 miles WSW of Cape Gambier (11°56'S., 130°58'E.). Vessels are cautioned to keep clear of this area, as surveys N of these dangers are incomplete and navigation in their vicinity would be difficult.

Directions.—Vessels approaching Port Darwin from Torres Strait generally use Clarence Strait proceeding on the recommended tracks. From a charted position about 1 mile N of Marsh Shoal Lighted Buoy, a course of 223°30' leads to the general vicinity of Charles Point Lighted Buoy No. 5.

Vessels not wishing to use Clarence Strait proceed to a position 30 miles NW of Cape Van Diemen (11°10'S., 130°23'E.) and then steer 213°, passing midway between the charted 14.6m and 16.4m depths, to a position 5 miles WNW of Moss Shoal. From this position steer 169° to a position 10 miles 325° from Cape Fourcroy Light. From the latter position, a course of 180° is steered for a position 9 miles 218° from the same light, and then 119° for the vicinity of Charles Point Lighted Buoy No. 5.

When coming from W follow the track indicated on the chart, passing approximately 5 miles N of Lorna Shoal; then steer 101°30' for the vicinity of Charles Point Lighted Buoy No. 5.

Entrance to Port Darwin

2.63 Port Darwin is an estuary of considerable size and is approached between Lee Point (12°20'S., 130°54'E.) and Charles Point, about 17 miles WSW. The W side of Port Darwin, from Charles Point to Talc Head, is described; then the E side of Port Darwin, from Lee Point to Fort Point is described. Channel dangers are then described from N to S.

Charles Point (12°23'S., 130°37'E.) is low and faced by reddish cliffs on its E side; a rocky ledge, which dries, extends 0.5 mile NW from the point, and shoal water with depths of less than 1.8m, extends 1.5 miles to the NE.

A light is shown from a conspicuous red and white framework tower standing about 1 mile ESE of the point. Radio masts stand about 1.5 miles SSE and 8.5 miles SE of the light structure.

The coast between Charles Point and **West Point** (12°26'S., 130°46'E.), 9 miles ESE, is low and is fronted by a coastal bank, which dries and has rocky ledges on it. Several shoal patches exist between the coast and Charles Point Patches, 4 miles NE. A pier extends out to a depth of 3m, about 0.4 mile SSE of West Point. A dangerous wreck lies about 0.8 mile ESE of the head of the pier.

Lighted Buoy No. 5 (12°20’S., 130°42’E.), Lighted Buoy No. 6 (12°25’S., 130°47’E.), Lighted Buoy No. 7 (12°24’S., 130°45’E.), Lighted Buoy No. 8 (12°28’S., 130°50’E.), and Lighted Buoy No. 12 (12°29’S., 130°51’E.) are equipped with AIS.

2.64 Talc Head (12°29'S., 130°47'E.), 2.5 miles SSE of West Point, is a conspicuous narrow cliffy promontory, 19m high, that is covered with brush. It forms a useful mark in making for Port Darwin.

Lee Point (12°20'S., 130°54'E.), on the E side of the approach, is low, with rocky ledges extending nearly 1 mile NNW of it.

A conspicuous hospital, with a chimney 73m in elevation, stands about 1.5 miles SSW of Lee Point; it is a useful aid when approaching from W.

Angler Reef, with depths of less than 1.8m, lies 1.75 miles NW of Lee Point.

Night Cliff (12°23'S., 130°51'E.) is located 3.75 miles SW of Lee Point; the coast between is fronted by a drying bank of weed, sand, and mud and is fringed with casuarina trees. Old Man Rock, which dries 5.6m, lies 2.5 miles SW of Lee Point. A conspicuous water tower stands at an elevation of 39m, about 0.5 mile S of the NE end of the cliff; a second water tank stands about 0.25 mile ESE of the water tower.

An aeronautical lighted beacon is occasionally shown from a conspicuous water tank about 3 miles SSE of Night Cliff. An aeronautical radiobeacon transmits from a position about 5.5 miles E of the lighted beacon.

2.65 East Point (12°25'S., 130°49'E.), about 3.5 miles NE of West Point, is formed of cliff and attains a height of 22m. Drying reef fronts the point for a distance of 0.35 mile.

Emery Point (12°27'S., 130°49'E.), about 3 miles S of East Point, is formed of low cliffs about 6m high. A sand bank, which dries up to 3.9m on its S part, extends 2 miles N of the point.

Emery Point Light is shown from a white, metal framework tower on the extremity of the point. A red sector of the light covers the above sand bank. When entering, vessels steer for this light between the bearings of 135° and 139°. It has been reported (2000) that the light structure has been difficult to locate during the day.

Elliott Point (12°28'S., 130°49'E.), about 0.3 mile SSE of Emery Point, is a cliffy promontory 10m high.

The Naval Base is situated about 0.35 mile SE of Elliott Point; the approach between the breakwaters is indicated by a range which is shown on the chart.

Fort Point (12°28'S., 130°51'E.), about 2 miles SE of Emery Point, rises to Fort Hill, which is 23m high. A conspicuous silo, 43m in elevation, stands on a point near the quarantine station, about 3.25 miles ESE of Fort Point.

Wickham Point (12°30.5'S., 130°51.5'E.) rises to Peak Hill, which is 31m high. Approximately 1 miles S of the point is Wickham Point LNG Terminal, which consists of a 1,295m-long jetty with a T-head at its extremity. There is a depth alongside of 12m. There is also an isolated danger lighted buoy 740m W of the berth.

Regulations.—A restricted area has been established around Wickham Point LNG Terminal. Vessels are prohibited from approaching within 100m of the jetty at all times. This distance is extended to 500m beginning 45 minutes before the berthing of an LNG tanker and until the LNG tanker has departed. The N and S boundaries of the 500m restricted area are marked by lighted buoys.

2.66 Charles Point Patches (12°21'S., 130°40'E.), with a least depth of 2.3m and marked by tide rips, lie from 3 to 5 miles ENE of Charles Point. Charles Point Lighted Buoy No. 5 marks the NE extremity of these patches. A detached 8.2m patch is marked on its NE side by Charles Point Lighted Buoy No. 5. There is an area of sandwaves, with depths of not less than 10m, about 1 mile ESE of this patch; ESE of this same patch, and joining up with Middle Ground, there are several other detached patches with depths of less than 10m.

Middle Ground (12°22'S., 130°46'E.), with depths of 2.3 to 10.0m, extends about 6.5 miles NW of East Point and is covered by the red sector of Emery Point Light.

Caution.—Unexploded ordnance lies in a depth of 13m, in an area with a radius of 0.5 mile, centered NE of Middle Ground, about 3.75 miles NW of East Point.

2.67 Channel Rock (12°25'S., 130°47'E.), with a least depth of 6.3m, lies 2 miles WSW of East Point and is usually indicated by tide rips and overfalls. A lighted buoy is moored close SW of this danger.

Abbot Patches (12°28'S., 130°48'E.), with depths of 7.3 to 10.1m, extend about 1.25 miles SSE from a position 1.25 miles W of Elliot Point; they are marked by a lighted buoy.

Two dangerous wrecks lie close W of the S extremity of Abbot Patches; an experimental fish device lies in the same position.

Bennett Shoal (12°28'S., 130°50'E.), with a depth of 4.6m, lies 1 mile SE of Emery Point and is marked by a lighted buoy.

A dangerous wreck lies about 0.65 mile S of Fort Point. A submarine pipeline extends about 0.5 mile S from a position on the shore about 0.9 miles ESE of Emery Point.

Darwin (12°28'S., 130°51'E.)

World Port Index No. 54670

2.68 Darwin is the principal port on the N coast of Australia. The port lies on the S shore of the Beagle Gulf in the Timor Sea. A line between Charles Point and Lee Point, 17 miles ENE, marks the extent of the port limit. The city is the capital of the Northern Territory and is of considerable importance. It stands on a table about 20m high and is favored by cool breezes throughout the year.

Numerous vessels, including ore carriers of considerable size, enter Port Darwin; the large tides in this area enable deep drafts to be accommodated. Live cattle are a major export in Darwin in addition to the offshore oil and gas industry in Northern Australia. The completed Darwin to Adelaide rail link and the development of the East Arm will increase the container-handling ability of the port to over 250,000 each year.

Darwin Port Authority Home Page
http://www.darwinport.nt.gov.au

Winds—Weather.—Darwin is under the influence of the monsoon seasons year around. The Northwest Monsoon blows from November to April with occasional winds from E, especially at night. From April to September the Southeast

Monsoon prevails and is strongest in July. The transition period occurs in October and winds are generally light.

The cyclone season extends from November to April. Ships may be placed on short notice for sea and required to maintain themselves in seaworthy condition at all times.

Visibility during the latter part of the Southeast Monsoon is often reduced by haze, and objects are frequently obscured at a distance of 3 miles. During the Northwest Monsoon, the visibility is usually good, except in the vicinity of thunderstorms and squalls.

Darwin—Iron Ore Wharf (left), Fort Hill Wharf (center), and Stokes Hill Wharf (right) from SW

Darwin

Darwin—East Arm Port from W

The rainy season commences during the latter part of October and lasts about 5 months, with the greatest amount falling in January and February. Lightning, torrential rain, and squalls are common at this time. From May to September, during the Southeast Monsoon, rain is very rare.

Temperatures range from a high of 37°C in summer to a low of 15°C in winter.

Tides—Currents.—See the table titled **Tidal Ranges for Darwin**. Near the entrance to the harbor, the strength of the tidal currents diminishes considerably, and the direction within the harbor usually corresponds with the direction of the channel.

During the flood current, considerable eddies may be experienced close to the wharves. These eddies often produce a current setting directly towards the jetties, or sometimes running along the jetties in a direction opposite to the current at a position about 200m off them. During the ebb current, the currents close to the jetties run in the same general direction as those offshore, but care must be taken to guard against the fact that the currents do not always run directly along the jetties, but may set towards or away from them. The currents area are considerably affected by heavy rains and by strong NW or SE winds.

Owing to the strong tidal currents, discoloration is present at all times, and during springs, a turgid, muddy color is seen in the harbor, the whole of which is disturbed by eddies.

Depths—Limitations.—Darwin is approached between Charles Point Patches and Middle Ground through Middle Pass (12°21'S., 130°43'E.) and is entered between Charles Point and

Lee Point. Middle Pass is a deep water route through the isolated patches of less than 10m which lie across the fairway between Charles Point Patches and the NW end of Middle Ground; it is marked by lighted buoys and is the main approach channel for deep-draft vessels. Middle Pass has a least depth of 13m.

Tidal Ranges for Darwin	
HAT	8.1 m
MHWS	7.0 m
MHWN	5.1 m
MSL	4.17 m
MLWN	3.3 m
MLWS	1.4 m
LAT	0.0 m

Notes:
1. Predicted heights are in meters above charted datum.
2. HAT—Highest astronomical tide.
3. LAT—Lowest astronomical tide.

The average depth in the main channel from Middle Pass to the quarantine anchorage, situated SW of the wharves, is 20m.

Vessels up to 245m in length, with drafts up to 12m, are generally the maximum size accepted. Greater drafts may be accepted by prior consultation, depending upon tidal predictions; vessels up to 246m in length and 12.8m draft have been accommodated. No restrictions on beam are in force. There are no air draft restrictions to access the port.

The Iron Ore Wharf, also called the No. 1 Berth, is a dolphin-type berth with a face length of 142m; mooring dolphins are situated 69m E and W of the wharf. The wharf was reported (2010) being demolished and unavailable for use.

New Fort Hill Wharf stands close NE of Bulk Ore Wharf. Berth 2W and Berth 2E are each 150m long, with an alongside depth of 12m. Vessels with a maximum draft of 11.7m can be accommodated.

A ro-ro terminal is situated at the W end of New Fort Hill Wharf. A pontoon, 77m in length, can be extended or retracted, thus enabling ro-ro vessels of any size or type (side-loading, end-loading, quarter-loading, port or starboard side-to) to use the Port of Darwin. When the pontoon is retracted, its outer end forms an extension of the New Fort Hill Wharf, and can then be used for vessels such as car carriers with side doors.

Stokes Hill Wharf, the main general cargo berth, is a concrete-decked steel-piled wharf with a trestle approach. Berth 3E and Berth 3W, on the outer side of the wharf, are each 146m long, with an alongside depth of 9m. Bulk, container, and general cargo are handled.

Berth 4E and Berth 4W are situated on the inner side of Stokes Hill Wharf. Each berth is 80m long, with an alongside depth of 4.5m. Fishing vessels and pleasure craft, with a maximum length of 70m and a maximum draft of 4.5m, can be accommodated.

Fort Hill Wharf No. 4 (Old Fort Hill Wharf) is presently restricted to small or special vessels by arrangement with the harbormaster.

A shipyard for small craft is situated on the W side of Frances Bay, with depths of up to 5.5m in the vicinity. There are moorings for small craft at Francis Bay Marina. The minimum depth is 3.5m.

East Arm Port is situated about 2 miles ESE of Fort Point (12°28.3'S., 130°50.7'E). The port consists of a jetty with a berthing face aligned 127°/307° that is 755m long with depths alongside that range from 11.3m to 13.3m; it constitutes the longest and deepest berth in the port. Vessels up to 100,000 gt can be accommodated here. East Arm Port includes the following:

1. Bulk liquid berth—which is connected via pipeline to a fuel oil facility and a bio-diesel refinery as well as pipeline piping for chemicals,
2. Container berth which serves as a common user berth to discharge or load break bulk cargo including livestock.

A Marine Supply Base (12°29.6'S., 130°53.4'E) has been established at the E end of East Arm, with a depth alongside of 8.7m. It is approached through a channel which passes SE and E of South Shell Island (12°29.8'S., 130°53.2'E) and is marked by lateral beacons. This channel has a maintained depth of 7.7m.

Aspect.—A radio mast and a water tower, both conspicuous, stand about 1.25 miles E and about 1 mile ESE, respectively, of the light on Emery Point. A conspicuous white building of unusual shape stands about 1 mile ENE of the light structure, but is obscured by East Point when bearing greater than 160°. Due to the close proximity of other prominent towers, caution is advised when identifying individual marks.

Peak Hill, 30m high and covered with bush, rises about 5 miles SE of Emery Point and is occasionally used as a leading mark for entering the port.

Kings Table, 47m high, is a circular flat-topped hillock about 7 miles SSW of Emery Point. It is the highest land in the Darwin area and can be seen from the approach in clear weather.

Stokes Hill is located about 0.5 mile NE of Fort Point. Frances Bay, consisting mostly of drying flats except for an area on the W side, lies E of Stokes Hill.

Pilotage.—Pilotage is compulsory for all craft exceeding a length of 35m unless a current Pilotage Exemption Certificate is held by the master.

Notice of ETA and request for a pilot must be made to the harbormaster not less than 24 hours before ETA at Channel Rock Buoy and confirmed 2 hours before arrival at Pilot boarding position. The harbormaster continuously monitors VHF channels 16 and 67 and the ETA may be confirmed or adjusted on these frequencies. Pilot boats are painted with a white and yellow superstructure and a blue hull with the word "PILOT" on each side.

The usual pilot boarding point (12°24.5'S 130°46.0'E) is 1 mile NW of Channel Rock Buoy No. 6. With prior arrangement, vessels with a draft of over 10.7m will board the pilot (12°19.6'S 130°42.1'E) about 1 mile N of Charles Point Patches Lighted Buoy No. 5. In case of bad weather, the pilot boat will lead ahead to sheltered waters, using the VHF. Pilot boarding arrangements must be in accordance with IMO rules.

Vessels awaiting a pilot may anchor between 1 and 2 miles NW of Channel Rock Buoy, in 25m, sand, good holding ground.

Darwin—Port Contact Information	
Port Control	
Telephone	61-8-89220710
Telephone	61-8-89995390
Facsimile	61-8-89810687
E-mail	harbour.control@nt.gov.au
Port Authority	
Telephone	61-8-89220660
Facsimile	61-8-89220666
E-mail	darwinport.dpa@nt.gov.au
Web site	http://www.darwinport.nt.gov.au

Regulations.—Darwin is within the southern zone of tropical revolving storms. The season extends from November to April each year and the Port may be more or less affected at any time during that period. All vessels entering Darwin during the "cyclone season" are supplied with copies of the Port Procedures, which set out in full the various stages of alert and preparation to be observed in the case of an approaching cyclone. Vessels may be placed on short notice for sea in such circumstances and required to maintain themselves in seaworthy condition at all times.

When underway within Darwin harbor limits all vessels shall ensure the following procedures are complied with:

1. Automatic steering devices, if fitted, are not used unless a competent helmsman is standing by in the immediate vicinity of the helm station or wheel and ready to assume hand-steering. Otherwise, vessels are to be in hand-steering mode only.
2. Any duplicate, secondary, or backup steering gear and steering gear power systems are to be fully operational and ready for immediate use while vessels are navigating within the port harbor limits. Emergency steering gear systems should have been recently tested.
3. The vessel's main propulsion plant needs to be immediately available for reducing speed, stopping or going astern at all times and without delay.
4. The vessel's anchors are available for immediate use in an emergency and capable of being used without power.

Vessels must not immobilize main engines without prior permission from the harbormaster. Tankers will not be allowed to shut down main engines while working cargo. Petroleum tankers are not moved during hours of darkness except in emergency conditions.

Vessels with a draft greater than 12m may need to await the tide before crossing Charles Point Patches.

A traffic separation scheme, the limits of which can best be seen on the chart, runs in an E-W direction off Emery Point to Fort Point.

Vessels are to report at the following points:

1. Inbound—When entering the Deep Water (DW) channel in position 12°18.2'S., 130°41.1'E and when passing the inner deep-water channel in position 12°25.3'S., 130°46.6'E.
2. Outbound—When passing the inner deep-water channel in position 12°25.2'S, 130°10.6'E.

Contact Information.—The following table lists the official radio channels for communication within the Port of Darwin:

VHF Channel	Function
10	Main Port Working Frequency
16	Distress/Calling—Continuous Watch Required
72	Ship to Ship
14, 69	Navy port working frequency
12, 13	Pilot working channels (tugs)

Anchorage.—Anchorage is available anywhere in the harbor where the depths are convenient and anchorage is not prohibited. The holding ground is good, but vessels remaining for more than a short period during the Northwest Monsoon should moor because of the stronger currents during the wet season. Anchorage C3 (12°30'S., 130°49'E.) has a wreck with a depth of 11.7m, foul ground to the E, and a gas pipeline running through the middle of the anchorage area.

Vessels under quarantine must anchor in the quarantine anchorage SW of Fort Hill until cleared. A lighted buoy, painted yellow, marks a foul area in this anchorage.

Port Darwin Anchorages			
Berth	**Length**	**Depth**	**Lat. and Long.**
A1	152m	17.0m	12°19.0'S 130°42.4'E
A2	190m	17.0m	12°19.5'S 130°42.8'E
B1	198m	14.8m	12°22.5'S 130°45.1'E
B2	107m	12.7m	12°23.0'S 130°45.5'E
B4	198m	12.0m	12°24.0'S 130°46.3'E
B5	183m	15.0m	12°27.6'S 130°47.1'E
C1	145m	19.0m	12°28.9'S 130°49.4'E
C2	180m	19.0m	12°29.5'S 130°49.7'E
C4	180m	12.0m	12°28.8'S 130°49.8'E
C5	158m	9.6m	12°28.9'S 130°50.2'E
C6	158m	9.9m	12°29.0'S 130°50.5'E
C7	46m	8.0m	12°29.0'S 130°50.9'E

Prohibited anchorage.—Anchorage is prohibited, due to power and telephone cables in the charted area, within the limits of East Point and the coast just W of West Point to the N, and between Elliot Point and Oak Point to the S. There is a foul area between Emery Point to the E and Oak Point to the W. Vessels are cautioned not to anchor, trawl, or sweep within the

area indicated due to the remains of boom defense netting and cables.

Vessels must not anchor in the vicinity of the pipeline E of Bennet Shoal. Anchorage is also prohibited in an area SE of Fort Point, as best seen on the chart.

Anchoring is also prohibited, as shown on the charts, between Elliott Point and Darwin Naval Base due to the existence of submarine cable extending SW from the coast and in an area SE of Fort Point.

Vessels should keep clear of the Naval Area encompassing all the waters of West Arm and Middle Arm.

Directions.—There is a deep-water route for LNG vessels which passes between Lighted Buoy LNG 1 and Lighted Buoy LNG 2. Between Lighted Buoys 1-2 and 3-4 it was reported that some navigation aids are visually confused with non-navagation aids in the dark due to close proximity to each other. This route is for single vessel operations and vessels using must not overtake or pass.

Caution.—It has been reported (2001) that when using the deep water approach to Darwin, the visual appearance of Lighted Buoy A and Lighted Buoy B, situated E of Charles Point Patches, gives the illusion that these buoys are incorrectly charted.

A wreck lies about 0.15 miles SSW of Light Buoy No 14, close SW of the leading line.

A fish haven has been established on the seaward side of the causeway leading to Stokes Hill Wharf. A lighted buoy is situated close SE.

Gas pipelines, which may be best seen on the chart, run from Darwin to Sahul Banks in the Timor Sea. Vessels should exercise appropriate caution in the vicinity of the pipelines.

A protected area is established over a historic wreck, marked by a special light buoy (12°23.4’S., 130°46.3’E.), with a radius of 150m. Fishing and anchoring are prohibited within this area.

Caution.—Mean high water spring tides rise 6.9m. The mean high water neap rise is 5m; low water neaps usually maintain a height of about 2m above datum, but the tides are mixed, which varies the daily heights. It is highly recommended that ships enter port during the high tide/slack water period due to the rapid shift in velocity of current. Significant currents are present.

Tidal currents in the approach channel, about 6 miles NW of East Point, run in the direction of the fairway at a rate of 1 to 2 knots, although a 4 knot ebb current has been reported (2000). The flood commences about 5 hours before HW; the ebb commences about 1 hour after HW. The currents become rotary at both HW and LW, with little slack.

Off East Point, the currents run mainly NNW and SSE, and attain rates of 3 to 4 knots at springs.

Currents in the vicinity of the quarantine anchorage run mostly NW and SE at rates up to 2 knots.

Charles Point to Cape Hay

2.69 The coast and waters between Charles Point, the W entrance point of Port Darwin, and **Pelican Islet** (14°46'S., 128°47'E.), about 183 miles SW, have not been thoroughly examined and should be given a wide berth at night or during poor visibility. Vessels running this coast under these conditions are advised to stay in depths of 37m or more until making an approach to port.

Inshore of Lorna Shoal (12°21'S., 130°19'E.), previously described in paragraph 2.61, there are numerous scattered shoals and reefs, some of which dry up to 6m. Jones Bank and Bass Reef, both of which dry up to 0.6m, lie about 8 miles inshore of the outer part of Lorna Shoal and are surrounded by foul ground.

Fish Reef (12°26'S., 130°26'E.), a coral reef which dries 2.1m, lies about 3 miles NE of Jones Bank and is marked on its W end by a light shown from a concrete tower.

Loee Patches, with a least depth of 4.9m, lies 23 miles WSW of Charles Point.

Bynoe Harbor (12°39'S., 130°32'E.) and Port Patterson, two inlets on the W side of the Cox Peninsula, are generally only used by small craft and fishing vessels with local knowledge of the area. They are both entered at the N from a position about 7 miles W of Charles Point by either of two channels, which are divided at their entrance by **Middle Reef** (12°28'S., 130°31'E.), a coral patch which dries 6.1m. Thrings Channel, to the E, has a limiting depth of 3.3m, but West Channel, entered between Middle Reef and Fish Reef to the NW, carries a least depth of 7.6m.

The best time to enter is at LW when the reefs are visible and the channel can generally be seen; at HW, discoloration usually obscures even the shallowest patches and makes navigation difficult. There is a patch of bright yellow sand on the S end of Middle Reef which forms a good mark.

2.70 **Port Patterson** (12°37'S., 130°28'E.), with depths of 5.5 to 11m in its entrance, is divided by a drying sand bar through its center. An extensive reef, on which are located the Gross Islets, the Bare Sand Islets, and Quail Islet, is located on the W side of the port. The latter islet, which is located about 18 miles SW of Charles Point, is 9m high and is the outermost on the above reef. Quail Islet extends for 4 miles SSW before branching into E and W arms. The island is a former bombing range and is now closed due to the presence of unexploded ordnance. The Gross Islets are low and covered with mangroves.

Bynoe Harbor, separated from Port Patterson by Indian Island, can be entered by Thrings Channel or West Channel, although the latter is preferred. The harbor is entered between West Point, the N extremity of Indian Island, and East Point, about 2.5 miles E, in a depth of about 19m, and is deep throughout the fairway, except for a 7.6m patch E of the S end of Indian Island. Numerous shoals fringe the edge of the channel and local knowledge is recommended.

Native Point (12°43'S., 130°21'E.), located 25 miles SW of Charles Point, is fringed with a drying reef and faced with red cliffs, about 10m high, which extend about 5 miles to the S. The head of Fog Bay, entered between Native Point and Point Jenny, 15 miles SW, is low with dense mangroves and tidal swamps fronted by drying sandflats extending up to 3 miles offshore.

Point Blaze (12°56'S., 130°08'E.), located 3.5 miles SW of Point Jenny, is fringed by drying reef which extends along its shores for about 3 miles to the NE and S. Blaze Reef, which dries 0.6m, lies 2.5 miles NNW of Point Jenny, and Bowra Shoals, with a depth of 3m over them, lie 1.5 miles N of the reef. Shoal water, with depths of 5.8 to 7.9m over it, extends about 4.5 miles NW of Bowra Shoals, and caution is required on entering Fog Bay.

Anchorage.—Fog Bay affords reasonable shelter during the Southeast Monsoon and has good holding ground of sand and mud. Vessels can anchor as convenient, but the bay should only be entered from the NW to avoid the dangers which extend up to 8 miles NNW of Point Jenny.

2.71 The coast between Point Blaze and Channel Point, 14 miles S, is low and considerably wooded. Foul ground extends up to 2 miles offshore here and the area should be approached with caution.

The Peron Islands, consisting of Peron Island North and Person Island South and lying up to 5.5 miles W of **Channel Point** (13°10'S., 130°07'E.), are two low sandy islands surrounded by drying reef and sand flats, some of which uncover to a height of 6.1m. Peron Island North, the largest of the islands, has a grassy peak nearly 30m high on its N end; the rest of the island is fringed with mangroves. A landing place for boats, available at any stage of the tide, is located on the SW shore of Peron Island South. Shoal water extends up to 3.5 miles N and W of the Peron Island North; the two islands are connected by drying reef.

Anson Bay (13°20'S., 130°03'E.), entered between Channel Point and Cape Ford, about 21 miles SW, has low, mangrove-covered shores along its NE side from the former point to the mouth of the Daly River, at its head. Red Cliff rises 17.5 miles S of Channel Point to a height of 15m, with the land behind it about 37m high.

Anchorage.—During the Southeast Monsoon, there is good anchorage, for vessels with local knowledge, about 5 miles NNW of Red Cliff, in a depth of 9.1m, mud.

There also appears to be anchorage available during good weather, in depths of 9 to 11m, about 2 miles S of the S extremity of South Peron Island.

Caution.—Bateman Shoal, with a least depth of 3.3m, lies on the N side of the approach to Anson Baylies, about 5.5 miles WSW of the SW extremity of North Peron Island; a shoal patch, with a depth of about 5.5m, lies about 3 miles to the N of this shoal. Other shoals, with depths of 3.6m and 3m, lie 2.25 miles N and 1.75 miles WNW of Cape Ford.

Wade Rock, with a depth of 0.6m, lies on the 5.5m curve about 2 miles NW of Red Cliff. Pelican Rock, awash at LW, and the position of which is approximate, lies about 3 miles WSW of the same cliff.

A shoal flat, which dries up to 0.9m, extends up to 5 miles off the entrance to the Daly River; it has been reported to be shoaling extensively and caution is required.

The **Daly River** (13°19'S., 130°17'E.) has been reported available at HW to vessels with drafts of 1.8 to 2.4m and possessing local knowledge. The bar at the entrance has been reported to be shoaling and lesser depths than charted may exist. During the wet season the river becomes a torrent and is not navigable.

2.72 Cape Ford (13°26'S., 129°52'E.) is a low narrow promontory from which a reef extends about 1 mile N. The coast to Cape Scott, about 5.5 miles SW, has a barren appearance, consisting of high bare sandhills fronted by reefs and foul ground. Cape Scott is a low, sandy spit terminating in a conspicuous rounded clump of mangroves; a rocky ledge extends 2 miles N from the cape and a shoal, with a depth of 0.9m, is charted about 1 mile farther NE; another ledge extends about 2 miles SW from the cape.

About 6 miles S of Cape Scott, the coast becomes higher and is thickly wooded to the edge of reddish cliffs extending to Dooley Point, about 7 miles farther S. This coast is fronted by shoal water to a distance of about 1.5 miles; a 1.8m patch lies about 5 miles NW of Dooley Point.

Cape Dombey (13°54'S., 129°42'E.) is located 24 miles S of Cape Scott and is fringed by reefs to the N and SE. The Barthelemy Hills rise about 7 miles E of the cape and attain a maximum elevation of 103m. A reef, about 200m in diameter and which dries 1.8m, lies about 3.5 miles NNW of Cape Dombey, and a rocky patch, with a depth of 5.5m, lies about 1.5 miles SW of the reef.

Hyland Bay (13°58'S., 129°39'E.), entered between Cape Dombey and Tree Point about 10 miles SW, is shoal, but there are depths of 5.5 to 7.3m midway between the entrance points. White Cliff Point, with a line of cliffs extending about 2 miles to its SW, lies at the head of the bay; the shores along the rest of the bay are low. Reefs and foul ground, some of which dry up to 3.7m, lie up to 2.5 miles NW of Tree Point.

Caution.—Banks Shoal, with a least depth of 1.8m, lies centered about 7 miles NNW of **Tree Point** (14°01'S., 129°36'E.); depths of 3.7 to 5.5m extend up to 3 miles to the N and S.

A depth of 1.8m lies about 11.5 miles N of Tree Point and several patches, with depths of 8.5 to 11m, lie up to 4 miles S. This area has not been closely examined and additional dangers may exist.

2.73 Port Keats (14°04'S., 129°33'E.), entered between Tree Point and the NE extremity of Dorcherty Island, extends approximately 8 miles S, where it divides into two arms, the E of which leads to a mission station at the foot of Mount Goodwin, 92m high. Although the entrance to this inlet has depths of 5.5 to 9.1m, the channel within is shoal and narrowed by reefs, and local knowledge is required.

Vessels may anchor about 3 miles W of Tree Point, in a depth of 10m. Small vessels may anchor about 3 miles SW of the point, in depths of 4 to 8.8m.

Cape Hay (14°03'S., 129°29'E.), the NW extremity of Dorcherty Island, is low and surrounded by foul ground. Shoal water, with a least depth of 1.5m, extends up to 3 miles NNW of the cape, but the waters up to 8 miles SW are unsurveyed. Howland Shoals, which dry 0.6m, lie from 3.5 to 7.5 miles NNW of Cape Hay. Drying rocks lie up to 4 miles W of the N extremity of Howland Shoals; depths of less than 11m extend up to 6.5 miles W and 8.5 miles NW of Howland Shoals.

Caution.—Emu Reefs, the exact extent of which are unknown and which dry up to 4.6m, lie centered about 11.5 miles N of Cape Hay; strong tide rips are formed between Emu Reef and the N end of Howland Shoals.

A rocky patch, which dries up to 1.2m and on which the sea breaks heavily, lies 18.5 miles NNW of Cape Hay. This patch is steep-to, especially on its E and W sides, where depths of 18 to 22m lie within 1 mile of it.

Joseph Bonaparte Gulf

2.74 Joseph Bonaparte Gulf consists of a large coastal bight between Port Darwin and Cape Londonderry, about 240

miles SW. At its head is the Victoria River to the E and Cambridge Gulf to the W, with the latter leading to Hare Channel and the port of Wyndham. Cambridge Gulf provides good anchorage to medium-sized vessels in most weather. Wyndham can accommodate ocean-going vessels of moderate size.

Aspect.—Joseph Bonaparte Gulf is entered between Cape Hay and **Cape Rulhieres** (13°56'S., 127°22'E.), about 125 miles W. The head of the gulf is divided into the estuary of the Victoria River on the E side, and Cambridge Gulf on the W side, but with the exception of the latter and its approaches, has not been thoroughly surveyed.

The coast between Cape Hay and Pierce Point, 24 miles SSW, is low and mostly wooded, with sandhills and cliffs in several places. Flat rocky shelves extend seaward from the cliffs in some places; elsewhere the foreshore is sand or mangrove clumps.

A bank, with less than 10m, lies 6 to 7 miles offshore extending up to 12 miles S from Howland Shoals. It has not been completely surveyed and undiscovered dangers may exist off this stretch of coast. Vessels approaching Cambridge Gulf are recommended to remain in depths of 37m or more until within about 15 miles of the outer entrance, and not to proceed into any other part of Joseph Bonaparte Gulf without local knowledge.

In 1980, safe anchorage was found, in 15m, about 2.5 miles SW of Cape Hay, but caution is necessary in approaching this anchorage because of the imperfectly surveyed bank mentioned above.

Caution.—The waters of the S and SE parts of Joseph Bonaparte Gulf are almost turbid, as sediment is held in suspension by the strong tidal currents and dangers may not be apparent. In some instances overfalls and eddies indicate deep holes and trenches as well as shoals.

2.75 Pearce Point (14°26'S., 129°21'E.), the N entrance point of the estuary of the Fitzmaurice River and the Victoria River, is a rocky promontory with wooded sandhills, 7m high, behind it. A level wooded cliff, 26m high, is located 0.5 mile E at the head of Treachery Bay. Providence Hill, 72m high, rises 4.5 miles E of the point, with increasing elevations within.

Rocky shelves extend about 300m offshore from Pearce Point and there is a 3.2m shoal 1.5 miles SW of it.

Shoals, with depths of 14.8m and 12.2m, lie 9 miles NNW and 5.5 miles WNW, respectively, of Pearce Point.

The area W of Pearce Point consists of broken ground. In this vicinity overfalls dangerous to small craft have been observed up to 6 miles offshore. A shoal, with a least depth of 11m, lies 9 miles W of the point.

2.76 Mermaid Bank (14°30'S., 129°20'E.), located 4 miles SSW of Pearce Point, has a depth of 3.3m at its N end, 4.3m at its S end, and dries 0.3m in its central part.

Detached shoals of 8.2m and 6.7m lie about 7 miles SE of the shallowest part of Mermaid Bank. These shoals signal the start of finger-like drying banks, lying in a NW-SE direction, which extend seaward from the mouths of the Fitzmaurice River and the Victoria River. An 11m shoal lies 5 miles W of the S end of Mermaid Bank.

There are shoals between Mermaid Bank and Treachery Bay, the positions and depths of which can best be seen on the chart.

New Moon Inlet (14°36'S., 129°37'E.), entered 15 miles SE of Pearce Point, extends E for about 14 miles, where it divides into two branches at the foot of Table Hill, a 195m high flat-topped peak. The inlet is shoal and filled with sand banks which just dry. The surrounding land is very low and somewhat swampy.

Keys Inlet (14°46'S., 129°37'E.), entered about 17 miles SSE of Pearce Point, forms the approach to the Fitzmaurice River, but is filled with shoals and sand banks requiring local knowledge to navigate. The surrounding land is very low and sometimes covers at high water springs; there are no leading marks or aids to navigation, but the channel to the river is said to carry a depth of 3.7m for about 30 miles from the coast.

Quoin Island (14°51'S., 129°33'E.) is low and covers at highest spring tides. It consists of large areas of dried mud flats and mangrove swamps. There is a distinctive clump of trees at its N end. A bank, which dries, lies 6 miles WNW of the N end of Quoin Island. Clump Island lies about 1 mile NE of the island's E side.

2.77 The **Victoria River** (15°00'S., 129°33'E.), believed to be the longest river in northern Australia, rises about 300 miles inland, but has only been traced for about 150 miles. It is entered via Queens Channel from a position about 16 miles S of Pearce Point and can accommodate small vessels, possessing local knowledge, with drafts to about 3.7m. Above Blunder Bay (15°12'S., 129°44'E.), just within Entrance Island, the river becomes encumbered with shoals and sandbars which alter annually and can only be navigated by light-draft vessels with extensive knowledge of the channels.

Queens Channel (14°41'S., 129°21'E.), the inlet to the Victoria River, is entered between Quoin Island and the sand banks E of Turtle Point, 17 miles W, and carries a depth of about 5.8m to within 7 miles of Entrance Island. The best time to enter is at LW, when the sandspit and banks NW and SW of Quoin Island can be seen, but great caution is necessary as there are depths of only 1.8 to 3.3m off the entrance to the channel.

In 1981, it was recommended that the best approach through Queens Channel was with River Peak bearing 137°. This leads to a position 2 miles W of Quoin Island, where the extensive sand banks, described above, will be encountered.

Tidal currents are strong, reaching 7 knots at springs, and the river floods heavily during the rainy season.

Caution.—Navigation of the Victoria River and Queens Channel is considered difficult and hazardous. There are no aids to navigation, the tidal currents are strong even in the approaches, and the exact position of the outer bars and shoals is doubtful. If it necessary to enter, vessels must exercise extreme caution and have enough power to overcome the cross currents in the channels.

2.78 Turtle Point (14°51'S., 129°14'E.) consists of low, scattered sandhills fronted by mangrove flats. Shoals and foul ground, with drying patches, extend 26 miles NW and nearly 12 miles NE of the point, the latter forming the SW edge of Queens Channel. Much of the shore S and SE of Turtle Point is

intersected by creeks and small inlets, and is inundated during high water springs and the wet season.

A large shoal inlet, mostly unexamined, extends about 22 miles S from the W side of Turtle Point. The entrance, which is about 9 miles across, appears to be fronted by rocks and should not be approached without extensive local knowledge.

Pelican Islet (14°46'S., 128°47'E.), 6m high, lies on the outer edge of a drying flat about 5 miles offshore and 26 miles W of Turtle Point. About 3 miles N of the islet there are charted depths of 11 to 12.8m, but the area has not been completely examined and several shallower depths, including a reef which dries 4.3m, lie up to 20 miles offshore in this vicinity.

Rocky Islet (14°44'S., 128°38'E.), 30m high, lies close off the coastal flats about 9 miles WNW of Pelican Islet. Patches, with depths of less than 11m, lie up to 12 miles N of the islet and shoal water extends W and NW to Medusa Banks.

The coast W of Rocky Islet is more hilly than that to the E and gives a distinctive appearance to the shoreline that is useful in making the entrance to Cambridge Gulf.

Cambridge Gulf

2.79 Cambridge Gulf (14°55'S., 128°13'E.) is located in the SW part of Joseph Bonaparte Gulf and entered between Cape Domett and Cape Dussejour, about 10 miles WNW. It is divided in its entrance into two channels by **Lacrosse Island** (14°45'S., 128°19'E.), which lies nearly midway between the capes. From Lacrosse Island, the gulf extends 45 miles in a SSW direction to Port Wyndham, and then in a WSW direction for 5 miles, where it contracts to a width of only 0.25 mile through The Gut, a rocky gorge 2 miles in length, which opens into a shallow lagoon.

The N limit of the port is a line joining Cape Dussejour and the summit of the highest hill on Lacrosse Island.

Tides—Currents.—Tidal currents in the vicinity of Lacrosse Island reach a maximum of 4 knots at springs. Within the narrow reaches of the channel, however, they can attain a maximum rate of 6 knots and large vessels may have to adjust their speed to negotiate the fairway near high water slack.

Depths—Limitations.—The preferred approach is W of Lacrosse Island, but the fairway through the greater part of the gulf is deep. Hare Channel, about 33 miles above Lacrosse Island, has a least depth of 6.4m and is the controlling depth to Wyndham; tides rise up to 7.3m, which allow deep-draft vessels to be taken in. Range lights have been established.

Pilotage.—Pilotage is compulsory for merchant vessels of more than 150 tons gross register whose masters do not hold a Pilotage Exemption Certificate. A master requiring a pilot should notify the Harbor and Light Department at Fremantle of the ETA 10 days in advance and the Harbormaster at Wyndham 48 hours and 24 hours in advance; the 48-hour message should also include the vessel's maximum draft.

The Sea Pilot Station is 4.7 miles S of **Lacrosse Island Light** and the Wyndham Pilot Station is 6 miles NE of Black Cliff Point; the master should state at which point the pilot should embark. It is preferable that vessels should arrive at the pilot boarding place at dawn, as entrance is only made in daylight. There is a port radio station at Wyndham and the pilot launch is equipped with VHF; the calling frequency is VHF channel 16, while the working frequencies are VHF channels 6 and 12.

Regulations.—Vessels should maintain a listening watch on VHF channel 16 at least 2 hours prior to boarding the pilot.

2.80 Cape Domett (14°49'S., 128°23'E.) is fronted by low cliffs on its NW side and fringed by reefs terminating with its SW extremity at Shark Rock, which dries 6.4m. Shakespeare Hill, with a flat-topped rocky summit, 131m high, rises 3 miles E of the cape and from a distance appears as an island. Cone Hill, 72m high, rises about 0.75 mile E of the cape and when aligned with the former hill, bearing 085.5°, forms a good mark from the pilotage area.

Medusa Banks (14°30'S., 128°19'E.), with depths of less than 5.5m, extends 20 miles NNW from the coast between Rocky Islet and Cape Domett. These banks form the E side of the approach to Cambridge Gulf and have isolated patches with depths of only 0.9m, some near the outer extremity.

Lacrosse Island (14°45'S., 128°19'E.) lies with White Stone Point, its SE extremity, about 4 miles NW of Cape Domett; the summit of the island, 141m high, rises near its SW end and forms a good mark in the approach. The N coast of the island consists of rugged sandstone cliffs, but the SE extremity is composed of a low spit formed by boulders; the S side is fronted by extensive mud banks.

Tucker Bank, awash at low water springs, is an oblong sandy patch extending from 0.5 to 1.75 miles S of White Stone Point.

West Bluff, the NW extremity of Lacrosse Island, rises to a height of 100m close within, and Bream Ledge, a rocky reef, steep-to on its W side, extends about 0.35 mile to the NNW. Shoal water extends 2.5 miles E of this ledge.

Lacrosse Island Light is shown from a white metal hut situated on a hill 0.25 mile ESE of West Bluff; a racon transmits from the light. In 1985, a shoal, with a depth of 9m, was reported to lie 8.6 miles NNE of Lacrosse Island Light.

Anchorage.—Anchorage can be obtained in the lee of Lacrosse Island on either side.

Vessels waiting for the pilot can take anchorage, in depths of 16 to 18m, sand and shell, about 4 miles S of Lacrosse Island, on the line of Cone Hill and Shakespeare Hill.

Directions.—Vessels should steer for the summit of Lacrosse Island on a heading of 170°. When 4 miles from the island, alter course to pass 1 mile off West Bluff, the NW extremity of Lacrosse Island. When Lacrosse Island Light bears 040°, alter course to 145° for the pilot boarding position, situated about 3.5 miles S of Lacrosse Island, with Cone Hill and Shakespeare Hill in range to the E. From the pilot boarding position, vessels steer 225° for Black Cliff Point, which lies about 1.25 miles W of Nicholls Point, the NW extremity of Adolphus Island. Directions S of this point are continued in paragraph 2.83.

2.81 Cape Dussejour (14°45'S., 128°13'E.), the W entrance point of Cambridge Gulf, is 43m high, with a low neck of land within that causes the cape to appear as an island from N. Three hills, from 122 to 161m high, rise between 2.5 and 4 miles WNW of the cape.

King Shoals, which form the W side of the approach to Cambridge Gulf, are three narrow sandy ridges nearly parallel to each other and with drying patches and shoals of less than 1.8m scattered across their limits. They extend generally 15

miles NNW of Cape Dussejour, with narrow channels within, which should not be attempted without extensive local knowledge.

Fathom Rock (14°43'S., 128°14'E.), 2m high, lies 2.5 miles NNE of Cape Dussejour, and Entrance Shoal, with a least depth of 4.9m, lies nearly 1 mile ENE of this rock. In 1966, an 8.2m shoal was reported 1.75 miles NNW of Fathom Rock. Lory Rock, awash at low water springs, lies on a spit with depths of less than 5.5m, which extends 0.25 mile E from Cape Dussejour.

2.82 Vancouver Point (14°50'S., 128°12'E.), 5 miles SSW of Cape Dussejour, terminates in a bluff from which cliff extends 1.5 miles along the shore to the NW. Two peaks, each about 100m high, are located about 1 mile NW of the point and can easily be identified from the NE. Myrmidon Ledge, a drying reef, extends 0.4 mile SE of Vancouver Point and a 4.6m patch lies about 0.75 mile NE of the point.

Cowan Patches (14°50'S., 128°16'E.), with a least depth of 3.4m and with shoal depths extending 2.5 miles SW, lies centered about 4.5 miles E of Vancouver Point. A depth of 9.6m lies midway between Cowan Patches and Lacrosse Island.

Guthrie Banks (14°55'S., 128°10'E.), which dry up to 3m, extend approximately 8 miles S of Vancouver Point and up to 4 miles offshore. These banks consist mostly of sand and nearly fill the W part of the gulf S of the above point; the NE extremity of Guthrie Banks lies only 1.25 miles W of the SW limit of Cowan Patches.

East Banks (14°56'S., 128°16'E.), which dry up to 3.6m, lie on the E side of the fairway. about 7 miles SE of Vancouver Point. The shore within these banks and between them and Cape Domett consists of a series of poorly-defined inlets formed by low mangrove islands and should not be approached without local knowledge.

Adolphus Island, a hilly island with a maximum elevation of 234m, lies with **Nicholls Point** (15°03'S., 128°07'E.), its NW extremity, about 20 miles SSW of Lacrosse Island. The shores of the island are low and mangrove-covered, with the exception of the above point, and are about 24m high, with Webster Bluff and Steep Head, two cliffy projections, on the W side.

Australind Bank extends about 4 miles NE of Nicholls Point and consists of drying sand banks. Small vessels can take anchorage off the W side of this bank, about 2.5 miles NNE of Nicholls Point, where they will be clear of the main tidal currents, in depths of 9.1 to 11m.

2.83 Black Cliff Point (15°02'S., 128°06'E.), conspicuous from NE, lies 1.25 miles W of Nicholls Point and is a rocky bluff surmounted by a grassy slope 19m high. Pilots steer for Black Cliff Point, bearing 225°, from the boarding ground S of Lacrosse Island; a 144m high hill lies about 1 mile SW of the point and forms a range on this bearing; caution is necessary as there are numerous other hills in this area.

Directions.—The channel S of Nicholls Point is difficult and intricate and should not be attempted by vessels without a pilot. The tidal currents run up to 6 knots at springs and cross the track in places. The fairway has a least depth of 6.4m and a minimum width of about 0.2 mile; it should not be run by large vessels below the level of half tide.

Vessels approaching Black Cliff Point on a course of 225° alter their heading for Agnew Point when it comes in line, bearing 203°, with Flat Top Hill, 266m high, about 5 miles SSW. When Saville Islet, 1 mile N of **Dundas Point** (15°10'S., 128°06'E.), the N extremity of Fairfax Island, bears 186°, steer for it to maintain a mid-channel course until off **Steep Head** (16°18'S., 123°31'E.), the W extremity of Adolphus Island.

From Steep Head, vessels steer to pass E of Saville Islet and then in mid-channel between Fairfax Island and Kent Islet, about 0.5 mile NE. The channel then leads E of Fairfax Island and E of Russell Island, about 2 miles S, to a position about 0.35 mile E of **Pender Point Light** (15°17'S., 128°06'E.). A shoal depth of 4.1m was reported (1990) to lie about 0.4 mile S of the S end of Fairfax Island.

2.84 Hare Channel (15°19'S., 128°04'E.) leads SW from Pender Point between the mainland and Middle Ground, a bank of sand marked by beacons, which nearly blocks Main Channel to the E. At Laffan Point, 2.5 miles SW of Pender Point, the channel turns SSE for Wyndham. The least depth in Hare Channel, in the approach to Wyndham, is 6.4m.

Range beacons mark both reaches of Hare Channel. The first set, on Laffan Point, consists of two range marks, all in line bearing 228°; the second set, N of Laffan Point, consists of two white columns in line bearing 336.75°, and also two white columns, on the E shore N of Wyndham, in line bearing 156.75°. On approaching the S part of the second range, vessels must veer to the E and pass between two beacons to avoid the tongue extending NNE from Myrmidon Bank. Vessels may then shape a course for the wharf, giving Stony Point a wide berth.

Anchorage can be taken SW of Steep Head, in mid-channel depths of 22 to 31m, by ocean-going vessels waiting for the tide or slack water. Tidal currents run about 3 knots at springs in this area.

Wyndham (15°27'S., 128°06'E.)

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2.85 Wyndham is the principal port in the Kimberly District for the export of cattle and frozen meat. A large meat plant has been erected in the town and is well-equipped with engineering and other facilities. The wharf is specially equipped with facilities for the loading of frozen cargoes and rail facilities lead directly from the meat plant to the berths.

Winds—Weather.—From April to September, the Southeast Monsoon prevails and brings a considerable amount of haze to the area. Fresh SE winds blow in the outer part of Cambridge Gulf at this time, but the port area is protected by the hills to the E.

In September, the weather is hot and misty, and continues so until the rains of the Northwest Monsoon set in, usually in October or November. Flies and mosquitoes are prevalent.

Tides—Currents.—At Wyndham, mean spring tides rise 7.4m, and mean neaps rise 5.6m. At Lacrosse Island, the tidal rise is about 0.8m less.

The flood sets on to both ends of the wharf at a slight angle with a rate of 2.5 to 3 knots. The ebb currents set off the wharf at a slight angle with a rate of 3 to 4 knots.

Currents in the approach to Wyndham are included with the descriptions under Cambridge Gulf in paragraph 2.79.

Depths—Limitations.—The least depth in Hare Channel in the approach to Wyndham is 6.4m.

Wyndham Wharf (Meat Works Wharf) is 482m long. There are two berths, with an alongside depth of 9.1m; the bottom is composed of mud and silt and is subject to silting. The wharf is of steel structure and flush-decked, allowing road and rail traffic.

An unmarked wreck, with a least depth of 3.6m, lies off the NW end of the wharf.

A shoal, with a depth of 3.3m, lies about 1 mile S of the SW end of the Meat Works Wharf.

Vessels up to 190m in length, with a maximum allowable draft of 8.8m, can be taken to Wyndham on most high waters; vessels up to 26,000 tons, with a length of 210m, have been accommodated.

Vessels are taken in and out during daylight hours only.

Wyndham Port Facility

Pilotage.—Pilotage is compulsory. Pilots board 4.7 miles S of Lacrosse Island Light. See Cambridge Gulf, paragraph 2.79, for additional information.

Anchorage.—Anchorage can be taken about 0.25 mile WSW of Wyndham Wharf, in a depth of 9.1m, mud.

Vessels subject to quarantine must anchor on a line S of Wyndham Wharf and N of Anthon Landing, about 0.5 mile S. Caution is necessary to avoid the 3.3m patch about 0.5 mile S of the latter wharf.

Directions.—The port is marked by a leading line bearing 045.2°.

Joseph Bonaparte Gulf (continued)

2.86 The coast from **Cape Dussejour** (14°45'S., 128°13'E.) trends NW for 70 miles to Cape Rulhieres and is mostly rocky with a few sandy beaches. It is open, exposed, and fronted by rocks, which in places extend about 2 miles offshore. Large areas of sand waves exist between King Shoals and Cape Rulhieres, extending to a distance of about 12 miles offshore. The largest area of these sandwaves lies to seaward of Rocky Islet and in 1975 carried a least depth of 8.8m.

Deep-draft vessels should exercise caution within this area and are advised to remain to seaward of the 50m depth contour when passing between Medusa Banks and Lesueur Islet.

The sandwave areas may be clearly identified by day when the tidal current transports bottom sediment and causes brown discoloration.

Obstruction Hill (14°40'S., 128°08'E.), 184m high, rises close to the coast about 7.5 miles NW of Cape Dussejour and is one of the highest hills in this area. Double Hammock, consisting of two peaks, 140 and 138m high, lies 2 miles SE of Obstruction Hill and Hunch Hill, about 175m high, lies about 3.5 miles SSW of Double Hammock.

Caution.—Vessels are advised against basing navigation wholly upon these hills, as there are numerous peaks in this area and identification may be difficult under some conditions.

Wyndham Wharf

2.87 **Thurburn Bluff** (14°35'S., 128°03'E.), about 30m high, rises 7 miles NW of Obstruction Hill; the coast is fringed by cliffs for 3 miles SE and 2 miles NW. About 3.5 miles NW of Thurburn Bluff, there is a bay 2.25 miles wide, which dries up to 1.25 miles from its head. Above-water and submerged rocks extend up to 0.2 mile off the SE entrance point.

Buckle Head (14°26'S., 127°53'E.), about 13.5 miles NW of Thurburn Bluff, rises to a height of 76m, with a shoal bay on each side. Reveley Island, 63m high, lies close offshore, 5 miles NW of Buckle Head. Two barren islets, from 9 to 23m high, lie about 1.75 miles E of the island; they are both surrounded by a reef.

Mount Casuarina (14°24'S., 127°42'E.), 210m high and flat-topped, rises 7 miles W of Reveley Island. There are some conspicuous sand hills, 92m high near Cape St. Lambert, about 4 miles NW of the same island.

Cape Rulhieres (13°56'S., 127°22'E.), the W entrance point of Joseph Bonaparte Gulf, has a white cliffy appearance and

several projecting points from which rocky ledges extend up to 1.5 miles. The coast SE of the cape, for about 24 miles, has not been closely examined, but several rocky islets and dangers are known to exist along this stretch.

There is a rocky bay S of Cape Bernier, about 9 miles SE of Cape Rulhieres, which affords shelter to boats, but there are several dangerous patches within it.

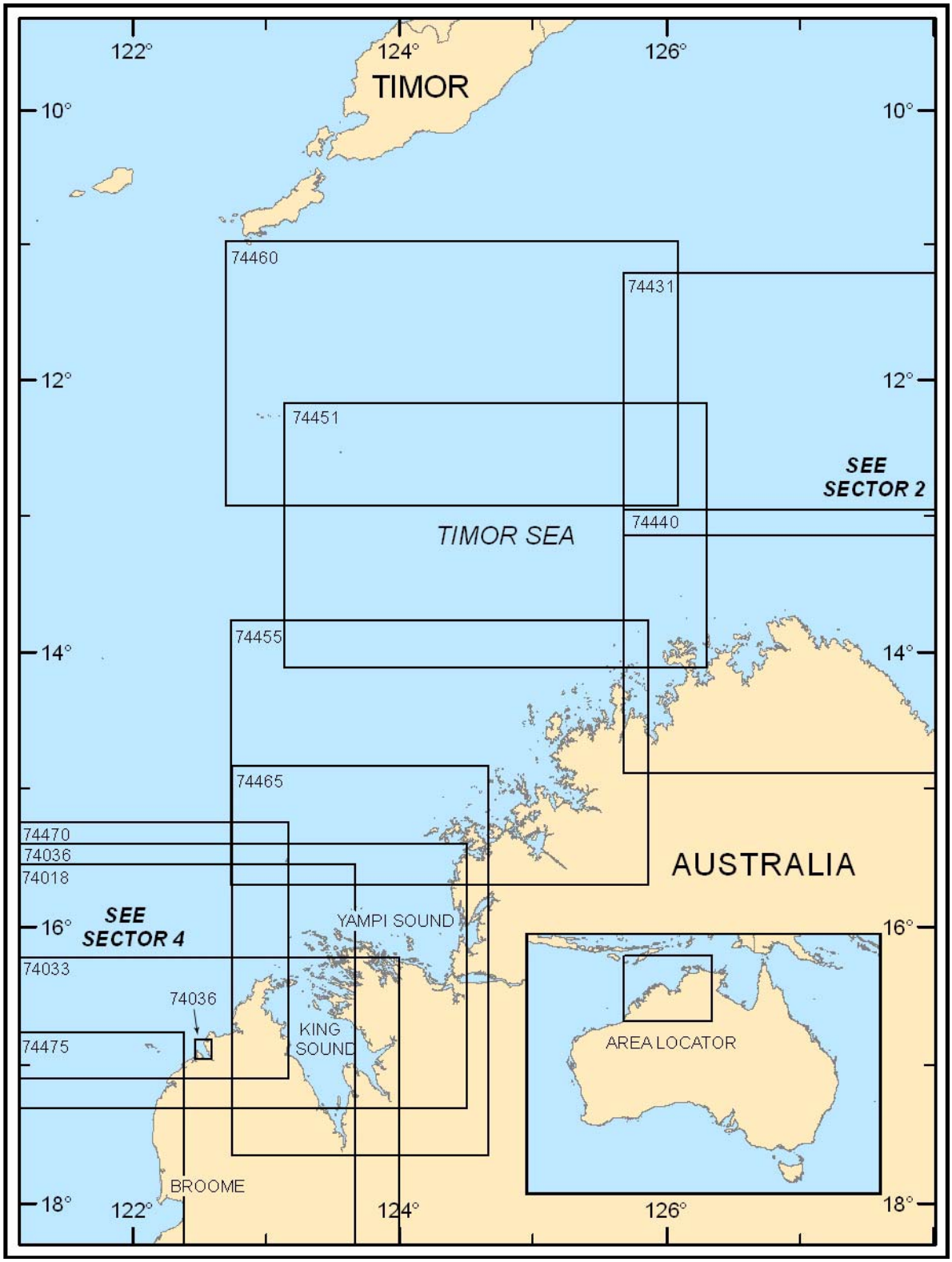
Cape Rulhieres to Cape Londonderry

2.88 Lesueur Islet (13°50'S., 127°16'E.), about 6 miles NW of Cape Rulhieres, is low, sandy, and surrounded by coral reefs which extends up to 1.5 miles from the NE and W sides. There appears to be a passage between the island and the mainland, but in 1983, the islet was reported to lie 1.4 miles NW of its charted position and caution is advised. A light is shown from a metal framework tower on the NW extremity of the islet.

The coast trends W from Cape Rulhieres for about 10 miles to a high islet lying close offshore. The shore is much indented with shoal bays, which have not been closely examined, and reefs, which dry in patches, extend about 3 miles NE of the high islet. A sandy bay lies SW of Cape Rulhieres and the King George River empties at its head; this bay has been visited by small craft.

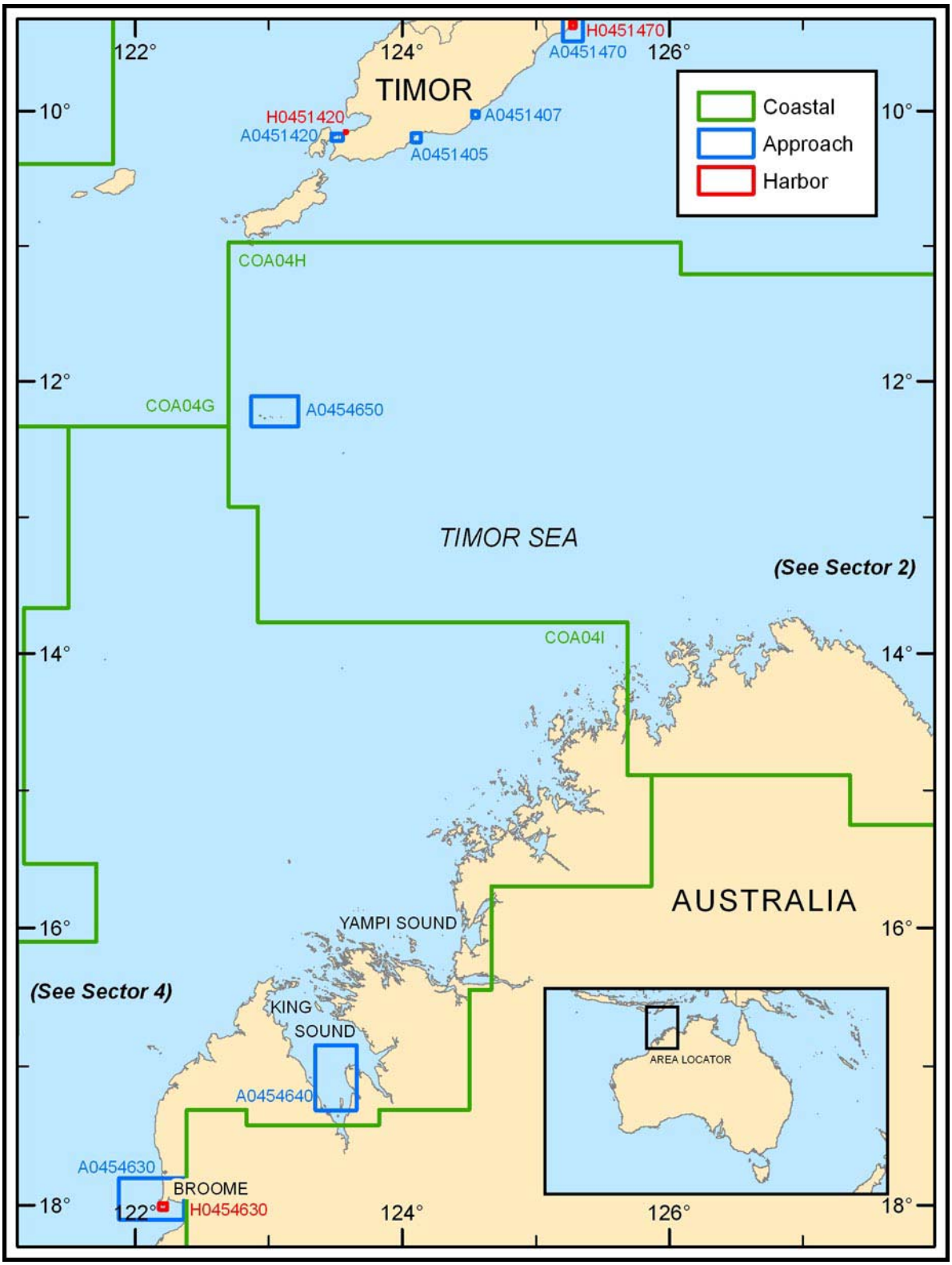
Caution.—Depths of 5.8m and 9.4m were reported (1983) to lie 1.5 miles SSW and 1.25 miles W, respectively, of Cape Rulhieres.

The coast from the above high islet extends about 16 miles NW to Cape Londonderry and is much indented by small bays and coves, the entrance points of which are fringed by reefs. One of these bays, about 8 miles SE of Cape Londonderry, forms a boat haven with sandy shores. The headland 6.5 miles SE of the cape is marked by red cliffs. Three wells lie 55 miles NE of Lesueur Island in positions: 13°10'.8’S 127°55.4’E, 13° 13.3’S 128°03.9’E, 12°53.2’S 128°29.8’E, and 12°51.1’S 128° 31.0’E.



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

NORTHWEST COAST OF AUSTRALIA—CAPE LONDONDERRY TO CAPE LEVEQUE

Plan.—This sector describes the NW coast of Australia from Cape Londonderry SW to Cape Leveque, and includes the offshore islands and dangers relative to their adjacent coastline. The outlying dangers, from Sahul Bank to Scott Reef, are described at the beginning of the sector after General Remarks.

General Remarks

3.1 Winds—Weather.—The Northwest Monsoon becomes well-established over the area described in the sector by early in January, bringing clouds, rain and thunderstorms. Tropical depressions frequently occur during the period from December to April and vessels should be prepared for them.

The Southeast Monsoon is accompanied by fine weather, usually from May to September, but may reach force 5 to 7 over the open sea. A full description of the monsoon seasons is contained paragraph 1.1.

Tropical storms, known as "Willy Willies," in which the wind may reach hurricane velocity, affect the coastline during the summer season. A full description is contained in paragraph 2.1.

Tides—Currents.—Because of the configuration of the coastal area between Cape Londonderry and Cape Leveque, and the restricting nature of the Timor Sea, the Indian Ocean tidal waves produces very large tides along this section of the Australian coast. Mean spring rises, as much as 10m, occur in some of the bays and sounds, although the average rises appear to be between 6 and 7m. Under such conditions, large apparent changes in hydrography and topography occur and caution is required.

The offshore currents in the region are highly variable. For further information, see paragraph 1.1.

Aspect.—With the exception of King Sound and Yampi Sound, the bays, gulfs, and sounds included in this sector contain only anchorages for vessels with local knowledge. The numerous off-lying dangers, and the limited number of navigational aids throughout this area, make the approach to the coast difficult for large vessels, even in daylight.

Yampi Sound (16°08'S., 123°38'E.), described in paragraph 3.75, contains facilities for loading ore, the berth being situated on the S side of Cockatoo Island. The ore piers can accommodate vessels up to 160,000 dwt, but no other facilities are available.

King Sound (16°25'S., 123°20'E.), described in paragraph 3.94, contains the port of Derby, situated on the E side of the sound near its head. The harbor dries at low water, but tides up to 10m allow moderate size vessels to dock, where they then lay over on the soft mud bottom until the next high water.

Caution.—The coast between Cape Londonderry and Hall Point, about 190 miles SW, is very indented and should be approached with caution because of the numerous off-lying islets, rocks, and reefs, as well as the strength of the tidal currents. In addition, certain portions of this coast have not been properly surveyed and some areas lie unsurveyed or only partly examined, requiring that when varying from the recommended tracks, the charts and sailing directions should be used with caution.

Oil exploration rigs and production platforms may be encountered off the NW coast of Australia and within the Timor Sea. The Australian Maritime Safety Authority has established shipping routes off its northwest coast to prevent vessels from colliding with offshore oil and gas rigs. Use of the new fairways is strongly recommended but not mandatory.

Sahul Banks—Outlying Islands and Dangers

3.2 The Sahul Banks consist of numerous shoals and banks of sand and coral rock extending ENE from the vicinity of position 12°45'S, 123°30'E to position 10°05'S, 127°25'E; so far as is known the depths over these shoals and banks range from 5 to 29.5m. The shoaled area extends farther ENE, to Evans Shoal (9°55'S., 129°33'E.), with least depths ranging from 4 to 8.4m. The banks rise abruptly from the sea bed in positions generally near to the charted 200m curve, which runs approximately parallel to the S coast of Timor, and at an average distance of about 80 miles. The northwestern most known shoal has a depth of 29.5m, coral, and lies 70 miles SE of Tandjung Oisana, the SW extremity of Timor. The bottom near these banks is generally coarse sand and broken shells, with white sand farther off. When clear of the banks, the bottom consists of green muddy sand. No breakers have been seen on the Sahul Banks, although it was stated to be dangerous in places.

The Sahul Banks and the area in their vicinity has only been partially surveyed and vessels navigating in the neighborhood should proceed with caution. A recommended track (122°-302°) through North Sahul Passage (10°10'S., 126°50'E.) is indicated on the charts for passing NE of Sahul Banks.

Bayu-Undan Gas Field (11°04'S., 126°39'E.), is situated in the central Timor Sea about 270 miles NW of Darwin, Australia and about 135 miles S of Suai in East Timor. The field consists of a lighted production platform, from which a racon is transmitted, and an FSO, which lies 2 miles WNW. Mooring buoys are also present. The field stands in 80m of water. Production began in late 2003 and is expected to have a life of 25 years.

An Operational Restricted Zone, with a radius of 5 miles, is centered on the platform. Vessels must remain outside of this zone.

Pilotage is compulsory for all vessels. Vessels should send their ETA to the terminal 72 hours, 48 hours, 24 hours, and 12 hours prior to arrival. Contact can be made with the terminal by VHF for pilot boarding information when within the 5-mile zone. The pilot normally boards approximately 2 miles N and W of the terminal.

Elang Terminal (Kakatua) (10°52'S., 126°34'E.), consisting of a LANBY, is situated within an area of oil wells and submerged pipelines that is best seen on the chart. The terminal stands in 90m of water. An anchorage area lies 12.5 miles NE

of the LANBY. A cautionary area has been established and is centered in this location.

Laminaria and Corallina Fields (10°37'S., 126°00'E.), are situated in a remote area of the Timor Sea, approximately 300 miles WNW of Darwin and 85 miles S of Timor. The terminal consists of an SPM lying about 11.5 miles WNW of Elang Terminal, is situated within an area of oil wells and submarine pipelines that is best seen on the chart. The Northern Endeavor Marine Terminal (10°38'S., 126°59'E.), a FPSO, is permanently moored between the two fields. A cautionary area has been established and is centered in this location.

Pilotage.—The pilot boards 3 miles N in position 10°34'S, 125°59'E.

Caution.—Between longitudes 125°05'E and 127°21'E, vessels not registered to the Republic of Indonesia are prohibited from entering waters within 12 miles of the S coast of Timor.

3.3 Dillon Shoal (11°00'S., 125°35'E.) has a depth of 13.1m and lies 17 miles SSW of Karmt Shoal. Between Dillon Shoal and Barton Shoal, 26.5 miles SW, there are several shoals and banks with depths of 18.3m or less; Barton Shoal has a least depth of 13.7m.

In 1936, a depth of 25.5m was reported about 75 miles ENE of Dillon Shoal; its position is approximate.

Other shoal areas, best seen on the chart, lie between Barton Shoal and **Mangola Shoal** (11°40'S., 125°07'E.), which has a least known depth of 9m and lies about 22 miles SW of Barton Shoal.

Pee Shoal (11°45'S., 124°50'E.), with a least known depth of 10.3m, lies 14.5 miles SW of Mangola Shoal. A number of other banks in the vicinity are best seen on the chart.

Fantome Bank (11°38'S., 123°57'E.) has a least known depth of 7.1m; a depth of 7.3m was reported 6.5 miles SSE of the charted position of Fantome Bank and an 18m patch lies 6 miles NE of the same position.

Vee Shoal (11°50'S., 123°49'E.) has a least known depth of 13.4m and lies 14 miles SW of Fantome Shoal. A number of banks, with depths of 12.5 to 30.5m, lie about 20 miles between the bearings W and NNW from Vee Shoal; these banks have not been thoroughly examined.

3.4 Hibernia Reef (11°59'S., 123°21'E.), reported to lie 1.6 miles NW, is composed of coral and dries, with a drying sand bank near its E extremity. Extensive banks, with unexamined depths as shoal as 12.8m, lie between 5 and 30 miles N and NNE of Hibernia Reef.

Ashmore Reef (12°15'S., 123°03'E.), composed of coral and sand, with four low islets on it, and also several sandbanks which dry about 2.1m, lies 19 miles SW of Hibernia Reef.

Fresh water has been used from wells on all the islets, but in 1984 it was reported that all the wells were contaminated.

East Islet and Middle Islet are each 3m high, sandy and covered with grass; the top of Middle Islet is depressed. There is a conspicuous tree on Middle Islet. West Islet is about 2.5m high.

There are depths of 7.9m 1.75 miles NNE and 25.5m 13.75 miles NE of West Islet. Marlin Bank, located 2.5 miles NNE of West Islet and extending 3 miles NE, has a least depth of 9.5m.

The S side of Ashmore Reef is an unbroken ridge of coral marked by heavy breakers, while its N edge is broken with four passages to the lagoons, of which only the W one was examined.

The W opening lies 2 miles NE of West Islet and leads into a lagoon where there are numerous detached reefs and coral heads, many of which have charted depths of less than 2m, in general depths of 10 to 25m. A visitors' mooring is situated in the lagoon.

A 9.1m shoal lies 6 miles N of East Islet; a 10.6m shoal lies 8 miles NE of East Islet.

Anchorage can be found anywhere along the N side of Ashmore Reef, in depths of 31 to 46m at a distance of about 1 mile.

Tidal currents in the vicinity of Ashmore Reef set E on the flood and W on the ebb. In the vicinity of the entrance to the W lagoon, the current is reported to set SE on the flood and NW on the ebb. The effect is fairly local and rates of up to 4 knots are evident at springs.

3.5 Johnson Bank (12°23'S., 123°17'E.), 12.5 miles SE of East Islet, has not been closely examined. It has a least known depth of 8.5m, and a 10.7m patch lies 4.5 miles ESE of it; both are located on an extensive bank with depths of 20m and less.

Woodbine Bank (12°24'S., 123°30'E.), of sand and coral, with a least depth of 11.5m, lies 13 miles E of Johnson Bank. The 200m curve SW and SE of Woodbine Bank is marked by tide rips.

Cartier Islet (12°32'S., 123°33'E.), 1m high, lies 29 miles SE of Ashmore Reef and is formed of sand and loose coral; the surrounding reef dries in places and is steep-to.

The islet is now the site of the Cartier Island Marine Reserve. Access to the reserve is prohibited. Legal action will not be taken against masters or crewmembers of vessels forced to shelter in the reserve for safety reasons. No collecting or fishing is permitted in the reserve.

Caution.—Cartier Islet is a former Military Exercise Area and may contain unexploded ordnance.

3.6 Pasco Passage (12°28'S., 123°32'E.), with depths of over 183m, lies N of Cartier Islet, at the S end of the charted 183m shelf extending S from Woodbine Bank.

In moderate weather the sea does not break on Cartier Islet Reef from 2 hours before to 2 hours after high water. As the current attains a rate of 1 knot, and its direction is uncertain, it presents a considerable danger to vessels, especially as soundings give no warning. A tide rip exists within the passage at position 12°25'S, 123°45'E.

The bottom between a distance of 10 and 20 miles NE of Cartier Islet is uneven and rocky, with the soundings varying from 20 to 90m, but no dangers have been reported.

Anchorage, good in SE winds, can be obtained about 0.25 mile off the W extremity of Cartier Islet Reef, in a depth of 38m. Landing is possible from 2 hours before until 2 hours after high water if the wind is light.

Wave Governor Bank (12°34'S., 123°36'E.), with a depth of 33m, lies 3.5 miles SE of Cartier Islet. Barracouta Shoal, with a least known depth of 10.3m, lies 25.5 miles E of Wave Governor Bank; a detached 25.5m bank lies 8.5 miles NE of this shoal. An oil wellhead, marked by a lighted buoy, lies 23 miles NE of Barracouta Shoal; vessels are requested to pass at no less than 2.25 miles.

Vulcan Shoal (12°48'S., 124°17'E.), composed of live coral,

with a least depth of 9.5m, lies 45 miles ESE of Cartier Islet, and it is steep-to. A 18.8m patch lies 7 miles SE of Vulcan Shoal. Eugene McDermott Shoal, with a least depth of 15.5m, lies 24 miles SE of Vulcan Shoal.

Osborn Passage, between Barracouta Shoal and Vulcan Shoal, lies near the entrance to one of the recommended tracks, indicated on the charts, approaching Port Darwin and Clarence Strait from W. The entrance to this track lies 11 miles SE of Cartier Islet.

3.7 Seringapatam Reef (13°40'S., 122°05'E.) encloses a lagoon. The reef dries and there are large boulders round its edges, with a few sandbanks, which dry about 1.8m, on its W side; it is steep-to on all sides. On a calm night the breakers on the reef were heard from a distance of 6 miles.

Scott Reefs (14°00'S., 121°53'E.), lying 15 miles SSW of Seringapatam Reef, consists of three separate coral reefs enclosing lagoons. North Reef encloses a lagoon and South Reef is crescent-shaped. Each reef is of considerable extent, almost dry, and has several above-water rocks on their outer edges.

Sandy Islet (14°03'S., 121°46'E.) lies on the central Scott Reef; this reef dries and extends from 0.5 to 1 mile from the islet. There is a conspicuous tower on the islet and also a boulder which dries 2.4m near its N end; a detached reef, which dries 0.6m, lies 1.5 miles NE of Sandy Islet.

East Hook and West Hook are the E and W extremities, respectively, of the N ends of South Reef. Between North Reef and South Reef there is a passage, about 1 mile wide, with depths of more than 366m; there is also a passage, with a depth of 33m, between the reef surrounding Sandy Islet and West Hook.

A stranded wreck lies approximately 2.5 miles SW of Sandy Islet just off West Hook.

The lagoon enclosed by South Reef has depths of over 24m throughout the greater portion. The lagoon within North Reef has not been examined, but is apparently deep.

The depths are great around Scott Reef. The sea breaks heavily on the weather side, and at night the breakers may be heard from some distance; the lee side is quite smooth, but the tidal currents are strong, and caution is necessary when approaching the reef as soundings give no warning.

The recommended offshore track passes about 10 to 15 miles S of Scott Reef.

3.8 Montara Oil Terminal (12°39.6'S., 124°32.7'E.) is situated to the S of Sahul Banks and consists of a permanently-moored converted tanker. The terminal is lighted and vessels are to avoid navigating, anchoring or fishing within the cautionary area around the terminal.

Cape Londonderry to Cape Talbot

3.9 Cape Londonderry (13°44'S., 126°58'E.) is a low, rocky headland from which a drying reef extends nearly 5 miles NNW; the two Stewart Islets, about 6m high and sandy, lie on the outer end of this reef and are surrounded by foul ground.

Two shoal bays indent the coast W of Cape Londonderry, but both are open to the NW and appear to be foul. Drying reef and foul ground extend right across the entrance to these bays, between Cape Londonderry and Cape Talbot, and up to 6 miles offshore.

Montara Oil Terminal

Caution.—The sea N and W of the Stewart Islets is often discolored and many tide rips are formed. Vessels should give this area a wide berth as uncharted dangers may exist.

3.10 Cape Talbot (13°48'S., 126°45'E.), about 13 miles WSW of Cape Londonderry, is low, sandy, and closely backed by trees and scrub. The extremity of the cape is difficult to distinguish from seaward because of its low-lying nature and the contour of the land to the E. The land behind the cape is thickly wooded and rises slightly with the tops of the trees reaching a height of about 18m.

A drying reef extends 4.5 miles NNE from Cape Talbot and Sandy Islet, 3m high, lies 3 miles NE of the cape; there is another islet 1.5 miles farther ENE. A spit, with a depth of 7.6m on its extremity, extends 3 miles NW of the cape and is marked by muddy patches during the strength of the tidal currents.

Napier Broome Bay

3.11 Napier Broome Bay (14°00'S., 126°47'E.) is entered between Cape Talbot and the NE extremity of the Sir Graham Moore Islands, about 7.5 miles WSW. The shores of the bay are indented by four smaller bays separated by projecting points, between which sheltered anchorage can be taken; however, the approaches are somewhat encumbered by shoals and obstructions, and some local knowledge is recommended.

The **Sir Graham Moore Islands** (13°52'S., 126°36'E.), two in number, lie on the W side of the entrance to Napier Broome Bay and are marked by a distinctive flat-topped summit, 61m high, located on the NE island and shaped like a truncated cone. In clear weather this is the first land sighted on the approach to the coast; from offshore the islands appear as one.

Scorpion Point, the E extremity of the NE island, is 11m high and the extremity of a low neck of land; a detached drying reef lies about 0.5 mile NE of the N end of the island, and an obstruction was reported (1968) about 2.75 miles ESE of Scorpion Point. In 1986, depths of 0.3m and 4.9m were reported

about 4 miles ESE and 3.75 miles E, respectively, of the point. The 0.3m shoal is marked by eddies when the current is running.

The SW and larger of the Sir Graham Moore Islands rises to a conspicuous bluff, 55m high, at its E extremity, which is joined to the W part of the island by a low wooded neck of land. The NW and W sides of the island have not been surveyed, but a mast is charted on the NW extremity.

Koojara Shoal (13°47'S., 126°35'E.), with a least depth of 0.8m about 4.5 miles NNW of the NE Sir Graham Moore Island, lies on the NE end of a reef which extends SW to the NW extremity of the larger Sir Graham Moore Island. The N end of this reef, about 0.5 mile NNW of the shoal, breaks in N winds; a depth of 0.8m lies about 1.5 miles SSE of the islet.

3.12 Anjo Point (13°57'S., 126°35'E.), the E extremity of the Anjo Peninsula, lies on the W side of Napier Broome Bay, about 3 miles S of the Sir Graham Moore Islands, with Geranium Bay between. The point, which is formed by a thin finger of land, is thickly wooded as is the peninsula SW, and forms a cove on its S side.

Carronade Islet, 12m high, lies 1.5 miles E of Anjo Point and is sandy and covered with small trees about 15m high; there is a conspicuous group of rocks on the E side of the islet.

Geranium Harbor (13°55'S., 126°34'E.), entered between the SE extremity of the Sir Graham Moore Islands and Carronade Island, is about 1.5 miles wide and 5 miles long with general depths of 13 to 20m, mud. The harbor provides sheltered anchorage for a number of vessels with local knowledge, but should only be approached from the E, as the S and W entrances are foul. The three small Geranium Islets lie on the N side of the harbor, off the narrow neck of land joining the E extremity of Sir Graham Moore Island to its main part. The outer islet is 12m high and the two inner islets are covered with mangroves.

The **Louis Islets** (14°01'S., 126°34'E.), four in number, lie centered in an area fouled by rocks and a reef about 5 miles SW of Carronade Islet. The SE islet, known as Bird Islet, lies near the outer edge of the foul area, but shoal water extends nearly 1 mile farther to the E and S; large numbers of sea birds nest here. The inner islets are covered with trees about 12m high.

Mackenzie Anchorage (14°01'S., 126°32'E.), S of the Louis Islets, is approached from a position about 1.5 miles S of Bird Rock, and affords good shelter, in depths of 9 to 13m. The tidal currents are weak here, but caution is necessary on entering due to the shoal water S of the Louis Islets and Pearl Shoal, with a depth of 1.8m, about 3 miles S of Bird Rock.

West Bay (14°05'S., 126°29'E.), entered between Guy Point, about 5 miles SSW of the Louis Islets, and a point 2 miles NW, has not been completely surveyed but has a depth of 9.1m in its center. The shores are low and wooded, much of it covered with mangroves except in the beach areas; there is an old jetty charted at the W end of the bay. Vessels with local knowledge can enter West Bay and anchor, in a depth of 7.3m, mud, near the W shore. The W side of the bay is shoal. In 1984, a depth of 2.7m was reported in the bay about 3 miles W of Guy Point.

Bluff Point (14°04'S., 126°39'E.), high and rocky, is an elongated point extending from the SE side of Napier Broome Bay which is closely backed by a hill rising to a height of 66m; this hill slopes gradually to the head of Mission Cove where it is low and covered with brush.

Caution.—Due to the existence of unexploded mines, a danger area, with a radius of 1 mile, is centered approximately 1 mile NE of Bluff Point.

3.13 Deep Bay (14°07'S., 126°38'E.), at the head of Napier Broome Bay, is entered between Guy Point and Bluff Point, but provides little anchorage as it is open to the N and shoal at its head. King Harman Point is located on the SW side of the bay and Pim Hill, 201m high, rises to a conspicuous bare summit about 2.5 miles SW of the point.

Mission Bay (14°06'S., 126°42'E.), entered between Bluff Point and Red Bluff, about 4.5 miles NE, provides some of the best shelter in Napier Broome Bay. Mission Cove, so named because of the abandoned mission near its head, lies at the S end of the bay and has a channel, with a depth of 8.2m, extending from the entrance to within 1 mile of its head. Depths shoal rapidly outside the channel and at the head of Mission Cove; caution is required. The E and SE shores of the cove are fairly clear of mangroves, but the remainder is thickly covered; the buildings of the old mission can be seen through the trees.

Anchorages.—There is good anchorage in the entrance to Mission Cove, in a depth of 9.1m, about midway between the entrance points; anchorage is also available in the middle of the cove, NW of the mission station, in a depth of 8.2m.

Anchorage can be taken by vessels of moderate size, in depths of 11 to 12m, mud, about 3 miles N of Bluff Point; anchorage is also available, in depths of 14 to 16m, about 3.5 miles ENE of Scorpion Point in the entrance to Napier Broome Bay.

3.14 The **Governor Islets** (13°56'S., 126°42'E.), consisting of West Governor Islet, the largest of the two, and East Governor Islet, are located close together on the E side of Napier Broome Bay, about 2 miles NNW of the N extremity of Red Bluff. Both islands are foul and not completely examined, but the latter is marked by a conspicuous mass of wedge-shaped rock, the W side of which is perpendicular and especially noticeable when viewed from N. Both islets are lighter in contrast than the coast to the S.

Steamer Rock, 6m high, lies 2 mile NNE of East Governor Islet, and resembles a ship from a distance.

Directions.—Steer on a course of 190° for the 61m high flat-topped summit of the NE of the Sir Graham Moore Islands as soon as it is sighted. Alter course to 167° for the perpendicular cliff, which looks like a wedge-shaped mass of rock when viewed from N, located on the W side of East Governor Island, when it comes on that bearing.

When the NW extremity of Carronade Islet and Anjo Point, the E extremity of the Anjo Peninsula, come into line on a bearing of 230°, steer on that bearing until the N point of the NE of the Sir Graham Moore Islands is abeam, when course can be altered to 203° for Mackenzie Anchorage or to 180° for Mission Bay, as desired.

Vansittart Bay

3.15 Vansittart Bay (14°04'S., 126°18'E.) is formed by an indentation of the coast about 20 miles W of Napier Broome Bay. It must be approached from E of Cape Bougainville, de-

scribed below, and is available as an anchorage for ocean-going vessels; however, the bay is mostly unsurveyed and only partially examined, and local knowledge is strongly recommended.

Cape Bougainville (13°53'S., 126°06'E.), the N extremity of an extensive peninsula which separates Vansittart Bay from Admiralty Gulf, is 54m high and fringed with reef. Red Islet, 35m high, lies close off its E extremity and is fronted by red cliffs which are conspicuous when the sun is in a favorable position.

Caution.—For a distance of 50 miles from Cape Bougainville, the water is so discolored and isolated rocks so numerous that it is highly probable uncharted dangers exist. Vessels having a draft of more than 3.7m should proceed cautiously at low water.

A shoal, with a least depth of 1.2m, lies about 4 miles W of the W extremity of Sir Graham Moore Island.

3.16 Approach to Vansittart Bay.—Jones Islet (13°45'S., 126°21'E.), 3m high, is sandy and surrounded by reef. It lies near the NW extremity of a large shoal area, known as the Eclipse Archipelago, which uncovers in places, and extends up to 9 miles E and 14 miles S of the islet. Numerous rocks and dangers lie within this area, the exact limits of which are unknown in places.

Tait Bank (13°45'S., 126°15'E.), with a least depth of 7.3m, lies 6 miles W of Jones Islet and is best passed to the N and W.

The **Eclipse Islands** (13°54'S., 126°19'E.), four in number and unsurveyed, lie surrounded by reef and rocks on the S end of the Eclipse Archipelago. Long Island, the SE of the group, is rugged and consists mainly of masses of worn sandstone; Eclipse Hill, on an island close W of Long Island, rises to a flat-topped summit 86m high, and forms a good mark.

Mary Island (13°59'S., 126°23'E.), 3 miles SE of Long Island, is connected to the mainland E and S by reef. A drying reef extends 1 mile NW from the island and rocks and dangers extend nearly 2 miles SW from this reef. A bare rock, 6m high, lies on the reef 3.5 miles ENE of Mary Island, and an islet lies about 1.5 miles SE of the rock. Middle Rock, 0.6m high, lies midway between Mary Island and Long Island. There is an obstruction W of the rock. A boat passage is reported between the rock and the reef extending NW from Mary Island.

Vansittart Bay is entered between Mary Island and a point on the Bougainville Peninsula, about 8 miles W. The E part of this peninsula is indented and mostly unsurveyed, but a 90m hill is charted on another point about 3 miles SE of Cape Bougainville.

Anchorage.—There is good anchorage in the middle of the entrance to Vansittart Bay, in depths of 12.8 to 16.5m, mud, usually with a light to moderate breeze from sea. As stated before, the approach to this anchorage is unsurveyed and only partially examined, therefore, caution is necessary on entering.

3.17 Several small bays indent the W shore and the head of Vansittart Bay, but none have been properly surveyed and only small vessels with local knowledge should attempt to enter.

Jar Islet, to the W, and Low Islet lie near the head of Vansittart Bay, and there is a channel with depths of 13 to 15m between them.

Waratah Shoal, with a depth of 4m, lies on the E side of the entrance to this channel about 1 mile E of Jar Islet, and caution is required.

Anchorage.—Moderate-size vessels with local knowledge can obtain anchorage, in a depth of 15m, about 1.25 miles N of Jar Islet; small vessels can anchor about 0.75 mile S of Low Islet, in depths 7.3 to 9m, mud.

Islands and Dangers North of Cape Bougainville

3.18 Islets, rocks, and reefs, with passages between, extend approximately 50 miles N from Cape Bougainville to the limits of Penguin Shoal. The depths throughout this area are very irregular, and the waters in the passages and over the deeps usually maintain a considerable amount of turbulence due to the tidal currents which run up to 3 knots in places.

Large vessels are recommended to only use the recommended tracks, which are charted about 4 miles N of Penguin Shoal, and never proceed into the waters S of this position. Vessels finding it necessary to enter the area should proceed at slow speed with caution, and at low water when many of the dangers are visible; the tidal rise in this vicinity is as much as 6m.

The water color gives no indication of danger. Uneven ground is frequently marked by overfalls and eddies on the flood current of the Northwest Monsoon and by the ebb current during the Southeast Trade Winds.

Holothuria Banks (13°51'S., 126°00'E.), with depths of less than 37m, extend from 14 to 47 miles N of Cape Bougainville. They consist mainly of dead coral, covered with sponges, and are roughly divided by Penguin Deeps, with depths of over 91m.

Penguin Shoal (13°05'S., 125°59'E.), composed of coral, has a least depth of 9.7m and lies off the N end of Holothuria Banks. It is the northernmost of the dangers extending from Cape Bougainville and has depths of 42 to 55m N of it.

Warn Rock (13°09'S., 126°06'E.), existence doubtful, with a least depth of 10.3m, is located on the N end of Holothuria Banks, about 8 miles ESE of Penguin Shoal.

3.19 Bassett-Smith Shoal (13°18'S., 125°45'E.), composed of coral, has a least depth of 4.8m and lies 19 miles SW of Penguin Shoal. It has been reported that the sea has not been seen to break over this shoal, and that there is nothing in the appearance of the water to indicate its position. All vessels are recommended to give it a wide berth. An 18m patch lies about 3 miles SW of this shoal.

Combe Rock (13°25'S., 125°55'E.), about 30 miles NNW of Cape Bougainville, lies on the W part of the S half of Holothuria Banks and dries up to 0.6m. Except in strong winds, it does not break when there is a depth of more than 1.8m; a rock, with a depth of 1.5m, lies 0.5 mile SW of Combe Rock.

East Holothuria Reef (13°35'S., 126°00'E.), which dries up to 3.7m in places, lies on the SE edge of Holothuria Banks, and covers an area about 10 miles long and up to 4 miles wide. A conspicuous rock, 0.6m high, is located on the N side of the reef, and a rock, awash at high water springs, lies on the E side.

West Holothuria Reef (13°35'S., 125°45'E.), which is reported to dry up to 2.1m, lies surrounded by foul ground on the SW edge of Holothuria Banks, about 28 miles NW of Cape Bougainville. This reef is seldom visible, as the tidal currents keep the waters in its vicinity most turbid.

East and West Holothuria Reefs are nearly connected by foul ground and drying patches which are dangerous to navigation. Vessels should never attempt to pass between these reefs.

Branch Banks (13°38'S., 126°12'E.) are two coral banks lying close together E of East Holothuria Reef; the N bank has a least depth of 10.3m, while the S has a least depth of 12.1m. A 15.9m patch lies about 4.5 miles N of Branch Banks.

Otway Bank (13°40'S., 126°04'E.), with a least depth of 1.5m, coral, lies off the SE end of East Holothuria Reef.

3.20 Troughton Islet (13°45'S., 126°09'E.), 9 miles NNE of Cape Bougainville, is 4m high and reddish in color. It is composed of ironstone, covered with grass, and is surrounded by a coral reef. Two prominent boulders, the largest 1.2m high, lie on the edge of the reef NE of the islet. A rock, which dries 1.5m, lies close off the S end of Troughton Islet. There is a landing place in an opening in the reef on the SW side of the islet.

A conspicuous white building stands on the islet. **Bishop Rocks** (13°44'S., 126°07'E.) consist of a small group of coral heads which dry 0.6m and lie 2 miles WNW of Troughton Islet. A reef, which dries 3.7m, lies about 0.75 mile ENE of Bishop Rocks, and shoals and foul ground extend intermittently for 8 miles NE of the reef.

Troughton Passage (13°48'S., 126°07'E.) leads E and S of Troughton Islet, with depths of 40m in the fairway. There are tide rips off the E and S extremities of the islet, and patches of mud and debris stirred up from the bottom sometimes have the appearance of coral reefs.

The channel between Troughton Islet and East Holothuria Reef is not recommended.

3.21 Van Cloon Shoal (12°39'S., 126°25'E.), with a least depth of 14.2m, lies about 38 miles NE of Penguin Shoal and 5 miles N of the recommended track. A heavy swell may build up over this shoal in strong N winds and vessels are cautioned to keep clear of it.

Baldwin Bank (12°51'S., 126°06'E.), with a least known depth of 15.5m, lies about 18 miles NE of Penguin Shoal and close N of the recommended track.

Gale Bank (12°37'S., 126°05'E.), with a least depth of 22m, lies 19 miles WNW of Van Cloon Shoal. There are depths of 37 to 55m within 2 miles of it.

Favell Bank (12°42'S., 126°09'E.), with a least depth of 22m, lies isolated about 7 miles SSE of Gale Bank. It is steep-to with depths of 55m within 1 mile of it.

Cape Bougainville to Gibson Point

3.22 The coast between **Cape Bougainville** (13°53'S., 126°06'E.) and Gibson Point, 9 miles SW, is heavily indented and forms several shoal bays. The land within rises to several flat-topped ridges from 40 to 130m high.

Hat Point (13°56'S., 126°01'E.), 5 miles WSW of Cape Bougainville, has an isolated hill on it, 42m high, which is easily identified from NE and SW. It is covered with brush and is the only good landmark in the vicinity.

The depths between Hat Point and the cape are very irregular with numerous tide rips over the outer part; a shoal bay between the points, provides shelter for small craft in S winds.

Landing in calm weather can be effected over the rock face on the W side of Hat Point, and also at high water on a beach on the SE side of the point.

Parry Harbor (13°58'S., 126°03'E.), entered between Hat Point and Gibson Point, about 4.5 miles SW, affords shelter to small vessels in all weathers. The bay is divided into two arms by a flat-topped, ridged peninsula, but the SW arm is shoal. A 10.3m patch lies in the entrance to the E arm, 1.75 miles S of Hat Point. Hecla Islet, 23m high, rocky, and covered with grass, lies 2 miles NE of Gibson Point and is fringed by drying reef except on its SE side. A patch of drying reef lies 1.75 miles NNE of Hecla Islet, and Fury Rock, awash at high water springs, lies 1.5 miles W of the islet.

Anchorage.—Make for Parry Harbor to pass 2 miles N of Fury Rock, then keep in mid-channel between the drying reef S of Hat Point and Hecla Islet and anchor as convenient, in depths of 8 to 11m, mud, N of the peninsula.

Admiralty Gulf

3.23 Admiralty Gulf is entered between Gibson Point (14°00'S., 125°58'E.) and Cape Voltaire, 28 miles SW. Much of it has not been surveyed and the available information is old and should be used with caution. The gulf is approached from N through Troughton Passage and from W by the channels of the Institut Islands, which lie between Cape Voltaire and Long Reef. The entire gulf, with the exception of its center part, is heavily encumbered by islets and shoals, and is abundant with fish.

Cape Voltaire (14°15'S., 125°34'E.), 45m high, is the NW extremity of a large peninsula which separates Admiralty Gulf from Montague Sound. There is a flat-topped hill, 123m high, about 2.75 miles ENE of the cape, and Sharp Peak, 145m high, rises 2.25 miles SSE of the cape. Krait Bay, with about 7.3m in its middle part, is entered about 2 miles NE of the cape.

Bigge Point (14°17'S., 125°44'E.), 9 miles E of Cape Voltaire, is described in paragraph 3.29.

3.24 Long Reef (13°55'S., 125°45'E.), with its adjacent dangers, is centered about 23 miles NNE of Cape Voltaire, and extends for nearly 18 miles in a N-S direction. It forms the W side of the N approach to Admiralty Gulf and lies with its N extremity about 14.5 miles NW of Hat Point. The reef is composed of sand and coral, dries up to 3m, and is surmounted by Sand Islet, 1.3m high and covered with grass, about 3 miles S of its N end.

Rothery Reef, a detached coral reef surmounted by a sand cay which dries 6m, lies about 1.5 miles NNE of Long Reef. Submerged dangers, including rocks with depths of less than 1.8m, extend up to 6 miles N of Rothery Reef; these dangers do not break and due to the lack of visual contacts, especially at high water, the area between Long Reef and Holothuria Reefs is considered dangerous to navigate.

Low Rocks (14°04'S., 125°52'E.) are a group of white rocks, surrounded by drying reef, which lie 3 miles SE of the SE extremity of Long Reef. The highest part of these rocks, is a flat-topped boulder, 6m high, located on the SE and largest islet.

Tancred Bank, with a least depth of 3.3m, coral, lies 2 miles SE of Low Rocks.

Forrest Rock, with a least depth of 4.6m, coral, lies steep-to,

with depths of over 22m close around, about 3 miles S of Low Rocks.

Cassini Island (13°57'S., 125°38'E.) lies 5 miles W of the W extremity of Long Reef. It is generally flat with a maximum elevation of 22m near the S end. Being composed of ironstone, it shows a light reddish color and has cliffs from 9 to 18m high along its shores, except at the N end, where the land slopes gradually to a rocky ledge awash at high water. The island is fringed by drying reef except for some beaches on the E side.

Anchorage can be found, in 15m, sand and rock, in the entrance to a bay on the NE side of Cassini Island. There is a beach suitable for landing on the NW side of the bay and a fairly good landing place on the SE shore of the island.

Oliver Rock (13°58'S., 125°33'E.), a small coral head with a least depth of 2.7m, lies 4 miles WSW of Cassini Island. The sea has not been seen to break over this rock and there is nothing in the appearance of the surrounding waters to indicate its presence.

The Institut Islands

3.25 The Institut Islands are a group of islands, islets, and rocks lying between Cape Voltaire and Long Reef, in the W approach to Admiralty Gulf. The principal islands are Fenelon, Descartes, and Corneille, all inhabited; the larger islands are covered with stunted trees, and from all directions appear flat.

Condillac Islet (14°06'S., 125°33'E.), the westernmost island of the Institut group, lies about 9 miles N of Cape Voltaire, and has a table-topped summit 72m high. It is covered with bushes and has a rocky coast, except at its E extremity, which consists of a high sandy beach. A rock, 0.6m high, lies 0.1 mile NNE of the islet, and a 5.5m coral patch lies a little more than 0.5 mile N of the islet.

Randall Islet, 2.5 miles SE of Condillac Islet, is rocky, with a conspicuous hump 15m high near its S end. It is surrounded by coral reef which extends up to 0.5 mile to the N and E.

Baudin Islet, 1.75 miles NE of Randall Islet, is dark in color with a well defined summit 67m high. The NE extremity of the islet is separated by a low isthmus and appears as a second islet, close by, when viewed from the NW at a distance. The islet is fringed by a coral reef which dries, except on its SE side, where a sandy beach provides good landing.

Anchorage can be taken, in depths of 18 to 25m, sand, 0.25 mile off the above sandy beach, with the S extremities of Condillac Islet and Baudin Islet in line, bearing 295°.

Tidal currents in the vicinity of Baudin Islet set S and W on the flood, commencing about 20 minutes before low water. The ebb current sets N and E and commences about 2 hours before high water.

3.26 Pascal Islet (14°04'S., 125°39'E.), 4 miles NE of Baudin Islet, has a sharp conical peak, the summit of which consists of ironstone and attains a height of 38m. The island is surrounded by coral reef which extends 0.4 mile from its S side. A 1.4m shoal lies 0.5 mile S of the island.

Fenelon Island (14°08'S., 125°42'E.), the largest of the Institut Islands, is 104m high and lies 5.5 miles E of Baudin Islet. The island is 2 miles long in a N-S direction and surrounded by reef with a large drying patch isolated about 1.5 miles NE of its N extremity. Flat Islet, 26m high, lies close off the S extremity of Fenelon Island and is connected to it by a shoal spit.

Oyster Rock, small, dark, but whitened at its top by bird droppings, is located about 5 miles ENE of the N end of Fenelon Island, with Oliver Island and several rocks and reefs between. Lee Rock, a dangerous pinnacle with a depth of 0.9m, lies about 0.75 mile NNE of Oyster Rock and generally shows no sign except at low water springs when some slight tide rips are occasionally formed.

Descartes Island, 94m high, lies about 1.25 miles SW of Fenelon Island, and islets, rocks, and reef extend SW to Cape Voltaire. An islet, 17m high, is located 1 mile NW of Descartes Island, and Lavoisier Islet, 11m high, lies about 1 mile off the mainland 4 miles SW of Descartes Island.

Bullara Rock, with a depth of less than 1.8m, lies about 2 miles NW of Descartes Island, with reef extending to its S. It must be rounded to the N with care as no sign of it is usually visible.

Approach to Fenelon Passage

3.27 Corneille Island (14°11'S., 125°44'E.), 130m high and the highest of the Institut Group, lies about 2 miles SE of Flat Island and has foul ground extending 0.5 mile N from it. A reef, with a 5.5m high rock on it, extends the same distance SE. The tidal current close N of Corneille Island sets in a 060° direction at 1.5 knots on the flood.

The Kingsmill Islands, consisting of two main islands with some rocks and a very shallow bar between them, lie close together on a bank of shoal water about 2 miles NE of Corneille Island. The W island is 9m high and the E island, known as Lafontaine Island, is long, narrow and 19m high. A 7.8m shoal lies 1.5 miles NE of Lafontaine Island.

Mushroom Rocks, one of which is 7m high, lie on a bank of shoal water within 1 mile NW of the W Kingsmill Island.

Lagrange Islet, 4m high, lies 2.5 miles SE of Corneille Island, on an extensive drying reef which surrounds the island to a distance of 1 mile off its shores. A shoal spit, with a depth of 1.2m, extends nearly 1.5 miles SW of Lagrange Islet, and several above-water rocks and another islet, 21m high, lie up to 2 miles SE.

Moliere Islet, 18m high, lies 3.5 miles ESE of Lagrange Islet. Patches of reef lie about 0.5 mile E and S of the islet, and a 4.9m shoal lies 2.25 miles ESE.

White Islet, Racine Islet, and Berthoud Islet lie 2 miles N, 1.5 miles S, and 3 miles SE, respectively, of Moliere Islet. In 1987, depths of 2.4m and 1.5m were reported to lie about 1.5 miles NW and 0.5 mile SSE, respectively, of Racine Islet.

Caution.—There can be lesser depths than charted in and among the Institut Islands.

3.28 There are three passages through the Institut Islands between Long Reef and Cape Voltaire, but caution must be exercised when navigating in their vicinity, especially at low water. The bottom is very irregular and the sea is heavily clouded with lime, which generally reduces visibility through the water to less than 1m. Since additional dangers other than those which are charted may exist, larger vessels are recommended to keep clear of the group.

Oyster Rock Passage (14°02'S., 125°46'E.) leads between Oyster Rock and Long Reef, however, it is fouled with Lee

Rock and is not recommended without local knowledge.

Fenelon Passage (14°09'S., 125°41'E.) leads between Fenelon Island and Descartes Island. Vessels from W pass to the N of Baudin Island (14°08'S., 125°37'E.) and steer with the S end of Fenelon Island ahead bearing 119°, passing NNE of Bullara Rock. The line of bearing (157°) to the W end of Parry Islet (14°19'S., 125°46'E.) ahead, or 337° to Pascal Island astern, leads through Fenelon Passage passing between the 21m rock lying close off the SW extremity of Fenelon Island and the 7.9m shoal located 0.5 mile N of Descartes Island. A shoal, with a least depth of 5.3m, lies 0.6 mile SW of Corneille Island.

Voltaire Passage (14°13'S., 125°37'E.) leads between Dice Rock and the islets W of it, to the N, and Lavoisier Islet to the S. It is only recommended to small vessels with local knowledge. In 1987, a depth of 3m was reported close N of Lavoisier Islet.

Admiralty Gulf—West Side

3.29 **Bigge Point** (14°17'S., 125°44'E.), the NE extremity of a narrow peninsula located about 9 miles E of Cape Voltaire, is fringed by both above and below-water rocks up to 1.25 miles offshore. The coast both W and S of the point has not been surveyed, but is known to be rock with dangers extending up to 2.5 miles offshore in places.

Parry Islet, 18m high, lies 3 miles SE of Bigge Point with foul ground between. Several large rocks lie close SW of the islet.

Walmesly Bay (14°24'S., 125°42'E.) is entered between Bigge Point and Pickering Point, about 8 miles S, but has not been surveyed. The shores appear low with several rocks offshore, and the Mitchell River, with mangroves fringing its mouth, flows into the S part of its head.

There is a narrow peninsula, 3.5 miles SE of Pickering Point, which extends 2 miles NE from the coast. The bay formed between the above points is unsurveyed but appears shoal and foul with submerged rocks across its mouth and up to 1.5 miles off the extremity of the peninsula. A rock, which dries 3m, lies 0.5 mile E of the E extremity of the peninsula.

3.30 **Crystal Head** (14°27'S., 125°51'E.), a steep rugged flat-topped projection covered with small trees and grass, is located about 6.5 miles SE of Pickering Point. Foul ground extends 1 mile NE of the head, and a detached reef, which dries 5.2m, lies about 0.5 mile farther in the same direction.

Anchorage can be found, in about 7m, mud and clay, about 0.6 mile SSW of the SE extremity of Crystal Point.

Port Warrender (14°31'S., 125°52'E.), at the head of Admiralty Gulf, is a secure harbor which affords good anchorage, in depths of 8 to 27m, generally S to SE of Crystal Head. The land around the port area is rugged and rocky, and the hills on the W side, which rise up to 244m, are thickly covered with trees and grass.

The E side of Port Warrender is formed by a reef that extends up to 4 miles N from a point about 7 miles SSE of Crystal Head, and has two islets and several drying patches on it. The head of the port is shoal and foul from a position about 7.5 miles S of Crystal Head, and sand bars lie across the entrances of two rivers located at its S extremity.

Admiralty Gulf—East Side

3.31 The E side of **Admiralty Gulf** has not been surveyed and little is known of the depths up to 7 miles offshore in places. The coastal features hereabout are only approximately charted and should not be wholly depended on for navigation.

Borda Island (14°14'S., 126°01'E.), also known as North Osborne Island, is low and stony. It lies off the S entrance point of a large unsurveyed bay, the N entrance point of which is located about 6.5 miles SSE of **Gibson Point** (14°00'S., 125°58'E.). North Rock, an islet 1.75 miles NE of Borda Island, lies on foul ground which extends between the two, thence NE apparently across the entire head of the bay.

The Osborne Islands, consisting of Middle Osborne Island, Southwest Osborne Island, Osborne Island, and Steep Head Island, lie in a group centered about 7 miles SSW of Borda Island. Middle Osborne Island, the largest of the group, rises to a height of 216m near its center, and on its W coast has a bluff about 213m high.

West Rock, the westernmost of the Osborne Islands, is a large rock located about 3 miles W of the N extremity of Southwest Osborne Island; Center Rock lies midway between. The area E of West Rock has not been surveyed.

Steep Head Island, the southernmost of the Osborne Islands, is conspicuous because of its precipitous form. It lies about 1 mile S of an unnamed point on the coast about 3 miles SE of the S extremity of Southwest Osborne Island.

Moon Rock, which dries 2.4m and on which the sea seldom breaks when covered, lies about 1 mile off the above unnamed point and 1.5 miles NNW of Steep Head Island.

Mount Connor (14°32'S., 126°08'E.), the highest peak charted in the area, rises to a height of 587m about 11 miles SE of Steep Head Island.

The Bonaparte Archipelago

3.32 The **Bonaparte Archipelago** (15°00'S., 125°00'E.) comprises all of the islands, islets, rocks, and shoals lying off Montague Sound, York Sound, and Brunswick Bay, all of which are encumbered by islets, rocks, and shoals.

Tides—Currents.—The tidal rise along the coast within the Bonaparte Archipelago attains heights as great as 8.2m at mean springs and causes a considerable difference in the coastline and shoal areas between high and low waters. The tidal currents set through the narrower channels with considerable force and tide rips are common near some of the outer dangers.

Caution.—The waters within the Bonaparte Archipelago and the coastal areas upon which it borders, are only partially surveyed and navigation requires a considerable amount of caution. Deep-draft vessels are recommended to remain seaward of the archipelago and not proceed within 10 miles of the outer dangers except in case of emergency.

In 1985, the positions of the coastline and topographical features in Montague Sound, York Sound, and Brunswick Bay were reported to differ from those shown on land survey maps; inshore areas are generally unsurveyed.

3.33 **Montague Sound** (14°25'S., 125°25'E.) is the water area between the peninsula, of which Cape Voltaire (14°15'S., 125°34'E.) is the NW extremity, and Bigge Island, about 26

miles SW. The sound is encumbered with islets, rocks, and numerous dangers, and most of the off-lying islands are chiefly rock formations with a reddish tinge.

Montalivet Group (14°18'S., 125°16'E.), the outermost of the visible dangers in the approach to Montague Sound, consists of five principal islets and several rocks, all centered about 19 miles W of Cape Voltaire. They appear dark in color and are covered by undergrowth.

East Montalivet, the largest islet of the group, has a flat-topped summit 70m high, and lies on a reef with Patricia Islet and Don Islet, close NE, and Walker Islet 0.5 mile S. A sand cay, which dries about 6m, lies 1 mile NE of Patricia Islet and Wolf Rock, conspicuous at low water, dries 3m, about 4 miles ENE of the same islet.

West Montalivet Islet, located about 4 miles WSW of East Montalivet, is fringed by reef and has a dark flat-topped summit 76m high.

Anchorage.—Anchorage can be taken off the SE side of West Montalivet Islet, in a depth of 12m; there is a sandy beach on this shore where landing can be effected.

3.34 Jamieson Reef (14°04'S., 125°21'E.), with depths of less than 4m, lies about 14 miles NNE of East Montalivet Islet. A sand cay, which dries 2.7m, lies on a coral patch located on the E side of this reef.

Ingram Reef (14°07'S., 125°17'E.), steep-to and about 1 mile in diameter, lies with its shallowest part, a coral reef awash, about 6.5 miles SW of Jamieson Reef. The sea does not break on this reef until nearly low water springs, and before that time there is nothing in the appearance of the water to indicate danger.

Albert Reef (14°15'S., 125°10'E.) lies about 4 miles NW of West Montalivet Islet and dries 1.2m. Foul ground extends about 0.5 mile NW and S of the drying portion.

More or less to the S of a line drawn between Cape Voltaire and the N extremity of Bigge Island, there are a number of islets, rocks, and dangers located across the entrance to Montague Sound, only the most important of which are described below.

Water Islet (14°21'S., 125°30'E.), the E of the above islets, is 45m high, rugged, and light in color. On the SE coast there is a small sandy beach which affords good landing; a reef, awash, extends nearly 0.15 mile offshore from the NE side of the islet. In 1986, the island was reported to lie 0.5 mile W of its charted position.

3.35 Tancred Islet (14°20'S., 125°20'E.), about 5 miles W of Water Islet, is a conspicuous rugged islet with a light-colored and well-defined summit about 45m high. It has two remarkable fissures crossing the surface in a NW-SE direction, and is steep all around.

Cleghorn Islet, about 1.5 miles S of Tancred Islet, is 61m high. Islets and rocks, some awash, lie up to 1.5 miles E and 4 miles S of Cleghorn Islet, but the area has not been surveyed and caution is advised.

Biddles Rock, 1.2m high, lies 2 miles N of Tancred Islet, and is steep-to with a depth of 31m all around it.

Hawick Islet, about 1.5 miles W of Tancred Islet, is rugged, light in color, and 24m high. A reef, on which lie two small islets, extends about 0.35 mile N of Hawick Islet. There are depths of 7.3m close N of the reef.

Warn Islet, 29m high, lies about 3.5 miles W of Hawick Island and is round and rocky. About 0.1 mile from the E shore there is a rock about 0.6m high which is connected to the islet by a sunken reef. Shoal depths of 4m and 6m lie 1.25 miles S and 2.5 miles ESE of Warn Islet.

Clerk Islet, 11m high, lies 4 miles S of Warn Islet, with Bishop Islet, 19m high, about 1 mile SE of it. A reef extends 0.25 mile off the NE shore of the latter islet.

The **Prudhoe Islets** (14°25'S., 125°15'E.), four in number, lie centered about 4.5 miles W of Clerk Islet. The largest of the group has a well-defined black summit, 85m high, but the N islet, which is surrounded by reef, is only 4m high. There is a chain of islets between this group and the NE coast of Bigge Island.

Branch Islet, 18m high, lies 1.25 miles SE of the larger Prudhoe Islet, and a 4m high islet lies between. Another small islet lies about 2.5 miles SE of Branch Islet.

Cotthurst Rock, 4m high, lies about 1.5 miles NNE of the N extremity of Bigge Island. There are depths in excess of 20m at a distance of 0.15 mile all around this rock. A shoal depth of 0.6m lies about 2 miles WNW of Cotthurst Rock.

3.36 The coast of Montague Sound between Cape Voltaire and the NE entrance point of Swift Bay, nearly 15 miles S, consists of small bays and rocky points, which are mostly unsurveyed from about 4 miles S of the cape.

An unnamed island lies close off the coast about 5.5 miles S of Cape Voltaire, and there is a channel between it and Water Islet, 4 miles W, which has depths of 13.7 to 18.3m leading to Swift Bay.

Katers Island (14°28'S., 125°32'E.), 105m high at its N end, lies 10 miles SSW of Cape Voltaire and forms the W side of the approach to Swift Bay. Between the SE extremity of the island and the N entrance to the bay, there is a channel about 1 mile wide with reported depths of 5.5 to 14.6m, which leads S to the entrance of the bay. Several islets and reefs lie off the W and NW sides of Katers Island.

Anchorage can be obtained by small vessels with local knowledge, in a depth of 14.6m, mud, in the channel between Katers Island and the mainland. There is a more secure anchorage in Swift Bay, in depths of 7.3 to 12.8m, but these waters are unsurveyed and caution is required. Tides rise up to 6.4m at springs.

Wollaston Island (14°30'S., 125°28'E.), 189m high, lies 3 miles SW of Katers Island and is 3 miles long in a NW-SE direction. A reef, with depths of less than 1.8m, extends about 1 mile NW from the N extremity, and several rocks and islets lie off the NE side of the island. The island is separated from the mainland by a narrow rock-filled channel that should only be attempted by boats.

Mudge Bay (14°33'S., 125°23'E.), a deep indentation in the coast, is entered about 5 miles WSW of Wollaston Island, between a peninsula, 155m high on the W, and a point off which lie several islets, to the E. Depths in the bay vary from 7 to 18m, but surveys are incomplete and only small vessels with local knowledge should attempt to enter. A shoal patch of 0.5m was reported (1988) to lie in the middle of the entrance to the bay.

Combe Hill Islet, 119m high, along with several other high

islets, lie in a line up to 2.5 miles N of the peninsula that forms the W side of Mudge Bay. In the bay itself there are several other islets and numerous rocks which dry up to 3m.

Capstan Islet (14°35'S., 125°16'E.), high and rocky, lies about 6 miles SW of the above peninsula, with several islets and rocks between. The coast within is rugged and rocky, with stunted trees and shrubs; it has not been examined, and the waters bordering it should be approached with great caution.

A rock, which covers at high water springs, is charted about 2 miles NE of the N extremity of Capstan Islet.

3.37 Bigge Island (14°34'S., 125°10'E.), which forms the W side of Montague Sound, is 14 miles long in a N-S direction and about 7 miles wide. It is rugged and barren with several irregularly-shaped hills, composed of quartzite tinged with oxide of iron, that maintain general heights of 61 to 91m.

Savage Hill, near the S extremity of the island, is table-topped and rises to a height of 143m; Camp Hill, near the W coast, is 125m high, and Round Hill, dark in color, rises to 97m near the center of the island.

Numerous rocks are heaped up on Bigge Island, with deep fissures in nearly every direction. The coast is rugged and rocky, with occasional short sandy beaches, and on the NW side is Boomerang Bay, an indentation about 2 miles in length.

A chain of rocks and islets extends about 2.5 miles NE from a position on the shore about 2 miles SE of Cape Chateaurenaud, the N extremity of Bigge Island.

Scott Strait (14°30'S., 125°07'E.), the channel separating Bigge Island from the mainland SE, has not been thoroughly examined and is only navigable by vessels possessing local knowledge and exercising extreme caution. The SE shore of the strait is composed of broken rock and is fronted by numerous islets and dangers which reduce the width of the fairway to only 0.25 mile in places. The least charted depth in the channel is about 16.5m; however, the bottom is irregular and the tidal currents are strong, which causes the water to maintain a muddy character that obscures the numerous dangers.

The waters to the W and SW of Bigge Island are unsurveyed; several islands and dangers are known to exist hereabouts. The northernmost of these, known as Championet Islet, is rocky with a flat grassy summit 11m high. Eyre Rock, steep-to, dries 6m and lies 1 mile W of Championet Islet; both of the above are located in the entrance to Boomerang Bay. A shoal depth of 9.1m lies 2 miles WSW of Eyre Rock. Queen Islet, surrounded by reef and 40m high, lies 1.25 miles off the W side of Bigge Islet and 10 miles SW of Cape Chateaurenaud.

An islet, 14m high, with a reef extending 0.5 mile to its NNE, lies 0.75 mile NNW of Queen Islet. Tooth Rocks, a group of rocks from 3 to 5m high, lie about 4 miles WSW of the SW extremity of Bigge Islet. Breakers were reported in 1964, about 0.5 mile NW of Tooth Rocks, and a small islet lies midway between Bigge Island and these rocks. A submerged reef, with several above-water rocks on it, lies off the W end of Scott Strait and extends from 2 to 6 miles SSW of the S extremity of Bigge Island.

3.38 The **Maret Islets** (14°25'S., 124°59'E.), two in number and connected by reef, lie centered about 11 miles W of Cape Chateaurenaud and rise to heights of 32m and 52m; the lower islet is to the N.

Berthier Islet, about 2 miles S of the Maret Islets, with several high rocks between, rises to a height of 98m with a flat summit. This islet and the two Maret Islets extend over a distance of 9 miles in a N-S direction, and from seaward because of their increasing height to the S, give the general appearance of Cape Bougainville, the ridges being flat-topped and surmounted by an ironstone cap with stunted gum trees.

Corvisart Islet, 14m high, lies about 1.25 miles S of Berthier Islet; a drying reef is located about 0.75 mile ESE of the islet and a dangerous rock, with a depth of less than 1.8m, lies a little over 0.5 mile SSE of the same islet.

Combe Islet, with a height of 12m, is black and rocky, and lies about 2.5 miles E of the S Maret Island; reef extends about 0.4 mile W from the islet. Ripple Rock, which dries 3.7m, lies 1.5 miles SSW of Combe Islet.

Caution.—The banks and reefs in the vicinity of Maret Islet and Berthier Islet are steep-to, and because of the strong tidal currents, the surrounding waters are usually turbid. Surveys in this area are incomplete and vessels navigating in this vicinity are recommended to exercise extreme caution.

Robroy Reefs (14°27'S., 124°52'E.) consist of three partially-drying rocky patches centered about 7.5 miles W of the S Maret Islet. A sand cay on the N reef dries 4.3m.

The **Albert Islets** (14°32'S., 124°55'E.), a group of five small islets, mostly connected by reef, lie centered about 5 miles SW of the S Maret Islet. The largest islet, near the N end of the group, is 43m high; the S islet is known as Suffren Islet.

3.39 York Sound (14°53'S., 125°07'E.), which is entered between Cape Pond and Fontanes Islet, about 14 miles SW, forms the approach to Prince Frederick Harbor, located about 19 miles within the entrance. The E side of the sound consists of two irregularly shaped bays, both unsurveyed, and the W side is only partially examined, therefore vessels are recommended to exercise a considerable amount of caution when entering.

Cape Pond (14°45'S., 125°08'E.), consisting of broken rock and fronted with dangers, forms the E entrance point of York Sound. Numerous rocks are located close off the S shore of the cape and a rocky islet, with reef extending 1 mile off its S extremity, lies charted about 2.5 miles SSE.

Lamarck Islet (14°47'S., 125°02'E.), 58m high, lies in the entrance to York Sound, about 6 miles WSW of Cape Pond. The islet is fairly steep with reef generally bordering its shores, but there is good landing on the E side. Some islets and rocks, including Tournefort Islet, lie within 1.5 miles SSE of the S extremity of Lamarck Islet, however, the waters to the E are unsurveyed.

Jussieu Islet, low and fringed by reef, lies 5 miles NNW of Lamarck Islet. A spit, with a least depth of 0.9m, extends about 0.4 mile W from the N extremity of the islet.

3.40 Cape Torrens (15°00'S., 125°06'E.), a point of land in the SW part of York Sound, is the E extremity of a rugged peninsula which extends approximately 6 miles N from the mainland and terminates at its N end in Hardy Point. A reef, which dries 6.4m and on which the sea breaks, lies 5 miles NW of Cape Torrens.

The **Anderdon Islets** (14°56'S., 125°09'E.), a group of rocks

and islets, lie on the E side of York Sound about 5 miles NE of Cape Torrens. Reef extends approximately 1 mile W from the westernmost islet and the passages E and SE of the group are reported to be foul.

Prince Frederick Harbor (15°05'S., 125°16'E.), a continuation of York Sound, is entered between Cape Torrens and the Anderdon Islets and forms a fairly good anchorage for vessels with local knowledge. The harbor is rather encumbered with rocks and islets and also several submerged dangers, but vessels can enter by passing midway between the N extremity of an island on the W side of the harbor, and the islets and dangers off the W extremity of the peninsula that lie SE of the Anderdon Islets.

The head of Prince Frederick Harbor is divided into two inlets which lead NE and SE, respectively, from the E shore of the harbor; both inlets are unsurveyed. The S inlet, which leads to the Roe River, is about 3 miles wide at its entrance, with reported depths of 9.1 to 12.8m in the channel.

The coast of much of the harbor is backed by irregular ranges of steep rocky hills, rising to several hills, the most prominent being Manning Peak, 15.5 miles E of Cape Torrens, and Mount Brookes, about 22 miles SE of the cape.

Anchorage.—Fair anchorage can be taken in the entrance of Prince Frederick Harbor, in depths of 22 to 37m; however, the bottom is rock and caution is necessary.

Vessels with local knowledge can take anchorage in Prince Frederick Harbor about 0.5 mile SSW of an islet located 15 miles SE of Cape Torrens, in a depth of about 12m, good holding ground. Caution is necessary during the rainy season as the currents from the Roe River are very strong.

3.41 Hardy Point (14°59'S., 125°01'E.), the W extremity of an irregularly shaped peninsula, is backed by a 91m conical hill about 0.75 mile ESE. Another hill, 135m high, rises about 1.5 miles SE of the point and is a good mark from seaward.

Ena Island, small and rocky, lies 1 mile NNE of Hardy Point and a drying reef, previously mentioned with Cape Torrens in paragraph 3.40, lies 2.25 miles farther in the same direction.

The Coronation Islands, centered about 5 miles W of Hardy Point, extend in a N-S direction for about 12 miles and consist of one large and several smaller islands, with numerous islets and rocks scattered around. They are covered with vegetation and the larger island is heavily wooded.

Fontanes Islet (14°54'S., 124°55'E.), 71m high and the northernmost of the Coronation Islands, lies 7 miles NW of Hardy Point. From this island, islets and reefs extend 2 miles SSE to a position about 0.75 mile E of Gale Island.

Gale Islet, 120m high, lies close off the N extremity of the largest of the Coronation Islands. The islet appears to be surrounded by dangers, but the waters in its vicinity are unsurveyed.

A chain of islets extends about 3 miles NNW of Gale Islet terminating in the Desaix Islets, with the latter being four in number.

The largest Coronation Island lies 5 miles W of Hardy Point and has two conspicuous peaked hills, the highest near the middle of the E coast, rising to a height of 151m. The coast is irregular in shape forming two shallow bays along its SE part; a reef which dries 0.6m lies 0.25 mile offshore, about 1 mile SSE of the N extremity of the island.

3.42 Port Nelson (15°04'S., 125°00'E.), entered between Hardy Point and Fontanes Islet, forms a secure anchorage area on the W side of the promontory which separates it from Prince Frederick Harbor. The port is protected from W winds by the Coronation Islands and extends about 8 miles S from Hardy Point, gradually shoaling towards its head where it forms two inner bays.

The W entrance to Port Nelson, between the S extremity of the Coronation Islands and the mainland coast, is narrow and not fully examined. It is available to small vessels with local knowledge proceeding to and from Brunswick Bay.

The general coastline of the port is rugged and steep with numerous small bays, the lower shores of which are lined with mangroves.

Careening Bay (15°06'S., 125°00'E.), entered between a point 6.5 miles S of Hardy Point and another point 1 mile SW, has depths of about 3.7m in its middle part, but shoals to a sandy beach which provides good landing for boats. A drying reef lies 0.5 mile N of the E entrance point of Careening Bay and caution is advised when approaching.

Anchorage.—Good anchorage can be taken, according to draft, nearly anywhere in Port Nelson; the nature of the bottom almost everywhere is mud. The best anchorage area appears to be from 1 to 1.5 miles NW of the head of Careening Bay, in depths of 9 to 11m.

Caution.—Tidal rises are in excess of 9.1m. Care is necessary not to anchor over shoal areas at HW.

3.43 Colbert Islet (14°52'S., 124°43'E.), 46m high, lies 12 miles W of Fontanes Islet, the N extremity of the Coronation Islands. Foul ground, with above and below-water dangers, extends up to 2 miles N and 1.5 miles S from the islet; another islet surrounded by drying reef lies about 2 miles to the E.

Buffon Island, 73m high, lies 3 miles SSE of Colbert Islet; two islets close together are located off its SE extremity, and two rocks lie off the NW point of the island.

Keraudren Island, 49m high, lies about 2.5 miles WSW of Buffon Island, with several islets scattered off its N end. A narrow reef, which dries 2.4m, extends from about 1 to 2.75 miles NNW of Keraudren Island, and depths of less than 11m extend up to 1 mile SW of this reef. A reef extends 0.5 mile SE and a shoal, which breaks, extends SW from the S point of the islet close W of Keraudren Island. Rocks, which dry, lie 2 miles W and 2.5 miles SW of the summit of Keraudren Island.

De Freycinet Islet (15°00'S., 124°32'E.), 26m high, lies about 9.5 miles WSW of Keraudren Island and is easily identified because of its resemblance to an inverted basin. A reef, which covers at high water, lies about 1.5 miles ENE of the islet. A small islet, 14m high, lies 2 miles E of De Freycinet Islet.

All of the above islands and islets lie in the approach to Brunswick Bay.

3.44 Brunswick Bay (15°10'S., 124°40'E.), a large open bay formed between the W side of the Coronation Islands (15°00'S., 124°56'E.) and the E side of Augustus Island, about 25 miles SW, has an irregular coastline and is encumbered with numerous islets and dangers. The bay forms the approach to St. George Basin, the Prince Regent River, and Port George IV, and is stated to be frequented by small vessels with local knowledge. Brunswick Bay has not been closely examined

throughout and in many places soundings are scanty, requiring considerable caution when entering.

Cape Brewster (15°06'S., 124°54'E.), located in the NE part of Brunswick Bay, is steep, rocky, and thickly covered with brush. Bat Islet, located close off the cape, consists of a mass of sandstone which is connected to the cape by a narrow ridge of rocks. The cape and the islet are similar in appearance, both being rocky and barren.

Cape Wellington (15°10'S., 124°50'E.), about 5.5 miles SW of Cape Brewster, terminates in a narrow point fringed with foul ground. The shore S of the cape terminates in a second point about 1 mile SSW and then trends NE to form an irregular peninsula. Several islets surrounded by foul ground lie centered about 4 miles SW of Cape Wellington; at half-ebb strong tide rips have been observed E of these islets. A dangerous rock, with a depth of less than 1.8m, lies about 5 miles WSW of the cape; another dangerous rock, reported in 1987, lies about 3 miles WNW of the cape.

High Bluff (15°16'S., 124°41'E.), 10 miles WSW of Cape Wellington, is formed of perpendicular cliffs about 76m high. It is located at the NW extremity of an irregularly-shaped peninsula which separates Hanover Bay from Port George IV, to the S. There is a low rocky point about 1.5 miles E of High Bluff which forms the W entrance point of Hanover Bay.

Adieu Point (15°15'S., 124°35'E.), the N extremity of Augustus Island, is a table-topped, rocky bluff about 61m high, which appears as two humps from seaward. A chain of islets and reefs, terminating in Lucus Islet, extends 4.5 miles NW from the point.

3.45 Islands and dangers in Brunswick Bay.—Desfontaines Island (15°02'S., 124°50'E.), 30m high, lies 6 miles NW of Cape Brewster with several islets off its W shore, and Low Rock lies about 2.5 miles to the ESE. An unnamed island, 52m high, lies 3 miles NNW of Desfontaines Island and there are several small islets in the vicinity of the unnamed island.

Bernouilli Island (15°02'S., 124°45'E.), 60m high, lies about 4.5 miles W of Desfontaines Island and has several islets off its NE and W shores. A dangerous rock, with a depth of less than 1.8m, lies about 2 miles ENE of the island.

The **D'Arcole Islands** (15°08'S., 124°35'E.), centered about 10 miles WSW of Bernouilli Island, lie scattered over an area about 10 miles square, with Forbin Island at the E extremity; Commerso Island and Jackson Island to the S; Browne Island, Rocky Islands, and Duguesclin Island to the W; and three isolated rocks to the N. The highest of the group is Duguesclin Island at 41m. The S islands appear to be surrounded by foul ground, but the entire area has not been completely examined.

White Islet (15°14'S., 124°19'E.), about 18.5 miles NW of Adieu Point, is 9m high and covered with white guano. It lies on a reef about 2 miles long, which dries 5m at its N end and has a depth of 3.7m at its S end.

A 3.6m shoal lies 6.5 miles ENE of White Island and a 6.1m patch is located about the same distance to the NE.

3.46 The **Prince Regent River** (15°16'S., 124°51'E.), entered about 5 miles S of Cape Wellington, at the head of Brunswick Bay, is available to small vessels with local knowledge. The entrance channel, which is approached E of the islets SW of Cape Wellington, is deep, but becomes narrow and somewhat tortuous with reefs fringing the numerous islets within, thus reducing the fairway to a width of about 0.25 mile in places.

Tidal currents vary with the width of the channel, but reach 7 knots in the narrow parts during springs.

St. George Basin (15°24'S., 125°01'E.), roughly 10 miles in diameter, lies about 11 miles within the entrance to the Prince Regent River and provides good shelter to vessels able to enter. Several islets and rocks lie in the N part of the basin, the largest being St. Andrews Island, and on the NE shore there are two conspicuous hills of fort-like appearance.

The upper reaches of the Prince Regent River, from the SE end of St. George Basin, runs straight in a SE direction for about 14 miles between rocky hills rising up to 120m. Although depths in the fairway are reported to be from 7.3 to 14.6m, numerous islets and dangers border the channel and local knowledge is necessary. The river continues for about 50 miles into the interior, but is winding and shoal in its upper part.

Anchorage.—St. George Basin appears to be deep, however, the E and S shores have not been closely examined. There is no extensive anchorage until above St. Andrew Island, where a vessel with local knowledge can anchor, in depths of 5.5 to 25m, between the NW shore and the above islands, out of the strength of the tidal currents.

3.47 Hanover Bay (15°17'S., 124°46'E.) is entered between High Bluff and the W extremity of the reef extending from the islets SW of Cape Wellington. The E side of the bay is formed by Uwins Island, lying in the entrance to the Prince Regent River, and the W side by the peninsula of which High Bluff is the N extremity.

Anchorage.—Good anchorage, in depths of 14 to 22m, excellent holding ground, can be taken nearly anywhere in Hanover Bay. The anchorage is reported safe except in strong NNW winds. Vessels usually approach from the N just E of the islets about 3 miles NE of High Bluff.

Port George IV (15°22'S., 124°39'E.), entered between High Bluff and Adieu Point, extends about 14 miles S and terminates in Augustus Water, a narrow inlet at its head. Although the harbor affords good anchorage and excellent shelter, the approaches are somewhat encumbered with dangers which in places have not been surveyed. It is recommended that only vessels with local knowledge attempt this anchorage and then only in daylight.

Entrance Island (15°17'S., 124°37'E.) lies in the middle of the entrance to Port George IV and is conspicuous due to the light-colored reddish cliffs, 60m high, at its NE extremity. A dangerous patch, which dries, lies about 2 miles NE of the island and Hummock Island, so named for its shape, is located about 2 miles to the S of Entrance Island. A shoal was reported (1998) to lie 1 mile NE of the red cliffs of Entrance Island, fronting High Bluff.

Depths—Limitations.—The channel E of Entrance Island is wide, deep, and except for the drying patch NE of the island, clear of dangers. The light-reddish cliffs on the NE extremity of Entrance Island form a good mark for making this channel and vessels would best approach it on a SSE heading.

The channel W of Entrance Island is encumbered with reef and rocks, but there is a narrow intricate fairway SE of Adieu

Point which can be taken by small vessels with extensive local knowledge.

Anchorage.—Vessels with local knowledge can take anchorage, in depths of 16 to 18m, mud, between Entrance Island and Hummock Island. Anchorage is also available, in a depth of 18.3m, mud about 1 mile E of Hummock Island.

Directions.—Vessels proceeding to Port George IV generally approach from the W by proceeding 3 miles S of White Island and thence steering to a position 2 miles SW of the SW end of Browne Island, in order to avoid the reefs NE of **Vulcan Island** (15°14'S., 124°23'E.). Course is then altered for High Bluff, bearing 116°, until the cliffs on the NE extremity of Entrance Island bear SSE, when a heading for the E channel may be taken.

Navigation above Hummock Island requires extensive local knowledge due to the limited surveys of the area.

3.48 **Augustus Island** (15°21'S., 124°33'E.) is high, rocky, and mostly covered with stunted trees and scrub. From its N extremity, **Adieu Point** (15°15'S., 124°35'E.), the E coast of the island forms the W side of the Port George IV, and is high and rocky with numerous islets and rocks close offshore. The W shore of the island is very irregular with several bays and inlets, but it is unsurveyed with numerous rocks and islets lying off most of its various points.

Rogers Strait separates the SE coast of Augustus Island from the mainland, but is encumbered with islets, rocks and shoals. It is used primarily by small vessels with local knowledge which find sheltered anchorage in the bay area SW of Brecknock Islet, the westernmost of the two largest islets in the strait.

Wildcat Reefs (15°17'S., 124°08'E.), two drying reefs about 1.5 miles apart in an E-W direction, each with a head that dries from 7 to 7.6m, lie between 23 and 28 miles W of Adieu Point. A shoal, with a depth of 7.3m, lies about 2 miles NNW of the middle of the W reef. Drying rocks lie up to 1.25 miles S of the reef.

Red Island (15°13'S., 124°15'E.), 35m high, lies about 6 miles NE of the NE extremity of Wildcat Reefs and is a rounded mass of dark red sandstone with low perpendicular cliffs. There is a little stunted vegetation on the summit. A reef, which dries 0.3m, lies about 0.5 mile W of Red Islet.

Violet Shoal, with a depth of 0.6m, lies 2 miles NW of Red Islet. Orange Shoal, with a depth of 1.5m, lies 1.5 miles NNE of the islet.

Osborn Reefs (15°09'S., 124°12'E.), consisting of two reefs 1 mile apart, lie about 5 miles NW of Red Islet. The N reef dries 0.6m; the S reef 0.3m.

3.49 Rainbow Shoals extend from 1.25 to 3.5 miles SSW of Red Islet and consist of a chain of reefs, one of which dries 7m. A shoal, with a depth of 10.1m, lies midway between the S end of these reefs and the N extremity of Champagny Island, about 3 miles ESE.

The **Champagny Islands** (15°09'S., 124°14'E.), consisting of the main island of that name together with the islets and rocks surrounding it, and Degerando Island, 2 miles SW, lie on a bank of foul ground centered about 20 miles WSW of Adieu Point. Champagny Island is 53m high near its NE end and appears as a light-colored rocky formation thickly covered with scrub. The small islets NE, S, and SW of it are similar in appearance.

Degerando Island is 32m high and lies on the end of the reef extending SW from Champagny Island; the island is surrounded with foul ground. Two islets lie off the E extremity of Degerando Island, and a reef, which dries 6m, lies close off the W extremity; a rock, with a depth of less than 1.8m, lies close N of the reef. A reef which dries 1.8m lies about 2.75 miles SE of Degerando Island.

Degerando Light (15°20'S., 124°11'E.) is shown from a white round metal hut on the W end of the island.

Caution.—The passage between the Champagny Islands and Wildcat Reefs has a least charted depth of 9.1m, however, the E approach between the Vulcan Islets and Red Islet has not been closely examined and caution is advised.

3.50 The **Heywood Islands** (15°20'S., 124°23'E.), three in number with numerous surrounding islets, rocks, and reefs, lie centered about 6 miles E of the Champagny Islands, and are separated from the latter by a strait which has been inadequately surveyed. Drying patches and other dangers extend SE from Degerando Island into the strait and vessels without extensive local knowledge are not recommended to attempt it.

Tidal currents during the falling tide have been observed in the above strait at a rate of 6 knots, and strong rips and eddies have been seen near its S end where the bottom is uneven and the general area unsurveyed.

Byam Martin Island (15°24'S., 124°21'E.), the S of the Heywood Islands, rises to a height of 67m near its N end; the waters around it are unsurveyed.

The **Vulcan Islets** (15°14'S., 124°23'E.), the largest of which attains a height of 88m, lie about 3.5 miles WNW of the N extremity of the Heywood Islands. Reefs have been reported to extend up to 5 miles NNE and 3 miles NE of the main islet, and others lie between the group and Adieu Point.

Caution.—In 1984, the Vulcan Islets were reported to lie 1.25 miles ESE of their charted positions.

Camden Sound to King Sound

3.51 **Camden Sound** (15°26'S., 124°24'E.) is bounded on the N and NE by the islands of the Bonaparte Archipelago, on the E by the mainland coast, and to the S by Wilson Point. The N part of the sound is unsurveyed, but the islands, numerous rocks, and dangers are known to exist. The N entrance of the sound between the Heywood Islands and Augustus Island appears to be foul.

Wilson Point (15°33'S., 124°24'E.), the rocky S entrance point of Camden Sound, rises steeply to a hill 66m high about 0.25 mile within. Battery Point, 3 miles NE of Wilson Point, is flat, rocky, and about 7m high.

The Slate Islets, four in number, are between 5 and 43m high, and lie close off Wilson Point. Two of these islets, which lie closest inshore, are connected to Wilson Point and to each other by coral reef. The outer two islets, which are separated from the inner by a channel 0.15 mile wide, are connected to each other by drying reef which extends up to 0.2 mile S of the extremity of the S islet.

Bumpus Islet, 1 mile N of the Slate Islets, is barren, rocky, and 24m high. It is surrounded by drying reef, extending up to

0.15 mile from the S side. Between this reef and that extending from Slate Islets, there is a channel 0.5 mile wide with a least depth of 18.3m.

Rice Rocks are two isolated pinnacles about 0.2 mile apart in a N-S direction which dry up to 1.8m; the S rock lies a little over 1 mile N of Bumpus Rock.

3.52 Sampson Inlet (15°31'S., 124°28'E.), entered on the NE side of the bay between Battery Point and Wilson Point, is deep and narrow widening at its E end into a well sheltered bay. Small vessels with local knowledge proceed through the inlet which is only about 100m wide, but steep-to, with depths of 14 to 15m, and enter the bay where good anchorage, sheltered all around, can be taken, in 9.1 to 14.6m, mud and clay, good holding ground.

Brecknock Harbor and Camden Harbor lie in the NE part of Camden Sound, the former being entered between the SW extremity of Augustus Island and the mainland S, and the latter located approximately 4 miles to the SE. Both these harbors are encumbered with islets and rocks which restrict the anchorage to the use of small vessels with local knowledge.

New Islet (15°28'S., 124°30'E.), located in the middle of the entrance to Brecknock Harbor, lies 4 miles NE of Battery Point and has two above-water rocks close off its SW extremity. Four islets lie in a semi-circle about 0.5 mile off the N side of the islet and Needle Rock, 6m high, lies off the S side. There is a clear channel with depths of 11 to 29m on either side of New Islet, but the tidal currents are strong and caution is advised.

Granite Islet (15°29'S., 124°36'E.) lies about 6 miles ESE of New Islet on the E side of the approach to Camden Harbor. The latter harbor, although deep in places, is encumbered with rocks and shoal ridges rendering it undesirable even for small vessels.

3.53 Hope Point (15°37'S., 124°24'E.) is located about 4.5 miles S of Wilson Point. The coast between these points is rocky and broken by reddish cliffs from 30 to 60m high. Bluff Hill, 88m high, rises 1.5 miles NNE of Hope Point and is wooded with reddish cliffy slopes descending to the sea.

Deception Bay (15°38'S., 124°25'E.), entered between Hope Point and Buckland Point, approximately 1 mile S, is free from dangers except at its N and S ends which are shoal with fringing reef at the shoreline. The latter point is low and rocky, with reddish cliffs close S of it. A ridge of hills extending S from the point reaches a height of 44m about 0.3 mile within, and in conjunction with Hope Point and the hills to the E, provides good shelter within the bay during all but W winds. The portion of the bay with depths of over 5.5m is only 1 mile in extent and it affords anchorage only to small vessels able to maneuver within its confines.

Hall Point (15°40'S., 124°22'E.), the W extremity of an islet 2.5 miles SW of Buckland Point, is fairly steep and fringed by reef. The islet rises to an isolated rocky summit, 81m high, which is covered with trees and appears wedge-shaped when seen from N or S, being steepest on its E side. The islet is connected to the mainland by a sandy spit which covers at high water, and a large rock, 20m high, lies close off its N extremity.

Between Hall Point and Buckland Point, a small bay is divided by Kid Islet, rocky, 10m high and connected to the shore by a sand spit; this bay affords shelter to small vessels except in N and W winds.

Tidal currents off the coast between Wilson Point and Hall Point set NW on the ebb and SE on the flood, with a maximum rate of about 2 knots at springs.

Prior Point (15°43'S., 124°23'E.), about 3 miles SSE of Hall Point, is the N extremity of a narrow, rocky tongue of land which rises at its S end to a height of 79m. A coral reef, with a depth of 3.7m, lies 0.5 mile NW of the point; the reef is identifiable by eddies over it when the current is running.

The Claret Islets, a group of rocky islets with a maximum height of 24m, lie in the entrance to the bay formed between Hall and Prior Point. The depths in this bay are irregular at its N and S extremities, but shelve slowly towards a white sandy beach at the center of the bay. Good anchorage in 8m, sand bottom, away from tidal effects, can be found 0.6 mile off the beach. The anchorage is sheltered from winds between N and SE.

The coast between Prior Point and a point about 10 miles S, is generally low, straight, and rocky affording no shelter. The waters off this shore have not been closely examined, but a coral reef lies off the S point extending to Lizard Islet, about 3.5 miles farther S.

3.54 Doubtful Bay (16°03'S., 124°02'E.), entered by Foam Pass between **Raft Point** (16°04'S., 124°27'E.) and a rocky, high island, about 2 miles NNE, is nearly 10 miles long in a NE-SW direction, but has not been closely examined. The island forming the N entrance point is the S extremity of a chain of high, rocky islands nearly 10 miles long; the coast E of the islands has not been surveyed.

Depths in Foam Pass apparently are not less than 18.3m throughout the fairway; however, there are two islets located on the S side of the fairway; the E one, known as Steep Islet, attains an elevation of 149m and lies 1.5 miles ENE of Raft Point. Within Doubtful Bay, general depths of 18.3 to 30m have been reported, but a reef, with a depth of 1.5m, lies more or less in the middle of the area and the waters in the SE part are unsurveyed.

Anchorage.—Doubtful Bay, being protected by the reefs surrounding Montgomery Island, about 15 miles WNW, affords good shelter with excellent holding ground. However, because the bay and its approaches are only partially surveyed, only vessels with local knowledge should attempt to enter. A range of rocky hills, attaining heights of up to 275m, backs the S and E shores of the bay, and Red Hill, about 8.5 miles E of Raft Point, is conical, forming a good mark for entering. The best anchorage is reported to lie about 2.5 miles E to ESE of Steep Islet, in a depth of 11m.

Tidal currents in Foam Pass have been estimated to reach 4 knots; eddies have been observed in the narrower parts of the passage.

3.55 Success Strait (15°57'S., 124°33'E.), the W of two passages leading to George Water, below, is formed by a large unnamed island at the N end of Doubtful Bay. The passage, which is 6 miles long and about 0.2 mile wide, has depths of 18.3 to 31m and is clear except at its N end where there are two small reefs, which dry. The N approach to the strait is shoal with drying patches and the channel lies close N of the unnamed island.

Tidal currents in Success Strait are strong.

George Water (15°52'S., 124°35'E.), a landlocked bay located N of Doubtful Bay, has depths of about 27m over a considerable portion of its length, but its entrance is somewhat obstructed N of Success Strait. It affords good anchorage to vessels with local knowledge, but surveys are incomplete and caution is required. The N part of the bay is obstructed by a large mud bar and the NE section constricts to a small bay encumbered with islets and shoals.

3.56 The **Montgomery Islands** (15°57'S., 124°12'E.) consist of one low sandy island, which is densely wooded, lying about 15 miles WNW of Raft Point, and several barren rocky islets lying E of the main island. They all lie on the extensive coral reef which mostly dries, but is generally unsurveyed off its E and S sides.

High Cliffy Islet, 22m high, lies on the E extremity of this reef about 7 miles E of the largest island and 5 miles WNW of Lizard Islet; islets extend along the SE side of the reef for a distance of 4 miles SW of High Cliffy Islet.

The Breakwater, a long coral spit about 1 mile wide, extends 7 miles N from the NW side of the main reef and terminates about 9 miles NW of the largest of the Montgomery Islands. It dries from 1.5 to 5m and forms a natural barrier during E and W winds, which can be rather closely approached, especially on its W side, by vessels seeking shelter.

Cockell Reefs (15°45'S., 124°05'E.), which are mostly dry, lie from close off to 6 miles N of the N extremity of the breakwater. Cockell Bank, consisting of sand, is located in the SW part of these reefs and dries 7.3m. There are numerous detached shoals and dangers off Cockell Reefs, and due to the strong currents and discolored water often seen in this vicinity, the area should be given a wide berth.

Reyne Shoal (15°42'S., 124°10'E.), a rocky steep-to shoal patch with a least depth of 5.5m, lies about 7 miles NE of the center of Cockell Reefs; Thorne Reef, a small coral head which dries 1.8m, lies 2 miles SSW of this shoal.

Barron Banks (15°46'S., 124°18'E.) consists of two isolated coral banks, with depths of 11.9m and 14.6m, lying from 7.5 to 10.75 miles ESE of Thorne Reef.

3.57 **Niblock Rocks** (15°49'S., 123°59'E.), isolated and dangerous, lie with a depth of less than 1.8m, about 4 miles NW of the N extremity of the breakwater. The NW side of these rocks is steep-to with depths of about 26m close by. Nicolle Reef, coral, dries 2.8m and lies about 2.5 miles NNE of Niblock Rocks. It is recommended that vessels without local knowledge not attempt to pass between these dangers and Cockell Reefs.

Denman Shoal (15°43'S., 123°56'E.), sand, with a least depth of 18.3m, lies 9 miles WNW of Cockell Bank. Lorikeet Shoal, with a least depth of 10.4m, lies 5.5 miles NE of Denman Shoal.

Viney Island (16°01'S., 124°01'E.), about 11 miles WSW of the largest Montgomery Island, is 43m high, rocky, and covered with grass. The N coast is cliffy with reef and rocks off it, and a spit on which there are several rocks, including one 9m high, extends about 0.75 mile WNW from the W extremity of the island. A detached shoal, with a rock which dries 0.9m on it, lies close outside the seaward extremity of this spit.

The Pyramid, a small barren rocky islet 58m high and conical in shape, lies 2.5 miles SSE of Viney Island. An islet, 34m high, lies about 0.25 mile SSW of The Pyramid.

Caeser Island (16°04'S., 123°56'E.), 28m high, rocky, and covered with grass, lies 5 miles SW of Viney Island.

Scaddan Island, 6 miles SW of Caesar Islet, is 64m high, rocky and covered with grass. A rock, which dries 1.2m, lies 0.2 mile NW of the NW extremity of the island.

Caution.—The waters between Caesar Islet and Scaddan Island are unsurveyed, but two islets are known to exist to the SE.

3.58 **Collier Bay** (16°12'S., 124°15'E.), entered between **Raft Point** (16°04'S., 124°27'E.) and an unnamed point 32 miles WSW, extends about 19 miles SSE, but is almost completely unsurveyed. The shores are fronted by islets and rocks, many of which lie on the outer edge of what appears to be a rather extensive and shoal shore bank extending along the E side of the bay. Past reports have indicated that the coastline charted within the bay is far from accurate and vessels attempting to enter should do so with great caution.

Collier Bay may be entered E or W of the large reef on which the Montgomery Islands are located. The E entrance, between High Cliffy Islet and Lizard Islet, is probably preferred, but several dangers are located within the bay S and SW of the former islet. The W entrances between Viney island and The Pyramid, and between Caesar Islet and Scaddan Islet are unsurveyed and little is known about them.

Eagle Point (16°11'S., 124°25'E.), about 6.5 miles SSW of Raft Point, is a rocky spur extending N from a high range of hills. A rocky patch, with a depth of less than 1.8m, lies about 0.5 mile W of the point.

The bay formed between Raft Point and Eagle Point is fringed by a broad coastal bank, which dries. A vessel might take temporary anchorage off this bank and just within the points, where depths of 9.1 to 12.8m are charted.

High Bluff (16°17'S., 124°23'E.), about 6.5 miles S of Eagle Point, is formed of gray slate. The entire shoreline between the bluff and Eagle Point is backed by a coastal range of moderate height which is remarkably rugged and has conical peaks scattered along its length.

3.59 **Walcott Inlet** (16°22'S., 124°22'E.), entered through Yule Entrance, about 3 miles S of High Bluff, is a landlocked bay about 5 miles wide and 32 miles in length. It provides excellent shelter for vessels able to enter, but the entrance channel appears to be blocked by a drying sand bank. Vessels have proceeded in at high water and reported depths of 27m within this bank, but the channel is narrow and unsurveyed.

The tidal currents reach 8 knots at springs, causing whirlpools and violent eddies. The shores of the inlet are bordered by hills 150 to 250m high, but little is known about the depths within.

Fletcher Island (16°21'S., 124°21'E.) is charted on the edge of the drying shorebank about 2 miles SW of Yule Entrance. An islet lies close S of Fletcher Island, and two islets and several rocks lie about 3 miles to the NE just N of Yule Entrance.

Secure Bay (16°27'S., 124°23'E.), entered about 3.5 miles S of Fletcher Island, through a narrow islet-strewn channel known as The Funnel, is from 0.75 mile to 3 miles wide and

about 12 miles long. The bay, which is divided in its center by a narrow cliffy channel with an islet in its middle, provides good shelter for vessels able to enter, but is unsurveyed and has strong tidal currents in the entrance. The hills surrounding the bay are steep and rugged; the depths in the center of the bay are reported to be deep, but little else is known of the general hydrography.

3.60 Shoal Bay (16°25'S., 124°16'E.), entered through a chain of red sandstone islets extending across its entrance, about 2 miles W of Secure Bay, is about 4 miles long and 2 miles wide. The shores of the bay are steep at the entrance, but become flat farther in before gradually rising again at its head. There are depths of 18.3 to 22m for about 1 mile within the entrance shoaling rapidly thereafter to 7.3m or less. The bay has not been surveyed.

Anchorage, in a depth of 7.3m, can be obtained in Shoal Bay by vessels with local knowledge.

Tidal currents in Shoal Bay decrease rapidly towards its head where they rarely exceed 0.5 knot.

The W shore of Collier Bay is backed by a range of barren rocky hills from 150 to 275m high, rising abruptly from the sea. Several unnamed islands and islets, between which dangers probably exist, lie off the coast, but they have not been closely examined. Two larger islands lie about 10 miles off the NW part of the W coast. The N island, with several islets off its N extremity, is located about 3 miles SE of The Pyramid.

Talbot Bay (16°18'S., 123°52'E.), entered between the W entrance point (16°13'S., 123°56'E.) of Collier Bay and a point 6 miles W, is unsurveyed and heavily encumbered with islets, reefs and shoals. Dugong Bay, an extension of Talbot Bay, lies about 10 miles S of the entrance to the latter, but the approach is filled with rocks.

Approaches to King Sound and Yampi Sound

3.61 Browse Islet (14°06'S., 123°33'E.) lies N of the offshore tracks about 82 miles NNW of Champagny Island Light. It is 6m high near its N end, and of coral formation covered with white sand; slight vegetation has been observed upon it which apparently varies with the seasons. The islet is surrounded by a coral reef which dries on the NW and N sides to a height of 1.2m; the E side appears to afford the best landing for boats, but only at high water. Anchorage is difficult as the reef is steep-to and the bottom close to its vicinity is uneven.

A historic wreck lies 1 mile ESE of the islet. In 1984, a depth of 15.2m lies 1 mile E of the islet. In 1986,this shoal was not found, but a depth of 25.6m was reported to lie 0.8 mile SE of the islet.

Browse Islet Light is shown from a white, metal framework tower with a white hut adjacent to it. A racon is situated at the light structure.

Directions.—Vessels proceeding NE or SW off the NW coast of Australia frequently make Browse Islet Light to establish an accurate position. Vessels proceeding to King Sound or Yampi Sound from NE are recommended to make the same light, especially if navigating by dead reckoning, and then steer SSW for the vicinity of Adele Island.

Large vessels approaching Browse Islet from NE should exercise caution to avoid Echuca Shoal, about 24 miles ENE of the islet and Heywood Shoal, about 26 miles NNE of the latter. Both these shoals could be dangerous to such vessels, especially in heavy weather.

3.62 Adele Island (15°31'S., 123°09'E.) lies approximately 45 miles offshore, NW of the mainland peninsula which separates Collier Bay from King Sound. The island is from 2 to 3m high, sandy, and covered with bushes and grass. It is surrounded by an extensive drying reef, steep-to, and of coral formation, with patches of sand scattered over much of its length. A sand cay on the N part of the reef has a height of 0.3m, and much of the rest of the reef dries from 1.2 to 2.7m.

Adele Island Light is shown from a red, metal framework tower close S of the N extremity of the island. A racon is situated at the light structure.

Fraser Inlet, a narrow inlet in the NE side of the reef surrounding Adele Island, can be entered by small vessels seeking shelter. Although the entrance and the inlet are deep, the channel is narrow and fringed with dangers, and it should only be attempted at low water and with local knowledge.

Barcoo Shoal (15°39'S., 122°55'E.), about 1.25 miles long in a NW-SE direction, lies about 16 miles SW of Adele Island Light and has a least depth of 3.9m, coral. Depths of less than 37m generally surround the shallowest part of this danger to a distance of 0.5 to 1 mile.

Adele Island Shoal (15°42'S., 123°14'E.), with a least depth of 8.m, lies about 13 miles SSE of Adele Island Light with depths of less than 18m extending up to 2 miles S, and 4 miles N of it. There are heavy tide rips S of Adele Island Shoal during the peak of the tidal currents.

Frost Shoal (15°47'S., 123°21'E.), with a least depth of 5.5m, lies about 8 miles SE of Adele Island Shoal, on a bank with depths of less than 37m. There are usually heavy tide rips over this shoal during the strength of the tidal currents.

Tasmanian Shoal (15°53'S., 123°21'E.), with a least depth of 14m, lies about 7 miles S of Frost Shoal.

Tidal currents in the vicinity of Adele Island are strong with rates of 2 to 4 knots during springs. Along the W side of the reef surrounding the island, the flood sets S to SSE and the ebb N to NNW. To the N and S of the reef the flood and ebb currents, respectively, maintain an E-W character with rates more commonly at or near the stronger levels in this vicinity.

3.63 Churchill Reef (15°28'S., 123°15'E.), an extensive coral reef which dries 2.7m on its W part, is separated from the E side of the reef surrounding Adele Island by a channel about 1.25 miles wide with depths of 73 to 110m along its W side. The 37m curve off the W side of Churchill Reef is usually clearly defined by the discoloration of the water between it and the reef E of it.

The waters N and E of Churchill Reef are unsurveyed and the eastern limits of this reef are unknown. The bottom in this area appears uneven and numerous uncharted dangers may exist.

Albert Reef (15°37'S., 123°20'E.), consisting of coral, dries 2.1m and lies about 13 miles SE of Adele Island. Another reef, which dries 1.2m, lies close off the NW extremity of Albert Reef, and a shoal, with a depth of 3.3m, is located about 2 miles NNW of the latter.

Beagle Reef (15°20'S., 123°31'E.), about 23 miles ENE of

Adele Island, is composed of dead coral and patches of white sand. A sandbank in its center, about 0.75 mile in extent, dries 7m and forms a good mark at low water.

Dingo Reef (15°19'S., 123°37'E.), which dries 0.6m, lies 4.5 miles E of Beagle Reef, and Fox Shoal, with a depth of 6.7m, lies 5.5 miles SE of Dingo Reef. The bottom between these dangers is uneven and other shoals may exist.

Mavis Reef (15°31'S., 123°36'E.), on which there is a sand cay which dries 6.1m, lies 11 miles SSE of Beagle Reef. Three small drying reefs lie within 2 miles of the NW extremity of Mavis Reef. A drying rock lies about 2 miles W of the southernmost drying reef.

Rosella Shoal (15°35'S., 123°50'E.), with a depth of 8.5m, lies about 13 miles ESE of the SE extremity of Mavis Reef. A depth of 11m was reported (1967) to lie about 6.25 miles NNE of Rosella Shoal and a depth of 12.8m was reported (1964) to lie about 5 miles NE of the same shoal.

The Buccaneer Archipelago—West Part

3.64 The Buccaneer Archipelago lies in the N approach to Yampi Sound and the NE approach to King Sound. It consists of numerous islands, islets, and rocks all generally located off the NW extremity of the peninsula separating Collier Bay from King Sound. There are channels between many of the islands, some of which are available to deep-draft vessels; however, the tidal currents are strong, reaching 6 to 10 knots in some of the restricted areas, where violent tide rips and eddies are formed.

Caffarelli Island (16°02'S., 123°17'E.), the westernmost of the islands in the Buccaneer Archipelago, is rocky and covered with coarse grass and scrub. The summit of the island, which rises to 63m, is located at the W end; the rest of the island is formed of hills about 49m high. The coast of Caffarelli Island is indented with several bays, but they all dry and are fringed with dense mangroves. The S coast is steep-to, but the N coast is fringed by drying reef with islets and rocks on it. An islet, 37m high, lies on the edge of the reef which extends from the W extremity of the island; a rock, awash, lies close S of this islet.

Caffarelli Island Light is shown from a white metal column situated on the summit at the W end of the island.

Caution.—Tidal currents W of Caffarelli Island are strong, setting SSW to SE on the flood and NNW to NNE on the ebb. Vessels should navigate with care as the currents shift direction N and S, respectively, of the island.

3.65 Thornbury Reef (16°02'S., 123°15'E.), which dries 1.2m, lies 1.5 miles W of Caffarelli Island and is small and steep-to. Its position can usually be ascertained using the tidal eddies around it. There is a deep clear channel between Thornbury Reef and the islet off the W extremity of Caffarelli Island.

Brue Reef (15°56'S., 123°02'E.), which dries 6.7m, lies about 15 miles WNW of Caffarelli Island Light and has numerous boulders on it, mostly at the N end. The reef is isolated and generally steep-to all around.

Anchorage can be taken in good weather on the bank about 1 mile E of Brue Reef, in a depth of 24m, sand and coral. The area should be cleared if the weather becomes unsettled, as a heavy swell can quickly rise in the vicinity.

Shepards Patch (16°01'S., 122°55'E.), with a least depth of 16.5m, lies with its shallowest part about 8 miles SW of Brue Reef. Etheridge Patch, with a depth of 18.3m, lies about 6.5 miles SW of Shepards Patch, and is the shallowest part of a bank, with depths of less than 37m, which extend S from positions 3.5 miles NNW and 2 miles SE, respectively, from this patch. The tidal currents set at a considerable rate over these two patches and vessels should pass SW of them.

Breading Patch (16°05'S., 123°02'E.), with a least depth of 14.6m, lies about 3.75 miles ENE of Etheridge Patch, and nearly in the center of the narrow bank with depths of less than 37m.

3.66 Fraser Rock (16°07'S., 123°04'E.), with a least depth of 1.7m, is a dangerous pinnacle rock which lies 2.5 miles SE of Breading Patch. Banks, with least depths of 12.8m and 14.6m, lie SSE and NNW, respectively, of Fraser Rock. Fitz Gerald Patch, with a least depth of 11.8m, lies 4 miles SE of Fraser Rock. The depths between Breading Patch and Fitz Gerald Patch are irregular; long lines of tide rips are seen during springs.

Pincombe Reef (16°05'S., 123°10'E.), a pinnacle which dries 1.8m and is steep-to all around, lies 6.5 miles WSW of Caffarelli Island and is usually marked by eddies. The tidal swirls around this rock make it appear to be much larger than its actual size.

Cleft Islet (16°02'S., 123°21'E.), about 2 miles E of the E extremity of Caffarelli Island, is the highest of a group of five islets located close together on a coral reef extending 2 miles E from its position. The islet, split in two by a chasm, rises to a bare summit at its E end, 56m high, and forms an excellent mark from seaward.

A rocky islet, 8m high, lies 0.5 mile W of Cleft Islet and there is deep water at a distance of 0.1 mile all around it. Drying reefs lie between this islet and the E extremity of Caffarelli Island.

Caution.—In 1983, tide rips were reported close W of Cleft Islet. A depth of 5.8m lies 0.25 mile N of the NW point of Cleft Islet.

3.67 Barrett Rock (16°04'S., 123°20'E.), 0.3m high, lies 1.75 miles SSE of the E extremity of Caffarelli Island and is surrounded by drying reef to a distance of 0.25 mile; a detached drying reef lies about 0.4 mile W of this rock.

Fraser Island, Admiral Island, and King-Hall Island are the largest of the islands extending about 5 miles ESE from Barrett Rock, and along with numerous islets and rocks, are all located on a connecting, drying reef. They are mostly flat-topped and covered with bushes, the highest elevation obtained, 84m, being near the middle of Admiral Island. Detached reefs fringe this group, mostly on the N side. Bowles Rock, 1m high, is the farthest offshore, at a distance of 1.5 miles N of the E extremity of Admiral Island.

3.68 Powerful Island (16°06'S., 123°26'E.) is separated from the E extremities of Admiral Island and King-Hall Island by a deep narrow channel through which the tidal currents flow with considerable force. The E side of the island is heavily indented and fringed by reef, but the W side is steep and cliffy, reaching a maximum elevation of 91m at Ram Point, the SW extremity.

Dampier's Monument, 86m high, lies 0.5 mile S of Powerful Island and is conical in shape with a rounded summit. Although small, the islet is very conspicuous from NE and forms a good mark from Yampi Sound.

Sir Frederick Island, 79m high, lies 1 mile W of Dampier's Monument and has numerous bays along its rocky coasts which mostly dry. Reefs and shoal water fringe the island and the entrances of the bays. Two reefs lie within a distance of 1.25 miles of the W extremity of the island; on the outer reef there is a rock 12m high, and on the inner reef a rock 17m high. There are also two islets close off the E extremities of Sir Frederick Island.

Caution.—The sheltered waters separating Powerful Island, Sir Frederick Island, and King Hall Island are used for Pearl Culture.

3.69 Lord Island and Bryon Island, 66m and 87m high, respectively, are located on the same reef S of Dampier's Monument. The S coast of Bryon Island is steep-to, the W sides of both being cliffs fronted by coral reefs. This reef extends a distance of 1 mile NE of Lord Island, with rocks mentioned below.

The Finch Islets are a group of rocks, from 15 to 47m high, on the reef lying NE of the N extremity of Lord Island.

Reefs, which dry, extend 1.25 miles NW of the W extremity of Byron Island; the outer dries 0.9m, the one between 7m, with a rock 2m high between it and the island.

The Gagg Islets are a group of small islets and rocks, ranging from 21 to 52m high, mostly connected by reef, lying nearly parallel to the S side of **Byron Island** (16°10'S., 123°27'E.), for 3.5 miles, rendering the channel between Byron Island and Hidden Island dangerous.

3.70 Gibbings Island (16°09'S., 123°31'E.), circular in shape, with an extreme width of 1.25 miles, lies midway between Byron Island and Margaret Island. It is steep-to at its N and S extremities, but a coral reef extends 0.35 mile off its W side and 0.7 mile off its E side. Its summit, which is a bare rock, is 86m high.

A patch, which dries 0.3m, lies 0.5 mile SE of the SE extremity of Gibbings Island. Between the patch and the E shore is a rock 14m high, about 0.75 mile off the mainland, and a patch of 0.4m, about 0.15 mile from the mainland.

Dorothy Island, 44m high, is a narrow island E of Gibbings Island, and encircled by the same reef. It has a rocky islet, 32m high, close off its NW end.

Hidden Island (16°15'S., 123°30'E.), the largest of the archipelago, appears as a portion of the mainland, but is separated by a narrow channel. It is of irregular shape, and about 5 miles long, N and S, with an extreme width of 3.25 miles. Its summit, near the S end, is 135m high; on the N part is a hill, 97m high. The island is covered with low scrub and stunted gum trees.

There is a large bay on the SE side of the island, with a mangrove swamp at its head, fronted by mud flats, which form the N side of Whirlpool Pass.

The **Bayliss Islands** (16°09'S., 123°32'E.), a narrow string of islands connected at low water, lie 0.45 mile off the NE part of Hidden Island; the N and largest is 56m high. A series of detached reefs extend for a distance of 1.5 miles NW of the Bayliss Islands, on which are four rocks from 1 to 19m high. A reef, with depths of less than 5.5m, lies parallel to, and about 0.25 mile from, the E coast of the N Bayliss Islands.

Between the Bayliss Islands and the mainland are a number of islets and reefs, mostly on the eastern side of the N approach to Whirlpool Pass; a reef which dries 0.9m lies in the fairway W of them, about midway between the N extremity of the Bayliss Islands and the SE extremity of Gibbings Island.

3.71 Whirlpool Pass (16°15'S., 123°30'E.) leads between Hidden Island, on the W, and Chambers Island and Dunvert Island, on the E. It is only 0.2 mile wide at its narrowest part, and the tidal currents run with great rapidity through it, forming whirlpools, which restrict navigation only during slack water by small craft with local knowledge.

Chambers Island (16°16'S., 123°32'E.), on the E side of Whirlpool Pass and practically connected with the mainland, is 2.5 miles long and 0.7 mile wide; its summit, 92m high, is at its E end.

Several islets from 37 to 55m high are located N and NE of the E end of the island, between it and the mainland, and form the E point of the entrance to Whirlpool Pass from the N.

Dunvert Island, 90m high, lies to the S of Chambers Island, at right angles to it, being connected by a coral reef which dries at low water. Steep Head, its S extremity, is a cliffy point, 89m high, with a reef extending 0.25 mile in a S direction. A rock, which dries 1m, lies in the middle of the channel 1.25 miles NNW of Steep Head.

Two islets lie 0.3 and 0.6 mile, respectively, from the E side of Dunvert Island; between them and the mainland is a shoal with depths under 5.5m.

The Buccaneer Archipelago—East Part

3.72 The **Macleay Islands** (15°15'S., 123°41'E.), mostly connected by a reef, are located at the NE extremity of the islets and dangers forming the Buccaneer Archipelago. They extend in a general N-S direction from 9 to 16 miles N of Yampi Sound and form a major navigational hazard in the NE approach to that body of water.

The **King Islets** (15°52'S., 123°38'E.), 16m and 19m high, the NW of the group, are located on the W end of a reef 2.5 miles in extent; depths of over 37m will be found 0.4 mile W of it. Rocks up to 11m high lie near the E and S extremities of the reef.

Conway Islet, 9m high, lies N of the E part of King Islets Reef, on a reef 0.6 mile in extent, practically connected with the latter. An islet, 4.3m high, is located close SE of Conway Islet.

Challis Rocks, the NE of the group, consists of a line of bare rocks, 3.3m high, located on a reef 1.25 miles in length, about 1.75 miles E of King Islets Reef. Deep water will be found close E of Challis Rocks.

Scobell Rocks, 1.3m high, lie on a reef 0.9 mile in extent, and which dries 6.5m midway between the SE extremity of King Islets Reef and the largest Macleay Island.

3.73 Macleay Island (15°57'S., 123°42'E.), the largest island of the chain, is a flat-topped grassy island, 69m high, and 2.25 miles in length in a N-S direction; its W side is formed of

steep cliffs, from 49 to 61m high. Near the N end of the island is a salt-water lagoon nearly cutting the island in two. Two small islets, 28m and 15m high, lie close off its S end.

Landing may be effected on either of the two shingle beaches at its S end. No water has been found on the island.

Crabbe Islet, 24m high, lies 0.5 mile S of Macleay Island, on the same reef; it is steep-to on its S side.

Sweeney Patches (16°00'S., 123°44'E.), with a least depth of 14.6m, are located on a bank 2 miles in length, from 1.5 to 3.5 miles SE of Crabbe Islet. There are heavy tide rips over these patches during strong winds.

Gibbings Reefs (15°56'S., 123°45'E.), drying 0.9m at low water springs, are two dangerous patches, 1.5 miles apart in an E and W direction. The E reef lies about 5 miles E of the summit of Macleay Island; these reefs should be given a wide berth, as they are usually hard to distinguish.

There is deep water to the E and W of the Macleay Islands, but the channel to the W is preferred as Gibbings Reefs form a natural danger on the E side. The channel between the S extremity of the Macleay Islands and the W extremity of Koolan Island, about 7 miles S, is deep, wide and clear, and easily navigated.

3.74 Bathurst Island (16°02'S., 123°31'E.), 94m high with steep cliffs along the SW coast, lies, along with Irvine Island, on an extensive coral reef, the greater part of which is covered with sand. A rock, 5.2m high, is located near the edge of the reef, extending for a distance of 0.45 mile from its N extremity.

Rocks, 24m and 46m high, are located on the reef which extends over 1 mile from the E side of the island, with a rock, 15m high, between the reef and Kathleen Island, and others as charted. A detached reef lies awash about 0.75 mile E of the SE extremity of Bathurst Island.

Irvine Island (16°05'S., 123°32'E.), 156m high, lies S of Bathurst Island and is 2.25 miles in length, N and S, and 2.25 miles in breadth. Two bays, both of which dry at low water, lie on either side of its SE point. The island is covered with stunted gum trees and coarse grass.

Kathleen Island, 81m, lies off the NE extremity of Irvine Island. Flora Islet, covered with coarse grass and about 24m high, lies off the NW extremity of Irvine Island.

Tanner Islet, marked by a light shown from a concrete tower on the summit of the islet, lies near the SW side of Irvine Island. A patch of reef, which dries 5m, lies about 0.25 mile off the W side of Irvine Island.

McIntyre Islet (15°59'S., 123°32'E.), 57m high, the N island of the above group, is located about 2 miles NNE from the N extremity of Bathurst Island; a reef extends 0.25 mile off its S and SE sides, and to a lesser distance elsewhere. A rock, awash, lies close off its E end. There is a clear channel between McIntyre Islet and Bathurst Island.

Lena Reef, which dries 0.3m at low water springs, lies about 0.7 mile NW from McIntyre Islet. It breaks heavily with a NW swell.

Yampi Sound

3.75 Yampi Sound (16°08'S., 123°38'E.) lies between Cockatoo Island and Koolan Island on the N and the mainland on the S. Its shores are rocky, with numerous coves. The coast ridge, which is from 150 to 180m high, is sterile, a few stunted gum trees and low scrub being the only vegetation visible, and the interior has scarcely a more fertile appearance.

A first port of entry encompasses Yampi Sound. The limits of the port extend from position 16°13'S, 123°32'E in a N direction 10 miles to a position between Bathurst Island and Irvine Island, then E for 15 miles; then S to the mainland. The S limit includes the coastline between the W and E limits.

Yampi Sound can be entered from the NW between Irvine Island, and Gibbings Island, from the N via Galah Channel between Irvine Island, and Cockatoo Island, or from NE via Parakeet Channel between Cockatoo Island, and Koolan Island.

Caution.—Numerous uncharted pearl farms, consisting of fixed or floating structures, along with their associated moorings, are situated in the bays and inlets between Yampi Sound and Cone Bay. These farms are generally marked by buoys or beacons, which may be lit, and should be avoided.

Tides in this area can rise as much as 10m at springs and caution should be exercised to not anchor over shoal areas during HW.

3.76 Cockatoo Island (16°06'S., 123°37'E.), centered about 3 miles ESE of Irvine Island, is 3.25 miles long in a WNW-ESE direction and about 0.5 mile wide. Its summit near the center is 137m high; there is a conspicuous cone-shaped hill 55m high at its W extremity. A deep valley extends up the center of the island in an ESE direction.

Usborne Islet, 55m high and cliffy, lies close E of Cockatoo Island and is connected to it by reef. The ore berth on Cockatoo Island at Yampi Sound is described in paragraph 3.81.

Caution.—Unexploded ordnance lies in an area, with a radius of 0.5 mile, centered about 0.75 mile S of the NW end of the island, in a depth of 10m. Unexploded ordnance also lies in an area, with a radius of 0.5 mile, centered about 1.25 miles WSW of the S end of the island, in a depth of 30m.

3.77 Black Rock (16°05'S., 123°35'E.), 4.6m high, lies 0.4 mile off the W end of Cockatoo Island, with which it is connected by a reef, dry at low water springs. A small reef, which dries 0.6m, lies 0.25 mile S of Black Rock. A shoal, with a least depth of 7.3m, lies between 0.2 and 1.1 miles SW of the W end of Cockatoo Island.

The Piccaninnies are a group of rocks and shoals which lie near the middle of Yampi Sound, about 1.5 miles SW of the E extremity of Cockatoo Island. The E of these rocks, 24m high, is surrounded by drying reef. The W rock, 13m high, and another rock, 20m high, are located together on a reef about 0.75 mile W of the E rock. A detached reef, which dries 2.4m, lies about 0.2 mile S of the two westernmost rocks.

There is a clear deep channel about 0.5 mile wide between The Piccaninnies and the S side of Cockatoo Island.

3.78 Koolan Island (16°08'S., 123°45'E.), about 1.5 miles E of Usborne Islet, is separated from the mainland by a narrow deep channel known as The Canal. The island is 204m high near its center, 7 miles long in an E and W direction, and has a maximum breadth of 3 miles at its E end, tapering to the W. Sanders Point, the NE extremity, is 122m high, with cliffs along its W extremity.

Roberts Islet (16°07'S., 123°46'E.) 60m high, lies 0.25 mile off the W extremity of Sanders Point, with another islet, 33m high, W of it, between which is a rock which dries 0.3m; both are covered with scrub and are steep-to on their N sides.

There are large deposits of ironstone on Koolan Island, Cockatoo Island, and Irvine Island.

Tarrant Islet, which is 71m high, lies off the W end of Koolan Island and is connected to it by a drying reef. The island is 0.5 mile long in an E-W direction and 0.1 mile wide. On its N side it is bare and rocky with steep cliffs.

The Canal (16°08'S., 123°44'E.) is 0.6 mile wide at its W end, narrowing considerably toward its E end, where it forms a dangerous channel, known as The Gutter, through which the tidal currents run with great velocity. There are depths of 20 to 30m over most of the length of this passage; it is used by large vessels proceeding to the wharf at Koolan Island.

3.79 Nares Point (16°08'S., 123°42'E.), the S point of the entrance to the canal, is 71m high, rising within. A light is shown from Nares Point.

A reef, which dries 1.2m, lies about 1 mile SW from Nares Point; between this reef and the point abreast, 38m high, are other reefs.

The bights on either side of the latter point afford good anchorage for small craft. From the head of the western bight, Silver Gull Creek extends about 1 mile SSE and then almost 1 mile NE; fresh water may be obtained from a spring in the creek. At spring tides vessels with local knowledge and drawing not more than 2.7m can enter the creek from about half flood to half ebb.

Margaret Island (16°09'S., 123°35'E.), with a bare conical summit, 97m high, lies about 7 miles W of Nares Point and close to the mainland. Woodhouse Point, its NE extremity, is the W point of approach to Yampi Sound. A reef, which dries 5.5m, extends 0.35 mile N from the point.

Channels to Yampi Sound

3.80 Galah Channel (16°05'S., 123°34'E.), which leads between Irvin Island and Black Rock off Cockatoo Island, is a clear passage with depths of over 37m over a width of about 0.3 mile on the W side of the channel. Galah Channel is frequently used during daylight by vessels proceeding to or from Cockatoo Island and the NE, but local knowledge is recommended.

Parakeet Channel (16°07'S., 123°40'E.) leads E of Cockatoo Island between Usborne Islet and Tarrant Islet and is wide and deep, except for Comber Rock, a small steep-to reef which dries 0.6m and lies in mid-channel. Parakeet Channel is frequently used by vessels proceeding to or from Koolan Island or Cockatoo Island from the NE and is considered somewhat easier to navigate than Galah Channel. A shoal, with a least depth of 20.1m, lies 2 miles NE of Comber Rock.

The main channel from NW leads between Irvine Island and Gibbings Island; it is wide and deep. It is frequently used by vessels unfamiliar with the sound when picking up pilots for Derby or Cockatoo Island.

Yampi Sound (16°07'S., 123°40'E.)

3.81 Cockatoo Island (16°06'S., 123°37'E.) is a well-sheltered deep-water port in Yampi Sound whose sole function is the export of iron ore.

Winds—Weather.—From November to March, Yampi Sound is near the S extremities of the Northwest Monsoon; cyclones can be expected during this period. The effects of cyclones are more prevalent in this area early in this period; however, cyclones have been experienced here as late as April.

During the wet season, from November to March, the prevailing winds are from the W and are strong at times, particularly during the afternoon. Rain and thundersqualls are also frequent during this period; the accompanying winds can reach gale force.

During the dry season, from April to October, very little rain falls. During the mornings, there are frequent periods of SE winds; these give way to light W sea breezes in the afternoon. No cyclones are likely during this period.

Temperatures during summer frequently reach 40°C and the atmosphere becomes somewhat oppressive. During winter the air is cool and dry, with temperatures falling to 14°C at night.

Tides—Currents.—The maximum tidal range is 9.9m. At Cockatoo Island Jetty, the tidal current sets E except for a period 1 hour before to 3 hours after high water, when the current sets W; it has been reported that the tidal current attains a rate of 3 knots on both the ebb and the flood.

Depths—Limitations.—The depth in the channel approach to the berth is 20.1m. It is reported that the depth alongside is 10.5m. The berth comprises seven berthing dolphins extending 170m E and 110m W of the shiploader.

Pilotage.—Pilotage is compulsory. The pilot boarding place is 1.5 miles WSW of Cockatoo Island Jetty. The pilot launch is equipped with a radiotelephone.

Regulations.—An ETA is required 48 hours, 24 hours, and 2 hours prior to arrival.

Signals.—A light, situated on the top of the old power station, 0.5 mile NW of the jetty, is shown 24 hours before the arrival and after departure of vessels scheduled for loading at the jetty.

The Port Office on Cockatoo Island is equipped with VHF channels 6, 12, 14, 16, and 67. The call sign is Koolan Island.

Anchorage.—The quarantine anchorage is situated about 0.75 mile WSW of Collins Cove Lighted Beacon, in depths of 18 to 29m, mud.

Anchorage can be taken off the W entrance of The Canal, in 14 to 18m, mud, good holding ground, with the E extremity of Tarrant Islet bearing about 341° and Nares Point Light bearing about 100°.

Caution.—Vessels should not proceed E of the berth on Cockatoo Island without a pilot.

3.82 Port of Koolan Island (16°09'S., 123°45'E.) is a deep-water port located on the E side of Yampi Sound. The sole function of the port is the export of iron ore.

Winds—Weather.—See Cockatoo Island (paragraph 3.81).

Tides—Currents.—The maximum tidal range is 8.9m.

Depths—Limitations.—Koolan Island is approached from the W through Yampi Sound, or from the N through Parakeet Channel. Maximum draft allowed is 15m plus tide less 1.5m UKC. The ore loading jetty consists of two mooring and seven berthing dolphins forming an alongside berth 377m in length with a depth alongside of 15m.

Pilotage.—Pilotage is compulsory. The pilot boarding place is 0.9 mile SSW of the W extremity of Tarrant Island. Two tugs are available. Berthing is restricted to daylight hours.

Anchorage.—Two anchorage areas have been established 2 and 2.75 miles, respectively, WSW of Naires Point.

Approaches to King Sound

3.83 King Sound (16°25'S., 123°20'E.) is entered between the S extremity of **Hidden Island** (16°15'S., 123°30'E.), which is part of the Buccaneer Archipelago, and Swan Point, about 27 miles W. It extends about 60 miles SSE to the town of Derby, which stands at the entrance to the Fitzroy River, and has depths of more than 18m within 20 miles of its head. Within this distance the depths gradually shoal towards the shore eventually drying at the Derby berth, but the sound itself affords anchorage throughout.

Caution.—Mean spring tides rise 10m at Derby, with maximum rises recorded at nearly 11m. Such rises result in very strong tidal currents in the entrance to King Sound (up to 10 knots) and low-powered vessels are recommended to proceed in only at or near slack water. Strong and dangerous overfalls are formed at such times on and around the dangers in Sunday Strait.

Vessels proceeding to Derby (see paragraph 3.105) and requiring a pilot frequently proceed to Cockatoo Island, where pilots will board for the run into King Sound.

3.84 Swan Point (16°21'S., 123°02'E.), the NW extremity of King Sound, is low and cliffy. A patch of 3.7m lies 0.4 mile offshore, about 0.75 mile W from Swan Point.

Swan Point is the NE extremity of a peninsula some 40 miles in length, within which is the W shore of King Sound. Shoals extend about 7 miles N of the cape, and islets and shoals extend some 12 miles E of Swan Point, terminating in the Sunday Islands. Between these are the surveyed channels leading to Sunday Strait, S of Pitt Shoal and the Twin Islets and into King Sound. Meda Pass, between the Roe Islands and the Sunday Islands, is the recommended route. Escape Pass, 2.5 miles E of Swan Point, leads directly into King Sound, but on account of the strong tidal currents local knowledge is considered necessary for its safe navigation.

Swan Island, 15m high, and 0.5 mile long, is located 0.25 mile NNE of Swan Point, with which it is connected by a ridge of rocks which dries 3.7m.

Karrakatta Rock, with a depth of 3.7m, is located on the NW edge of a rocky ledge extending 0.5 mile WNW from the N extremity of Swan Island.

Between Karrakatta Rock and the E extremity of Alarm Shoal is a deep channel 0.5 mile wide leading from seaward to King Sound, by Meda Pass or by Escape Pass. The tidal currents rush around Swan Island with considerable violence, rendering the passage hazardous for low-powered craft, and difficult without local knowledge.

3.85 Pitt Shoals (16°15'S., 122°53'E.) are the outer and westernmost dangers in the W approach to Sunday Strait. The main ridge within the 18.3m curve is about 4.5 miles in length E and W, and from 0.2 to 0.5 mile wide, including detached patches. The least depth on this ridge is 4.6m located about 10 miles NW of Swan Point. At a distance of 2 miles N of the 4.6m head is a shoal about 0.5 mile in extent with a least depth of 3.7m.

Tides—Currents.—Over the Pitt Shoals the flood sets E and the ebb W at a rate of 1 to 3.5 knots, and also in the fairway between them and Alarm Shoal.

Alarm Shoal (16°20'S., 122°59'E.) is a long narrow shoal of sand extending about 8 miles W from a position 1.5 miles N of Swan Point. It is from 0.5 to 1 mile wide with depths varying from 1.8 to 9.1m, and dries in places about 2.25 miles NW of Swan Point.

Northwest Twin Islet (16°17'S., 123°04'E.), 9.1m high and located 4.25 miles NNE of Swan Island, is the northwesternmost of the group. It is a rocky islet, 0.15 mile in extent, surrounded by a coral reef extending from 0.1 to 0.25 mile from it. A sunken, rocky flat, with depths under 3.7m, extends 0.6 mile NE from the islet.

To the E of this flat is a shoal 0.5 mile in extent, with a least depth of 7.8m, steep-to. These flats are marked by strong tide rips.

Ferret Reef, 0.5 mile in extent and steep-to, is nearly awash at low water. Its NW extremity is located about 1.5 miles NW from Northwest Twin.

Southeast Twin Island, rocky and 14m high, is 0.25 mile long and 0.15 mile wide; it is located 2 miles SE of Northwest Twin Island, and is surrounded by a fringing reef extending from 0.1 to 0.2 mile from the coast, and steep-to on the W side.

Shoal water extends 0.5 mile NE from the island, 0.25 mile S and SW, and 0.1 mile to the SE.

A bank, with depths of 12.8 to 16.5m, is located 1.5 miles SE of the Southeast Twin Island, with other patches of 16.5m in the same direction.

There is a channel nearly 2 miles wide between the dangers off the E side of Southeast Twin Island and the northwestern 9.1m head of Anchor Shoal.

Anchor Shoal (16°21'S., 123°09'E.), with general depths of 2.7 to 5.5m, is a sandy shoal extending within the 10m curve, for a length of 2.75 miles in a NW and SE direction, and having a breadth of about 0.35 mile. The shallowest part is a small patch about 0.2 mile long, with a depth of 0.3m located nearly in the center, at 4 miles SE from Southeast Twin Island. A detached shoal of 7.3m is located 0.75 mile E of this shoal head.

Anchorage.—Vessels proceeding into King Sound against the N current may find it convenient to anchor on the bank N or E of Anchor Shoal.

3.86 Sunday Strait—Approach channel—Sunday Strait (16°24'S., 123°16'E.), the main entrance to King Sound, is located between the Salier Islands, the Tide Rip Islands, High Island, Tree Island, and Mermaid Island on the E, and Pincombe Shoal, the Roe Islands, and the Sunday Islands on the W. It is about 11 miles in length N and S by about 4 miles least breadth between the East Roe Island and Hancock Reef, which extends W of Tree Island. The tidal currents run with considerable velocity and must be guarded against in vessels of low power. The fairway dangers are Menmuir Rock, with dangerous overfalls during the strength of the currents, and Amur Reef and Alert Rock, 6 and 7 miles within it. A shoal, with a depth of 15.9m, lies on the recommended track about 0.5 mile ESE of East Roe Island.

Caution.—Sunday Strait should be navigated during daylight hours only and preferably at the time of slack water.

The tidal currents are very strong; rates of up to 10 knots have occurred at springs. These currents set across the track N of East Roe Island and form dangerous overfalls in the vicinity of Menmuir Rock and Rip Rock.

3.87 Sunday Strait—East side—The **Tide Rip Islands** (16°19'S., 123°18'E.), a group of rocky islands, occupies a space 2 miles long in an E and W direction, and 1.5 miles wide. Gibson Island, 33m high, and Gregory Island, 41m high, are the largest of the group, and are both of irregular form, standing on the same reef and nearly connected at their N extremities. A coral patch, drying 0.6m, is located 0.25 mile S of Gibson Island.

Doris Island, 39m high, is the NW of the Tide Rip Islands, and is nearly 0.5 mile long by 0.25 mile wide; it is separated from Gibson Island by a narrow channel.

Fairthlough Ridge, with a least depth of 5.5m, coral, extends about 2.5 miles NNW from a position 1.5 miles NNW of Doris Island.

3.88 The **Salier Islands** (16°19'S., 123°16'E.), bare, rocky, and small, form a closely connected chain, steep-to, 2 miles long in a NW and SE direction, from 19 to 30m high, and about 100m wide. The islands are separated from the Tide Rip Islands by a channel 1 mile in breadth, which has a depth of about 18.3m.

High Island (16°21'S., 123°21'E.), 89m high, 2.25 miles in long, and 1 mile wide, is located about 1 mile SE of Gregory Island; the W side is steep-to, high, and cliffy; the S coast is much indented and has a fringing reef.

A narrow reef extends about 0.75 mile N from its NE coast, and a small detached reef, which dries 5.5m, lies close off the N extremity of the island. A reef, with a rock on it 13m high, extends about 0.25 mile SE from the SE extremity of the island.

Caution.—The ebb current sets at a rate of 4 to 8 knots toward the S side of High Island.

3.89 Tree Island (16°23'S., 123°18'E.), 26m high, about 0.3 mile long, and about a little over 0.1 mile wide, lies 2 miles SW of High Island, and forms the E side of the entrance to Sunday Strait.

Reefs extend about 1.5 miles SE from Tree Island, having upon them several islets and rocks, of which the Clarke Islets, a group of three, 5.5m high, are located on the SW edge. The Wood Islets, from 1 to 5m high, form a chain near the NE edge.

Reefs surround Tree Island, extending 0.4 mile W into the strait, with rocks on it, the W of which is 6m high.

Hancock Reef dries 5m, and is located 0.3 mile SW of the above rocks, to which it is connected by a shallow rocky ledge; its W edge lies about 0.75 mile W of the summit of Tree Island.

Pillar Rock, 5.5m high and conspicuous, is located 0.1 mile within the S edge of these reefs, and a rock, which dries 3m, lies on the extreme edge, forming the W side of Mermaid Passage.

Mermaid Island (16°26'S., 123°21'E.), 66m high, 2 miles long in a N and S direction, and 1 mile broad, is a rugged island, located 2.5 miles SE of Tree Island; reefs, with rocks above-water, extend from the N and S extremities, but the E and W sides are fairly steep-to. A reef, with three islets and some rocks on it, extends as far as 0.5 mile from its SE side, and a detached reef, which dries 1.5m, lies about 0.5 mile N of the island.

Mermaid Passage (16°25'S., 123°20'E.), about 1 mile broad, separates Wood Islets Reef, on which is Pillar Rock, from Mermaid Island. A bank, with a depth of 11.9, and possibly less, marked by strong tide rips, is located in the center of Mermaid Passage.

3.90 The **Wybron Islets** (16°28'S., 123°21'E.), a group of four rocky islets lying on the same reef, of which the highest is 15m, are located 0.75 mile S of Mermaid Island; the channel between the reefs on either side, 0.3 mile wide, is free from dangers, but the tidal currents vary in direction.

Channel Rock (16°26'S., 123°23'E.), 2m high, is a small reef, steep-to in the N entrance to Fantome Passage, and located 090°, 1.25 miles from the SE extremity of Mermaid Island. The channel between is deep and free from dangers.

Fantome Passage, about 1 mile wide, and free from dangers, separates the Wybron Islets from Vickery Islet, and affords the best passage for small vessels proceeding from King Sound to Yampi Sound.

Vickery Islet (16°29'S., 123°21'E.), 4m high, is a small bare islet surrounded by a reef, and is the NW of two parallel chains of small rocky islands, covered with scrub and long grass, about 0.15 mile apart, extending to Faint Point, the SW entrance point of Crawford Bay.

Strickland Bay and Cone Bay, entered from the N and S of High Island (16°21'S., 123°21'E.), respectively, are two elongated bays, both shoal in their inner parts. The approaches and confines of these bays are heavily encumbered with numerous islets and dangers and only small vessels with local knowledge should attempt to enter.

3.91 Sunday Strait—West side—The **Roe Islands** (16°18'S., 123°12'E.) are two narrow islands lying about 9 miles E of Swan Point.

West Roe Island is rugged and bare, 33m high, 1.5 miles long, and about 0.25 mile wide; the S side is steep-to, but a fringing reef extends from 0.1 to 0.3 mile from the N coast. The reef that extends W for about 0.5 mile from the W side of the island appears to form part of the island. A rock, with a depth of less than 1.8m, lies about 1 mile NNW of the W extremity of West Roe Island, and several rocks, from 5 to 12m high, are located close off the same point.

East Roe Island (16°22'S., 123°47'E.), 0.9 mile E of West Roe Island, is 23m high at the E end and covered with coarse grass; the W end forms a knob.

Mid Rock, 3.7m high, is located midway between East Roe Island and West Roe Island and lies on a reef nearly connected with East Roe Island.

Pincombe Shoal, of sand, gravel, and coral, with a depth of 1.2m near the center, is 2.25 miles long within the 9.1m curve, and 0.25 mile wide; it is located N of the Roe Islands, from which it is separated by a channel 0.5 mile wide, with depths of 24 to 37m. Its N extremity, lies 2.5 miles NNW of Mid Rock.

The **Sunday Islands** (16°25'S., 123°13'E.) are two rugged islands, sparsely covered with scrub, of irregular form, and lo-

cated on the same reef, 11 miles ESE of Swan Point. The E and smaller island is separated by a narrow passage, which dries at low water, and extends in a NNE and SSW direction. The N coasts of both islands, which are separated from the Roe Islands by Meda Pass, are fringed by narrow coral reefs, which are wider on the E and S sides.

The westernmost Sunday Island is 56m high, 3.25 miles long, and 1.5 miles wide; the E island is 49m high, 2.5 miles long, and 0.75 mile wide. The W side of the westernmost Sunday Island is fronted by an extensive flat, on the edge of which are Allora Island and other islands, mentioned with Hadley Pass and Escape Pass.

A conspicuous boulder is located W of Waterlily Creek, on the southern side of the W island, and a similar boulder near the summit of the E island.

Tides.—At Sunday Island the mean spring rise is 6.7m; mean neaps rise 4.9m.

Caution.—Dean Islet, an islet 11m high, steep-to on the N side, is nearly joined to the N side of the W Sunday Island.

Hunt Islet, 5m high, with a fringing reef surrounding it, is located close to the NE point of E Sunday Island.

Rip Rock, above water, with a rock having a depth of less than 1.8m close E of it, and foul ground, marked by strong overfalls, extending 0.2 mile SE of it, is located 0.15 mile SE of Hunt Islet.

Pelican Rock, 3m high, a small rock surrounded by reefs, is separated from the S coast of East Sunday Island by a narrow boat channel.

A reef, upon which are two rocks which uncover 6 and 5m, respectively, extends 0.4 mile SE from Pelican Rock.

3.92 Menmuir Rock (16°22'S., 123°15'E.), with a depth of 3.7m, lies near the W end of a narrow ridge of rocky ground, having depths of 9 to 14.6m and marked by dangerous overfalls. It is located in the fairway of Sunday Strait, about midway between East Roe Island and Hancock Reef.

Amur Reef (16°28'S., 123°16'E.), of coral, steep-to, and drying 1.2m, is 0.15 mile long in a N and S direction and 150m wide, located in mid-channel, about 6 miles S of Menmuir Rock, and bearing WSW distant 4.5 miles from the S extremity of Mermaid Island.

A narrow bank, with depths of 10.1 to 14.6m and 0.25 mile long, is located 0.35 mile E of Amur Reef.

Alert Rock, with a depth of 2.7m, is located 1 mile SSE of Amur Reef.

Fairway Rocks (16°35'S., 123°19'E.), a rocky group about 1 mile in extent N and S, and 9m high, lie about 7 miles S of Amur Reef and 2 miles W of Long Island. A coral reef, that dries 0.9m, is located about 1.25 miles N of Fairway Rocks.

3.93 Passages in Sunday Strait.—Meda Pass (16°22'S., 123°10'E.) is approached from W between Alarm Shoal and the Twin Islets; it leads between Anchor Shoal and the Roe Islands to the N and the Sunday Islands to the S. This pass is preferred by many mariners for entering King Sound as the tide rips are less violent than in Sunday Strait. Hadley Rock, with a depth of 9.1m, is the only danger in the pass. The tidal currents in the pass attain rates of 4 to 8 knots.

Hadley Pass (16°25'S., 123°09'E.), the E passage through the island chain leads between Allora Island and the reef extending from the E side of Tallon Island. It then leads W of Hancock Island where it joins with the S entrance to Escape Pass. The pass is narrow and intricate with a least width of about 0.3 mile.

Pearl Pass, connecting Karrakatta Bay with King Sound, is narrow and used by small craft with local knowledge.

Rees Islet (16°23'S., 123°06'E.) and Howard Islet, 2 miles W, form the N entrance of Escape Pass, which then leads SSE between Tallon Island on the E, and the reef to the W, on which Leonie Island and Jackson Island lie. This pass, which is deep and not less than 0.4 mile wide, is the shortest route into King Sound from the W, but the tidal currents, which attain a rate of 10 knots during springs, require that vessels proceeding through possess local knowledge to maintain safe navigation.

King Sound

3.94 Long Island (16°34'S., 123°22'E.), rugged and rising to a height of 68m near its center, lies with its N extremity about 10 miles SE of the E end of the Sunday Islands. An islet, 34m high, lies close off the SE extremity of Long Island, and Long Island Shoal, which dries 0.3m, parallels the island about 0.75 mile to the NE.

Cascade Bay (16°34'S., 123°26'E.), entered between the above islet and Lachian Island, 2.5 miles ESE, is formed between the shoal NE of Long Island and the mainland to the E. The E side of this bay is heavily encumbered with shoals, but the N part is nearly steep-to. Depths in the entrance of the bay range from 14.6 to 29m, and from 18.3 to 37m within. Rip Reef, which dries 1.2m, lies isolated about 2 miles SSW of the W extremity of Lachian Island and must be avoided.

Anchorage.—Anchorage can be taken in the NE part of Cascade Bay out of the strength of the tidal currents, S of the E extremity of Pecked Island, at the N end of the bay. Depths in this anchorage vary from 11 to 18m, good holding ground; the tidal currents are weak and varied.

Caution.—The tidal currents in the entrance of Cascade Bay are strong with rates of 6 to 8 knots at springs. The ebb flows NW through the S entrance of the bay and forms violent eddies over the uneven ground.

3.95 Port Usborne (16°39'S., 123°30'E.), a small harbor, lies S of Lachian Island and NW of Point Usborne. It is fronted by Swirl Shoal, Rip Reef, and Tree Island and is difficult to enter except by small vessels with local knowledge which sometimes use it as an anchorage area. The head of the harbor is somewhat obstructed by Brolga Shoal, with a depth of 2.7m, and a large unsurveyed inlet is entered immediately NE. Rip Reef, which dries 1.2m, lies isolated about 2 miles SSW of the W extremity of Lachian Island and must be avoided.

Caution.—The tidal currents W and N of **Tree Island** (16°40'S., 123°29'E.) are very strong and the area is unsuitable for anchorage. Swirl Shoal, NW of Tree Island, has a least depth of 2.4m and the tidal currents form eddies over it. Towndrow Rock, which dries 0.6m, lies about 0.5 mile NE of Swirl Shoal and is dangerous.

3.96 The coast from Port Usborne trends E for 7 miles to the base of Compass Hill, 213m high, and then SE 17 miles to Stokes Bay. The first part of the coast is high and rocky, but the

last is a low muddy mangrove shore, with a level track of land between it and ranges of hills, extending in a SE direction from Compass Hill. Saddle Hill, about 198m high, and Round Hill are conspicuous. A bank, with 7.3m and possibly less, lies SE, 5 miles from Usborne Point.

The **Helpman Islets** (16°44'S., 123°38'E.), from 8 to 11 miles ESE of Point Usborne, are connected to the coast by a shoal ridge, which dries. A shoal, with a least known depth of 5.8m, lies 2.5 miles WSW of the NW Helpman Islet and then extends NW to the bank SE of Point Usborne.

Stokes Bay (16°55'S., 123°40'E.) is about 15 miles in length and 8 miles in breadth; its head is nearly dry at low water for about 7 miles and the soft muddy shores are fringed with mangroves, through which the tide flows, inundating at spring tides many miles of the interior country. The land around the bay is also low and swampy for a breadth of nearly 3 miles in places, and then rises gradually, the slope being well wooded with white gum trees.

The Meda River discharges into the SE corner of Stokes Bay, and is navigable at high water for about 15 miles for vessels of 2.7m draft.

The Robinson River is on the E shore of Stokes Bay, and traverses the valley between Saddle and Round Hills.

The May River in the S portion of Stokes Bay, 30 miles from its mouth, joins the Meda River and then takes the name of the Lennard River.

The entrances of these rivers appear to be obstructed by sand bars which probably dry at low water.

3.97 Point Torment (17°00'S., 123°36'E.), the W extremity of Stokes Bay, has a spit, with depths under 5.5m, extending about 6 miles NW of it; it dries out 3 miles from the point.

Point Torment Creek, a small stream 4 miles E of Point Torment, was ascended for 12 miles by boat, where it terminates in a mangrove swamp. No landing could be effected.

Aspect.—The remaining portion of the E shore of King Sound from Point Torment takes a general S direction for about 20 miles to the Fitzroy River. The coast is low, irregular, lined with mangroves, and fronted by mud flats.

Nob Hillock, about 13 miles S of Point Torment, is a dark wooded conspicuous hillock, about 22m high. About 5.5 miles farther S are two similar elevations close together, named Double Nob Hillock; within the latter is the town of Derby, which is described at the end of King Sound in paragraph 3.105.

3.98 Cygnet Bay (16°34'S., 123°01'E.) is the deep indentation between **Shenton Bluff** (16°28'S., 123°03'E.) and Cunningham Point, 14 miles SSE; in its N part are Lugger Cove, Mission Bay, and Catamaran Bay.

The shore is almost totally fringed with closely twining mangroves; the country behind gradually rises to an average height of 61m and is thickly covered with various kinds of gum trees.

Gilbert Rock (16°29'S., 123°03'E.), 2.4m high, is a small rock located 0.6 mile S of Shenton Bluff, with which it is connected by a rocky ledge.

A sand patch, which dries 6.5m on the same reef, is located 0.2 mile W of Gilbert Rock.

Reefs and foul ground extend 0.5 mile W of Gilbert Rock, near the W extremity of which there is a rock which dries 2.4m. Within the 30m curve the bottom is foul.

Newman Ledge is a reef 0.2 mile long in a N-S direction which dries 2.4m, and is located 0.8 mile E of Gilbert Rock.

Shoal water surrounds Newman Ledge to a distance of about 0.35 mile, and a rock, drying 3m, is located midway between it and Gilbert Rock.

Lugger Cove (16°28'S., 123°02'E.), located W of Shenton Bluff, is encumbered by a sand flat fringed with coral reefs extending from the head.

Riddel Point, the W point of Lugger Cove, is 20m high and faced by cliffs; a reef extends 0.2 mile from this point.

Bird Rocks are a group of small rocks, from 3 to 7.3m high, located on the outer part of the shore reef about 1.5 miles SSW of Riddel Point.

Anchorage.—Good anchorage, in a depth of 7.3m, sand, is found in Lugger Cove with Shenton Bluff bearing 107°, about 0.9 mile distant, avoiding a rocky spit of 0.6m which extends about 0.5 mile W from that bluff.

Between Riddel Point and Bird Rocks the coast recedes and forms two shallow bays, N of which is Mission Bay, where there is a house belonging to the Roman Catholic Mission; the S bay is Catamaran Bay.

3.99 Skeleton Point (16°32'S., 123°01'E.), 38m high, is a narrow point located about 4 miles SW of Shenton Bluff. It is fringed by reef, and rocky ledges, on which are rocks 0.6m high, extending from the NE and SE ends of the point.

Shell Bank (16°30'S., 123°06'E.), with general depths of 11 to 14.6m, sand and coral bottom, and from 0.5 mile to 1 mile wide within the 18.3m curve, has been traced for a distance of 6 miles in a SW direction from a position 0.75 mile SW of Evans Rocks to the entrance to Escape Pass. The least known depth is 7.6m, located about 4.5 miles ENE of Skeleton Point; a patch of 8.2m lies 1.5 miles NE of this position.

Cunningham Point (16°41'S., 123°08'E.), the S extremity of Cygnet Bay, is a steep rocky cliff connected with the mainland by a low narrow isthmus covered at springs. A rocky ledge, which dries 3m, lies close N of the point, and shoal water borders the shore to a distance of 1 mile E of the point.

Meda Shoal (16°35'S., 123°07'E.), awash at low water and about 1 mile in diameter, lies 6 miles N of Cunningham Point. The waters around Meda Shoal have not been completely surveyed, but numerous shoals are known to exist within a radius of 4.5 miles to the N, W, and S.

Anchorage.—Most of the smaller bays in Cygnet Bay afford good anchorage for vessels with local knowledge in depths of 7 to 9m between 0.5 mile and 2 miles offshore and out of the strength of the tidal currents. Caution is required in the approach as the waters of Cygnet Bay have not been thoroughly surveyed and additional dangers may exist.

The best anchorage for small vessels is in the bay immediately W of Cunningham Point in depths of 4 to 5m, but care is required on approaching to avoid the shoals between the above point and Meda Shoal.

3.100 Carlisle Head (16°45'S., 123°08'E.), 2.75 miles S of Cunningham Point, is a conspicuous cliff, between which and the latter point, the coastal bank dries for about 0.5 mile offshore, with three rocks on its outer edge.

A narrow shoal, about 3.5 miles in length and which just dries at low water springs, lies centered about 2.5 miles E of

Carlisle Head.

Foul Point (16°48'S., 123°09'E.), fronted S by a reef to a distance of about 1 mile, falls in conspicuous cliffs; it also marks the S termination of the range of cliffs on the W side of King Sound.

Goodenough Bay lies between Carlisle Head and Foul Point, and is dry throughout at low water, and foul to some distance beyond the points.

Disaster Bay (16°54'S., 123°11'E.), entered between Cornambie Point and Repulse Point about 8 miles SSE, mostly dries and is foul with reefs and shoals. There are some conspicuous red cliffs at the head of the bay, about 2 miles SW of Cornambie Point. A long narrow shoal composed of coarse sand and gravel, which dries 2.1m, extends approximately 7.5 miles N of Repulse Point and forms a natural breakwater fronting Disaster Bay.

Anchorage can be taken, in depths of 9 to 15m, within the above shoal and the shoal flats off Disaster Bay.

3.101 South Meda Shoal (16°54'S., 123°17'E.), 5 miles NE of Repulse Point, has a least depth of 0.3m, coarse sand, with depths of less than 11m extending 0.75 mile N and up to 1.5 miles SSE from its shallowest part.

Tides—Currents.—At spring tides there are extensive eddies and overfalls over all the shoal areas in King Sound and in other areas of irregular depths. In strong winds dangerous tide rips occur in the vicinity of most of the projecting points along the shore of the sound, and discolored water is frequently observed in the approaches to the Fitzroy River during the spring ebbs.

Spring rates of 5 knots are frequent throughout the fairway in the S part of King Sound.

Valentine Islet (17°05'S., 123°19'E.), 26m high, with cliffs at both ends and a low valley between, lies on the edge of the shore bank about 8 miles SSE of Repulse Point. A conspicuous white sandy patch, 24m high, is located on the coast 4 miles NW of Valentine Islet.

Estuary of the Fitzroy River

3.102 The **Fitzroy River** (16°15'S., 123°53'E.) flows into the head of King Sound and forms a rather extensive but shoal estuary which is entered between **Point Torment** (17°00'S., 123°36'E.) and Valentine Island, 15 miles W. The E side of the estuary, between the above point and the river entrance, approximately 20 miles S, is low, irregular, and lined with mangroves fronted by mud flats. Black Rocks, a group of drying reefs and submerged rocks, lie within 1.5 miles of the coast about 3 miles S of Point Torment.

A light is shown, at an elevation of 13m, from a position close off the coast 3 miles S of Point Torment.

Christine Point (17°12'S., 123°17'E.), 10 miles S of Point Torment, is low and swampy; two inlets enter the coast immediately E of the point, and a spit, with depths of less than 5.5m, extends nearly 7 miles NW of the same point.

3.103 Nob Hillock (17°16'S., 123°37'E.) stands close to the coast about 4 miles S of Christine Point; Double Nob Hillock is located about 5.5 miles farther S.

The W side of the estuary S of Valentine Islet is low, marshy, and poorly defined. The coast is backed by timbered country, but the waters on the W side of the estuary are nearly unsurveyed.

Caution.—Numerous shoals and dangers lie within the entrance to the estuary of the Fitzroy River and local knowledge is essential to enter. An isolated patch, with a depth of 5.2m, lies 4.5 miles W of Point Torment.

3.104 Outer Rip Shoal (17°06'S., 123°31'E.), which dries 2.1m, is located 6 miles SW of Point Torment, and depths of less than 5.5m extend 0.75 mile NNW and SSE of its drying part.

Inner Rip Shoal, which dries 2.1m, is located 9 miles SSW of Point Torment; depths of less than 5.5m extend 1.5 miles NW of the drying portion of this reef, and the SE extremity is nearly connected to the coastal bank.

Elbow Shoal, with general depths of 1.8 to 3.7m and on which there is a bank which dries 1.8m, extends 4 miles NW and W of Christine Points.

North Mary Islet (17°16'S., 123°33'E.), lies 4 miles W of Nob Hillock and is about 11m high to the tops of the trees. The N end of the mangrove-covered flat extending from this islet is known as Josephine Point.

South Mary Islet, 0.75 mile S of North Mary Island, is 5m high and covered with mangroves which nearly connect it to the latter. There are numerous shoal flats, several of which are covered with mangroves, that extend SW from South Mary Islet to the W shore of the estuary.

3.105 Derby (17°18'S., 123°36'E.) (World Port Index No. 54640), a small port near the head of King Sound, is the capital of the West Kimberly District and was a shipment area for pastoral and mineral produce. The port is reported closed to commercial shipping; all cargo was being handled through Broome (see paragraph 4.13).

Anchorage.—There is anchorage for vessels, in 11 to 12.8m, with Black Rock Light bearing 090°, distant 4 miles. Anchorage is also available, in depths of 7.3 to 9.1m, NNW of North Mary Island, with the front range light bearing 141°, distant 6.5 miles. Small vessels can anchor just NE of the same islet, in depths of 5.5 to 7.3m. A lighted mooring buoy lies 1.5 miles N of the N end of North Mary Island

Directions.—Vessels should proceed through Sunday Strait passing about 0.5 mile E of East Roe Island and 0.75 mile E of East Sunday Island thereby avoiding Menmuir Rock. When at a position about 2.75 miles SW of Amur Reef, steer 157° for about 28 miles passing W of Fairway Rocks to a position with Black Rock Light bearing 135°, distance 14 miles. Steer for the light structure until about 4 miles from it, then proceed to the anchorage. The approach is subject to constant change.

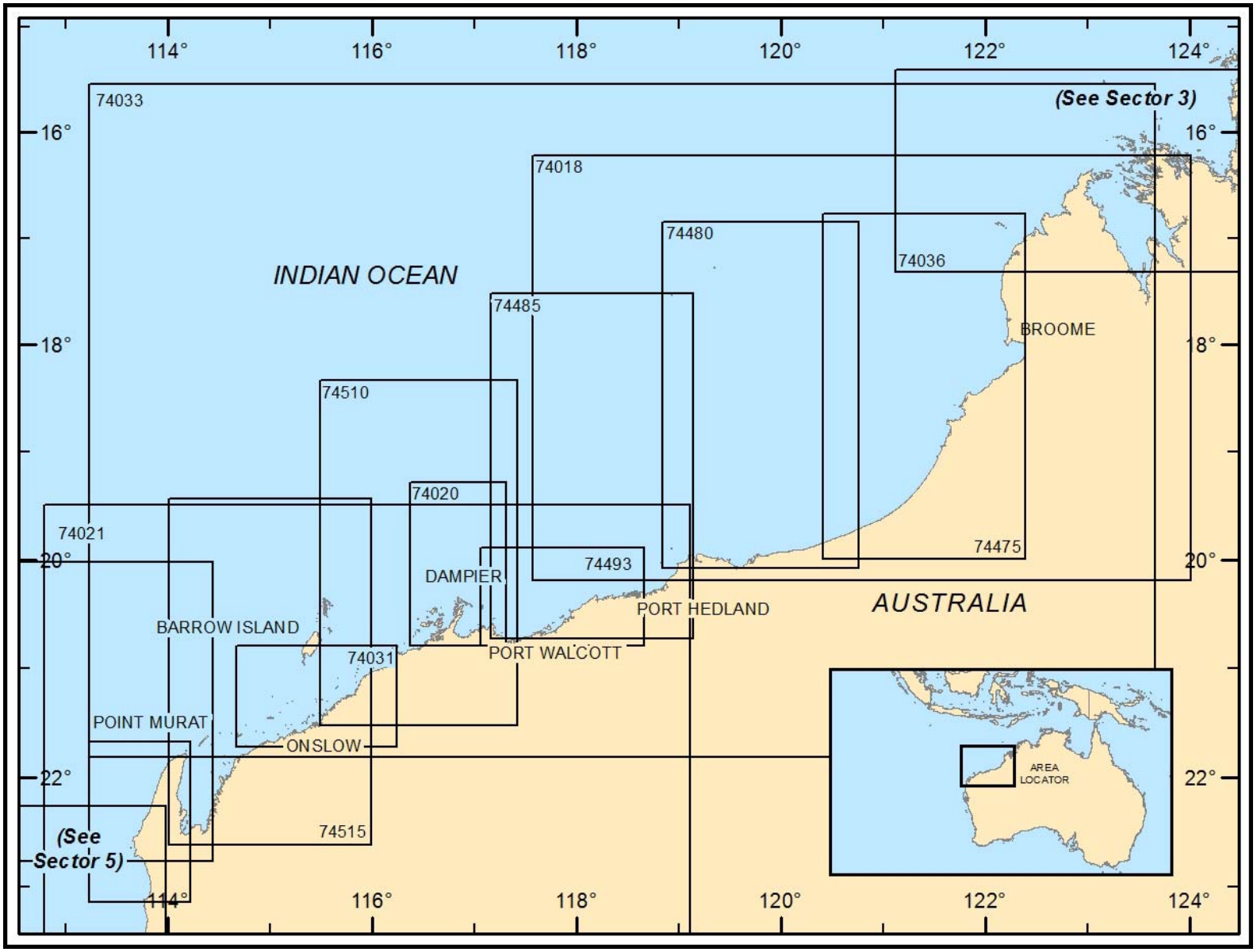
King Sound to Cape Leveque

3.106 The coast between Swan Point, the W entrance point of King Sound, and Cape Leveque about 7 miles WSW, is low and sandy, and fronted by coral ledges and sandflats extending up to 1.5 miles offshore.

Hunter Creek (16°23'S., 122°59'E.), about 3.5 miles SW of Swan Point, dries, but can be entered by local craft with local knowledge at high water when there are depths of about 5m

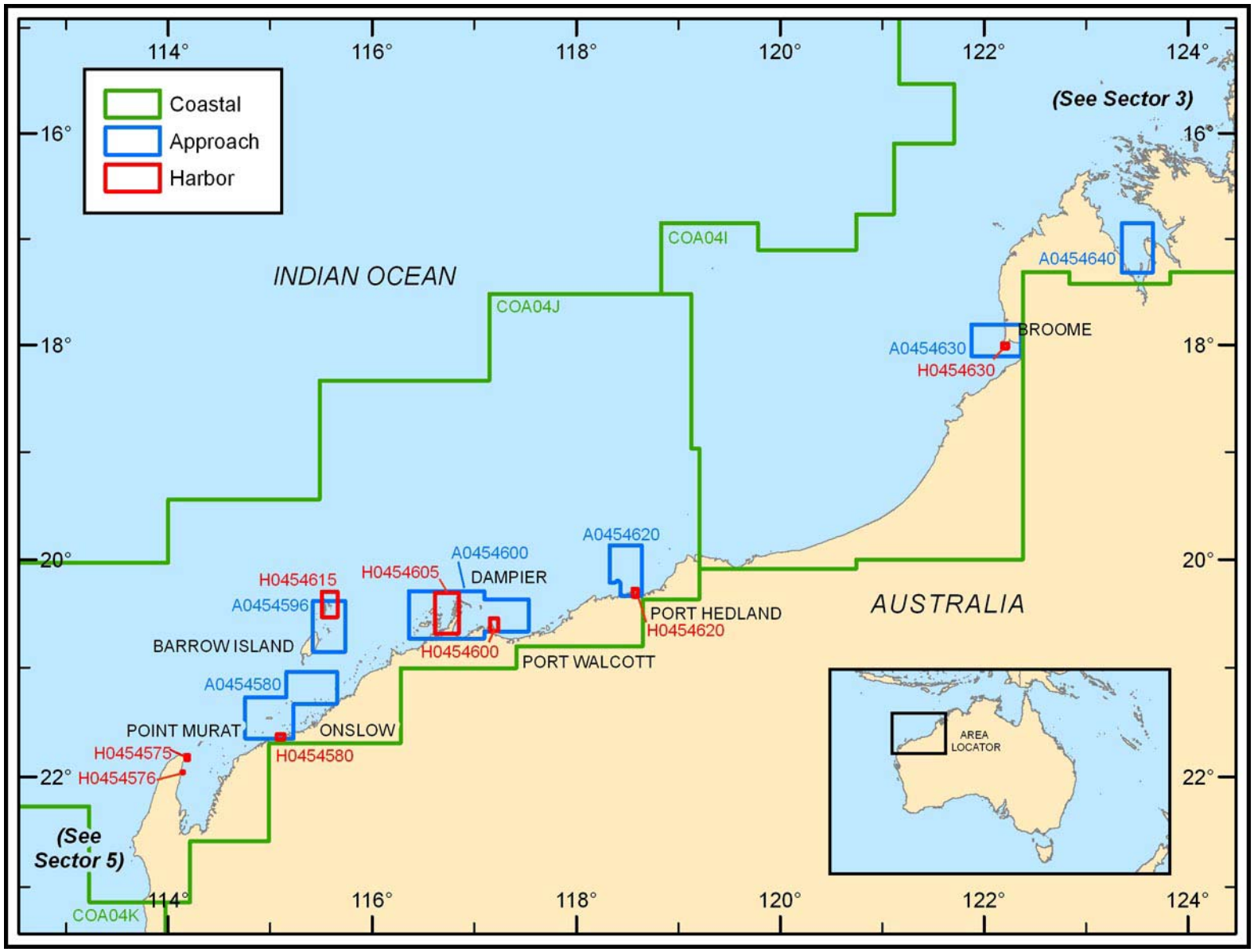
over the bar. Between the creek and Cape Leveque, about 3.5 miles WSW, there is a bay entirely obstructed by a reef known as Jonas Shoal. There are some red sand hills, 34m high, at the head of the bay.

Cape Leveque (16°23'S., 122°56'E.) is a red cliffy point about 37m high. Reefs, on which Leveque Islet is located, extend 1 mile N and 0.6 mile W of the cape. A light is shown from the cape and a racon is situated at the light structure. Ball Rock, with a depth of 3m, is located about 0.5 mile N of Leveque Islet.



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

NORTHWEST COAST OF AUSTRALIA—CAPE LEVEQUE TO NORTH WEST CAPE

Plan.—This sector describes the NW coast of Australia from Cape Leveque to North West Cape, and includes the offshore islands and shoals. The principal ports described include Broome, Dampier, and Port Hedland. The general arrangement of each group of islands or shoals is from NE to SW, with each island group or shoal under a separate heading.

General Remarks

4.1 The Australian coast from Cape Leveque SW to North West Cape, about 600 miles distant, is generally barren and consists of a low coastline backed by low sand hills. The coastal regions are undulating with an interior slope to the central portion of the continent. Large areas of Western Australia are hilly for some hundred miles inland, however, there are a few hills near the coast, with heights to 152m which are conspicuous.

The coast is imperfectly examined and charted, mariners are cautioned to proceed accordingly. There are some ports and good anchorages, but the shore is much indented with shoal or drying bays. In general, the 18.3m curve may extend offshore 50 miles, as in the vicinity of **North West Island** (20°22'S., 115°30'E.), with patches of less than 18.3m existing outside this curve.

Winds—Weather.—The principal winds in this sector are the Southeast Monsoon, also known as the Southeast Trade Winds, and the Northwest Monsoon. Further information can be found in paragraph 1.1.

Tides—Currents.—The currents in this sector are affected to a considerable extent by the changing monsoon wind. At distances of more than 60 miles from the coast, the predominant direction of the current is NE to E, in summer, at a rate of about 0.5 knot, with countercurrents in some of the bays. In winter the currents are variable but are generally of a SW to W nature.

Throughout the year the constancy of the predominant direction is generally less than 25 per cent, but in some areas it is between 25 per cent and 50 per cent. The mean rate is usually less than 1 knot, but on occasion rates of between 2 and 3 knots, setting either E or W (and sometimes opposing the predominant direction already referred to), have occurred in both seasons.

On detached reefs, the tidal currents usually set towards the reef from all sides during the flood tide and away from the reef during the ebb tide. The currents are particularly noticeable in the channels through the reef, where the rates may be considerable.

Visibility.—Fog is very rare. In coastal water, the frequency of fog is either nil or less than 2 per cent throughout the year. There is some increase over the ocean towards 35°S. It is almost frequent in the extreme SW during summer and autumn, but even here its frequency does not exceed 2 per cent.

Mist or haze is more common. Visibility of less than 5 miles is reported on 40 per cent of the occasions around North West Cape in January and February. In November and December, more than 20 per cent of observations report mist and haze on some part of the N coast of Australia, but from April to July reports of even haze occur at a frequency of less than 5 per cent. Dust, and smoke from bush fires, are the common causes of the haze.

In the tropical part of the region, the few occasions of true fog occur mainly in the dry season, most frequently in some lagoons and estuaries. Visibility is also liable to be reduced to fog limits in some of the heavier downpours of the wet season.

Vessel Traffic Service.—The Australia Maritime Safety Authority (AMSA) has established a network of shipping routes off its northwest coast to direct large vessels such as bulk carriers and LNG vessels trading to the major ports, into pre-defined routes that will keep them clear of existing, planned off-shore infrastructure. The fairways aim to reduce the risk of collision between transiting vessels and offshore infrastructure. such as oil and gas platforms.

Use of the new fairways is strongly recommended but not mandatory.

Caution.—Numerous oil and gas fields exist off the NW coast of Australia. Each field contains clusters of installations consisting of lighted and unlighted, permanent and movable, and awash and submerged structures. Most, but not all, structures exhibit lights, especially the platforms. Since not all features are charted or marked, mariners are cautioned to exercise special care when navigating these waters.

Pipelines lead between structures within a field, between the various fields, and to shore-based collecting stations. Cautionary and restricted areas exist in which navigating and anchoring are prohibited. Gas from a damaged gas pipeline could cause an explosion or other serious hazard.

Rowley Shoals

4.2 **Rowley Shoals** (17°20'S., 119°20'E.) consists of three extensive coral reefs lying 150 miles offshore. The sea breaks heavily on these reefs and in clear weather they are readily seen; however, they present poor radar targets. The reefs are steep-to and afford no anchorage.

Mermaid Reef (17°06'S., 119°37'E.), the NE of the three reefs, is an atoll with a large lagoon enclosed by a rim of coral, which dries. There are many drying patches in the lagoon. On the NE side of the reef, there is a passage, about 60m wide, leading into the lagoon. The passage is narrow and difficult, but suitable for vessels up to 4m draft, provided that the sun is sufficiently high for the many dangers to be seen. The tidal currents, with violent tide rips, set through this passage at a considerable rate.

Anchorage can be obtained, in 13m, about 0.1 mile inside the lagoon. In 1965, there was a sand bank, which covers at HWS, on the N end of the reef. A historic wreck lies midway along the W side of Mermaid Reef.

Clerke Reef (Minstrel Shoal) (17°19'S., 119°21'E.) lies

about 15 miles SW of Mermaid Reef. The reef has a length of about 9 miles N to S, and a width of about 4 miles. Near the N end of the reef lies Bedwell Islet, a bare sand cay about 2m high. On the E and W sides of the reef there are a number of boulders which dry. A narrow passage, which is navigable by boats at high water slack, leads to a lagoon, with many detached coral patches within the reef. There is anchorage in the lagoon for vessels up to 15m in length. The depths are over 183m within a short distance of the reef.

Imperieuse Reef (17°35'S., 118°55'E.) lies about 22 miles SW of Clerke Reef and is the southwestern most of Rowley Shoals; it is about 10 miles in length N to S and has a width of about 5 miles. On the SE edge of the reef there are numerous coral boulders, which dry about 3m. Large areas of the reef dry at low water and there are two lagoons, which each contain many coral patches within.

Cunningham Islet, a small sand cay 3.7m high and devoid of vegetation, is located close within the N extremity of the reef, and appears to be surrounded by a small lagoon, 93m wide.

Imperieuse Reef Light is shown from a round metal tower, on a concrete base, on Cunningham Islet. In favorable conditions the light structure has given good radar returns at a range of 36 miles. A racon is situated at the light structure.

Caution.—During the strength of the tidal currents, heavy tide rips were experienced along the 183m curve about 60 miles E of Rowley Shoals. These rips were about 0.2 mile wide and, at a distance of 1 mile, resembled heavy breakers.

Cape Leveque to Cape Baskerville

4.3 The coast between Cape Leveque, described in paragraph 3.106, and **Cape Baskerville** (17°08'S., 122°14'E.), about 58 miles SW, is generally low, fronted by rocks and shoal water, and indented by shoal or drying bays. The 40m curve is charted from 20 to 30 miles offshore on this stretch of coast, except in the vicinity of the Lacepede Islands and Baleine Bank, where it extends to 60 miles. Isolated banks, with depths of less than 37m, lie outside the charted 37m line.

From Cape Leveque to Chile Head, about 8 miles SSW, the shore is formed by sandy beaches backed by sand hills from 15 to 26m high; 4 miles SSW of Cape Leveque there are some low red cliffs with red sand hills inland. The coast is fronted by rocks and drying ledges extending up to 1.5 miles offshore. Chile Head, the S entrance point to Thomas Bay, has a shoreline 1 mile in length, is shaped like an anvil, and is formed of boulders; it rises to a conical hill 11m high. Rocky ledges, which dry up to 6.7m, extend 1.75 miles N and SW from Chile Head, forming natural breakwaters to the adjacent bays.

Thomas Bay (16°28'S., 122°53'E.) is entered between Chile Head and a point 2.5 miles NE. The bay recedes about 1.5 miles SE, and is backed by sand hills from 18 to 24m high. Drying reefs extend from both points across the entrance. A detached drying reef lies in the entrance, 2 miles NNE of Chile Head; there are depths of 1.8 to 5.5m within the bay.

From Chile Head to Cape Borda, about 14 miles SSW, the coast continues to be backed with low sand hills and is fronted by rocky and drying reefs. A detached 9.1m patch lies 4 miles WSW of Chile Head, about 1 mile outside the 10m curve. Black Rod Rock, which dries 0.6m, lies about 6 miles SW of Chile Head and 0.75 mile offshore. McVilly Rock, which dries 1.5m, lies 3 miles NNW of Cape Borda and 2 miles offshore. Some rocky ledges, which dry, with foul ground around them, extend to the cape. There are other rocks, with less than 1.8m over them, N of McVilly Rock, and drying ledges NNE to shore.

4.4 **Lord Mayor Shoal** (16°31'S., 122°37'E.) lies about 13 miles W of Chile Head. The shoal has a least depth of 7.6m and lies on the N side of a coral bank that extends S and SW.

Pender Bay (16°44'S., 122°41'E.) is entered between Cape Borda and Emeriau Point, about 10.5 miles SW. Cape Borda is a low rocky point, with a white sandy patch near its extremity, backed by red cliffs from 18 to 21m high. Behind the cape, white sand hills partly covered by scrub rise to a height of 42m. Depths of less than 11m extend up to 5.5 miles W of Cape Borda.

From Cape Borda, the eastern shore of Pender Bay extends SE to Kelk Creek, which dries throughout, then SW to Bell Point, a rocky point 6.5 miles SSW of Cape Borda. The S shore of Pender Bay, between Bell Point and Emeriau Point, about 7 miles W, consists mostly of red cliffs broken in places by small sandy beaches. From 1 to 2 miles WSW of Bell Point, the cliffs are from 6 to 24m high and are conspicuous. From these cliffs, the shore extends W about 2.5 miles, then NNW to Perpendicular Head, then W to Emeriau Point.

4.5 **Woodhouse Rocks** (16°43'S., 122°42'E.), some of which dry from 2.1 to 2.7m, form the outer dangers in Pender Bay and lie about 3.3 miles SW of Cape Borda. Chimney Rocks lie close NE of Emeriau Point; the outermost of the four rocks is the largest and is 13m high. It is easily identified when seen clear of the land.

Anchorage can be obtained during good weather, in depths of 7m, 1 mile E of Perpendicular Head, with Chimney Rocks in line with the head.

The coast between Emeriau Point and North Head, about 5 miles SSW, is fronted by rocks, many of which uncover at low water. About 3.5 miles SSW of Emeriau Point, the coast is indented by Tappers Inlet, which dries throughout. The position of the entrance to the inlet is liable to shift.

North Head (16°50'S., 122°32'E.), the N entrance point to Beagle Bay, is a low dark-colored cliff with a conspicuous stony hummock, 16m high, above it; it has a ridge of grassy hummocks which extends NE about 0.5 mile. A wooded hill, about 26m high, is located 0.5 mile E of North Head.

Beagle Bay (16°52'S., 122°30'E.) is entered between North Head and Sandy Point, about 4.5 miles SW. The depths in the bay decrease regularly from 12.8m in the entrance to its head, about 7 miles SE. On the E side of the bay, about 2.25 miles SSE of North Head, there is a conspicuous sand-faced ridge, and about 0.5 mile farther S, there is a conspicuous green peak, 22m high. East Sandy Point, 4 miles S of North Head, rises to a height of 23m.

4.6 **Sandy Point** (16°54'S., 122°28'E.), 9.1m high, the SW entrance to Beagle Bay, is composed of sand hills with their tops and inshore slopes sparsely covered with brush. South Head is 0.6 mile within the extremity of Sandy Point and rises to a height of 15m. The coastal bank, with depths of less than 5.5m, extends 1 mile N and 0.5 mile NE of Sandy Point.

Several submerged rocks lie on the coastal bank; the outermost of these, with a depth of 1.5m, lies 1 mile N of the point.

Tidal currents, which set in and out of the bay with rates from 0.5 to 1.5 knots, set directly across the shoal ground N of Sandy Point. Care is necessary in approaching Sandy Point, as the currents setting across the shoal ground create a tide rip.

Good anchorage may be found on either side of the bay, according to direction of the wind and the draft of the vessel. Although the bay is open NW, strong winds are seldom experienced from that quarter, and on rare occasions when they do blow, last a few hours only.

Caution.—Pearl culture activity is conducted in the bay. Pearl beds, which may be floating or fixed structures, and their associated moorings should be avoided. The beds are generally marked by buoys or beacons, which may be lit. Their positions are not charted.

4.7 The coast from South Head to Cape Baskerville, 19 miles SW, is indented by Camp Inlet and Baldwin Creek. Camp Inlet dries throughout and for 1.5 miles W of its entrance. The shore S of Sandy Point to Camp Inlet, 3 miles S, is low and sandy. From Camp Inlet SW to Baldwin Creek, about 7 miles distant, the coast is low and is backed by parallel ridges of sandy hillocks, 6.1 to 20m high.

Red Bluff (17°03'S., 122°19'E.), about 4 miles SW of Baldwin Creek, is a conspicuous red cliff surmounted by a square-topped sand hill, 45m high, covered with grass and shrubs. A light, from which a racon transmits, is situated on the bluff.

King Peaks, located 3 and 6.5 miles ESE of Red Bluff, are two conspicuous peaks, 77m and 84m high, on a wooded range of hills. The W of the two peaks is known as Carnot Peak. The shore from this area SW to Cape Baskerville continues as conspicuous reddish sandy cliffs with little break in its configuration.

The coastal waters from Sandy Point to Camp Inlet are bordered by drying reefs extending 0.4 mile offshore and by a bank that dries, 0.8 mile farther offshore. The coast for about 5 miles SW of Camp Inlet is fringed by foul ground which dries up to 6m, and extends about 0.5 mile offshore. The 5m curve extends up to 3 miles off this section of coastline. From Baldwin Creek, 4 miles SW to Red Bluff, rocky ledges extend up to 1.5 miles offshore.

Cape Baskerville (17°08'S., 122°15'E.), the N entrance point to Carnot Bay, is a conspicuous sandy hillock 38m high. About 1 mile E of this hillock there is a wooded hill, 50m high, which is considerably higher than the land farther S. Carnot Bay lies between Cape Baskerville and a low point 3.5 miles SSW. The bay dries for a distance of 2 miles outside the line joining the entrance points. Within the cape, its shores are flat and swampy and are intersected by creeks.

Off-lying Dangers

4.8 The coastal bank, which includes Baleine Bank (16°47'S., 122°00'E.) and the Lacepede Islands (16°53'S., 122°09'E.), with depths of less than 18.3m, extend up to 35 miles NW from the coast between South Head and Cape Baskerville.

The 10m curve extends 11 miles WNW of South Head and embraces Sloper Shoal, which has a minimum depth of 6.4m. There is an isolated 10.9m patch about 2 miles NW of Sloper Shoal.

The **Lacepede Islands** (16°53'S., 122°09'E.), a group of four islets about 10 miles in length NW to SE and about 5 miles in width, lie from 10 to 20 miles NW of Red Bluff. East Islet and West Islet lie in the SE and NW part of the group, respectively. These islets lie on a coral reef that dries; at high water, its S edge is marked by heavy breakers. Danger Rocks lie on the edge of the foul ground extending 3 miles W from West Islet. A light is situated on East Islet; a racon transmits from the light structure. Surprise Reef, composed of sand and coral, with a least depth of 2.1m, lies on a spit with its shallowest head about 4.75 miles SSW of East Islet; the sea occasionally breaks over this reef at low water.

Baleine Bank (16°47'S., 122°00'E.), composed of sand and coral, extends within the 20m curve, about 18 miles WNW from the W end of West Islet. The bank, about 5 miles wide, has general depths of 2.7 to 9.1m. The edges of this bank are generally clearly marked by tide rips, but the water is usually so discolored that it is difficult to detect the shallower spots. Rocks other than those charted may exist. Weston Patch, a narrow ridge with a depth of 4.6m, lies on the N edge of the bank, about 6.5 miles NW of West Islet. Walker Rock, with a least known depth of 6.1m, lies 16.5 miles W of West Islet; an unexamined 4.3m patch lies about 5.5 miles ENE of Walker Rock.

Anchorage may be taken about 1.25 miles NNW of the E end of West Islet, in a depth of 8.2m, but the bottom is uneven. This anchorage is exposed to NE winds which occasionally blow with sufficient force to cause an unpleasant sea. Vessels with a draft of over 5.5m should anchor farther NE. Currents set SE with the rising tide and NW with the falling tide.

Caution—Vessels engaged in underwater operations, including anchoring and trawling, SW of Baleine Bank are advised to do so with caution as well heads are reported in the area.

4.9 Lacepede Channel (17°00'S., 122°15'E.) leads between the islands and the mainland, and is about 3 miles wide between the 10m curves on either side. In approaching the channel from the NE, the track passes E of Sloper Shoal. The shoal water surrounding the Lacepede Islands lies along the W side of the channel, while Eclipse Shoals, Awong Patch, Tangier Shoals, and Baskerville Shoal lie to the E of the track; these shoals have depths of as little as 2.1m. There are isolated patches of 10.9m in the channel. Useful aids are the lights and racons at Red Bluff and East Islet.

Cape Baskerville to Roebuck Bay

4.10 Cape Bertholet (17°15'S., 122°11'E.), about 8.5 miles SSW of Cape Baskerville, is a low point that is difficult to distinguish, located at the N end of a ridge of white sand hills; this ridge terminates about 1.5 miles SSW in a sandhill, 19m high. The shoreline from Cape Baskerville to Cape Bertholet is low and swampy, and is inundated at high water springs.

The coastal bank from Carnot Bay SSW to Cape Bertholet, with less than 5.5m over it, extends up to 3 miles offshore, and has several drying rocks on it. Baskerville Shoal, with depths of 2.1m, is centered about 6 miles NW of Cape Baskerville and

Panton Shoals, with several rocks that dry, lie on the coastal banks off the entrance to Carnot Bay.

The coast from Cape Bertholet to Coulomb Point, about 7.5 miles SSW, presents a sandy shoreline backed by sand hills up to 19m high, partly covered by scrub. A brush-covered sand hill, 30m high, is located 0.75 mile SSE of Coulomb Point. Foul ground, with rocks that dry, extends up to 3 miles offshore. A depth of 5.7m is located just inside the 10m curve about, 6.5 miles NW of Coulomb Point.

Talboys Rock (17°18'S., 122°02'E.), an isolated coral head with a depth of 3.7m, lies 7.5 miles WNW of Coulomb Point. The rock is plainly marked by tide rips.

James Price Point (17°30'S., 122°09'E.), about 8 miles S of Coulomb Point, consists of low cliffs backed by red sand hills, 27m high, partially covered with scrub. The intervening shore between the two points is sandy for 2.5 miles S and is backed by white sand hills. The remainder of the coast to James Price Point consists of red cliffs, 8 to 24m high. A green hillock, 10m high, stands 4 miles S of Coulomb Point. The wooded coastal range of hills rises gradually to its summit, 122m high, 15 miles ENE of James Price Point; there is also a hill, 100m high, 6.5 miles ENE of the same point.

The coastal waters, with depths of less than 5.5m, extend to 2 miles offshore between Coulomb Point and James Price Point; within this area there are submerged and drying rocks. James Price Patches, composed of sand and coral, have a least depth of 7.3m at their N end, about 2 miles W of James Price Point.

Tidal currents between Cape Leveque and James Price Point are rotary in the offing. When the tide begins to rise the current sets to the SSE, gradually turning through E, and at high water sets between NE and N.

4.11 Cape Boileau (17°40'S., 122°11'E.), about 10.5 miles SSE of James Price Point, is the S extremity of a conspicuous red cliff 3 to 6m high. From James Price Point S, the coast consists of sandy beaches and occasional low cliffs, backed by sand hills, partly covered by brush. The land immediately behind the sand hills is low and covered with scrub, gradually rising inland to the slopes of the coastal range.

The 10m curve lies up to 4.5 miles offshore between James Price Point and Cape Boileau. Farm Shoal, with a least depth of 4.6m, lies 1 mile offshore, about 2.5 miles NNW of Cape Boileau. Grey Shoal, with a least depth of 9.1m, lies outside the 10m curve, about 8 miles WNW of Cape Boileau. Boileau Patches, with a least depth of 8.2m, are located between Cape Boileau and Naringla Shoal, a sand and coral shoal with a least depth of 7.6m, about 4.25 miles W of the cape.

From Cape Boileau S to Gantheaume Point, 18 miles distant, the coast is indented by two drying creeks. Barred Creek is located E of Cape Boileau; Willie Creek lies 6 miles farther S. Between these creeks, the shore is sandy and fringed with a low range of white sand hills. A house and a radio tower stand on the N shore of Willie Creek, close inside its mouth.

From Willie Creek, the low sand hills run S to Station Hill, which is a conical hill, 36m high, located 3.5 miles N of Gantheaume Point. A range of sand hills continues SSW to Gantheaume Point, which terminates in a rock cliff about 15.2m high.

Coastal banks, which dry and extend up to 0.75 mile offshore, lie between Willie Creek and Gantheaume Point. Cary Patch, with a least depth of 4.6m, is located 2 miles NW of Willie Creek. Depths of 8.5m lie up to 15 miles off this section of the coast.

Declaration Rock (17°55'S., 122°09'E.), with a depth of 4.9m, lies about 3.75 miles NNW of Gantheaume Point.

Whale Rock, which dries 0.9m, lies about 0.75 mile N of Gantheaume Point. Swirl Rock, with depths less than 1.8m, lies 0.5 mile NW of Gantheaume Point and is marked by tide rips. Inshore of these dangers, the bottom is foul.

Caution.—Fish aggregation devices (FAD), marked by special spar buoys, are moored approximately 12 miles NW of Gantheaume Point and should be given a wide berth by mariners.

Roebuck Bay

4.12 Roebuck Bay (18°05'S., 122°12'E.), one of the best harbors on this coast, is entered between Gantheaume Point and Cape Villaret, 22 miles SSW, and extends about 11 miles E. The N shore of the bay trends SE nearly 3 miles to Entrance Point, then NNE to Dampier Creek, with the town of Broome on its W side. There are some red cliffs, 12m high, about 5 miles ENE of Entrance Point. A number of creeks discharge into the NE and SE corners of Roebuck Bay; the E shore is fringed by mangroves. The low shores continues WSW to Bush Point, which has a clump of stunted trees and bushes on it, located 11 miles NE of Cape Villaret. From Bush Point, the low shore rises to Cape Villaret, a hillock 48m high, with some red patches under it.

Roebuck Bay appears as a spacious bay at high water, but at low water a large portion of the bay is occupied by drying sand banks extending up to 7 miles from the S shore. Pearl Shoals, which cover an extensive area, obstruct the entrance, leaving Roebuck Deep, a channel about 0.75 mile wide, between their NE side and the coast at Gantheaume Point.

Lights are shown from both Gantheaume Point and Entrance Point; the light structure at Entrance Point is situated about 0.3 mile NW of the S extremity of the point.

Broome (17°58'S., 122°14'E.)

World Port Index No. 54630

4.13 Broome is situated close within the entrance to Roebuck Bay and is entered through Roebuck Deep. There is berthing for deep draft vessels at Broome Harbor and for light draft vessels about 3 miles NE, in Dampier Creek, abreast the town of Broome. The principal imports are general cargo and bulk oil, and the exports are primarily frozen and chilled beef, beef by-products, and wool. The port is also a major export outlet for cattle to middle and far-eastern countries, and is also a supply center and base for vessels servicing petroleum exploration activities off the coast, and for the pearling industry.

Broome Port Home Page

http://www.broomeport.wa.gov.au

Broome

Winds—Weather.—The Southeast Trade Wind is the predominate wind throughout the year and is associated with good weather. From December to February, the Northwest or West Monsoon winds spread from W and N through this area. In March the winds become variable, but by April the SE wind has re-established itself.

The Southeast Monsoon or Southeast Winds are associated with fine dry weather, with practically cloudless days. The Northwest or West Monsoon is attended, especially at its onset, with considerable cloud, rain, and frequently thunderstorms. With the approach of the Northwest or West Monsoon, squalls occur at intervals of 4 to 5 days, but their frequency increases until they occur almost daily. The transitional period from one season to the next occurs through March and part of April and during the quarter October to December. The winds at these times are light and variable, but usually blow from the direction appropriate to the season.

Fog is rare, occurring only about 2 per cent of the time throughout the year. It occurs more often in summer and autumn, although, mist or haze is more common. Dust and smoke from brush fires are the common cause of haze. Visibility is also reduced to fog limits in some of the heavier downpours of the wet season.

Tides—Currents.—The tidal rise at Broome is 8.5m at mean high water springs and 5.4m at mean high water neaps. Strong tides can be experienced across the entrance channel and at the berth. In Roebuck Deep and at the entrance to the inner anchorage, the tidal currents attain a rate of 4 to 5 knots during springs; at other times the rate seldom exceeds 2 knots.

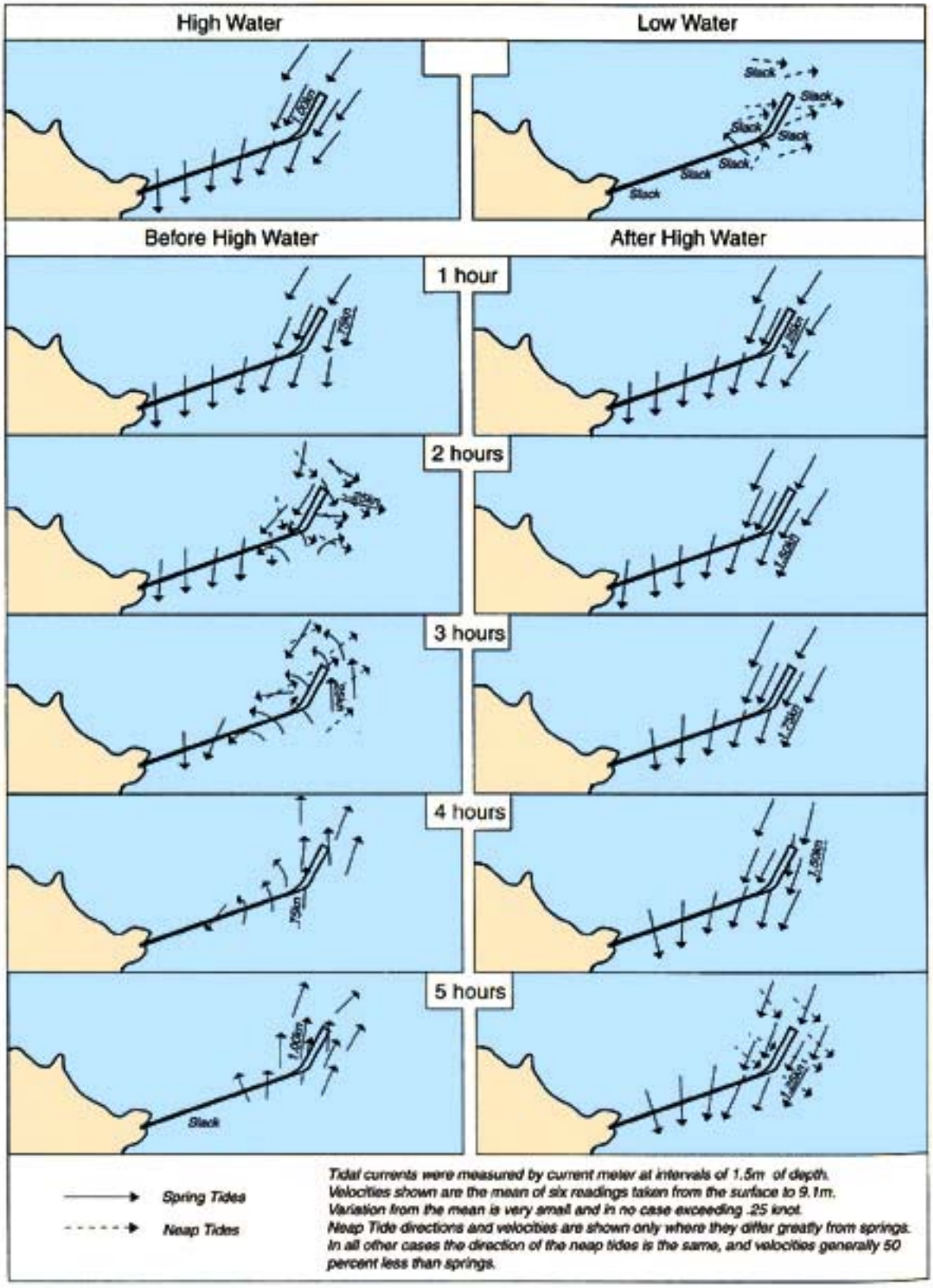
Tidal movements at the wharf may be quite different from tidal movements in the channel.

Depths—Limitations.—The entrance to Broome is through Roebuck Deep, which should be approached with caution. Pearl Shoals, the SW danger of Roebuck Deep, has a minimum depth of 2.1m; however, North Rock, with a depth of 1.2m, Escape Rocks, with a depth of 0.6m, and East Rock, with a depth of 1.2m, lie on the N, NE, and E edge of Pearl Shoals, respectively. Nab Rock, with a depth of less than 1.8m, is the outermost danger on the NE side of Roebuck Deep.

From the SE end of Roebuck Deep, the passage E of Channel Rock (18°00.7'S., 122°12.8'E) has a least depth of 5.2m lying off the W end of Middle Ground. The passage W of Channel Rock has a least depth of 11.3m.

The wharf is situated about 0.75 mile NE of Entrance Point, at the head of a concrete jetty which extends across the ledges fronting the shore. The outer berth, which is 183m long, can accommodate a vessel with a maximum draft of 9m. The inner berth can accommodate a vessel with a maximum draft of 8m.

Aspect.—Station Hill, 37m high, is the northernmost and highest of a range of sand hills which lie to the N of Roebuck Bay. Saddle Hill, 33m high, stands about 2.25 miles SSW of Station Hill and is bare and conspicuous. Red Hill, 21m high, is conspicuous and stands about 1 mile NW of Entrance Point. Four radio masts stand within 0.2 mile ENE of Entrance Point light structure and some conspicuous tanks are situated close N of the structure. A conspicuous water tower and radio mast, 55m high, stand about 2.25 miles and 3.25 miles, respectively, ENE of Gantheaume Point. A lighted buoy moored about 1.25 miles SW of Gantheaume Point marks the N extremity of Pearl



Broome—Tidal Currents

Shoals. Lighted beacons are situated 0.35 mile ESE and 0.65 mile ENE of the S extremity of Entrance Point, and in the approach to Dampier Creek, about 2.75 miles NE of the wharf.

Range lights mark the preferred track leading E of Channel Rock. Range lights also mark the passage W of Channel Rock.

An aeronautical radiobeacon is situated about 3.75 miles NE of Gantheaume Point and an aeronautical light is shown from a position at the airfield, about 0.75 mile SSE of the radiobeacon.

Pilotage.—Pilotage is compulsory for all vessels of 150 gross tons or more and is available 24 hours. Pilots board in 17°58.02’S 122°05.40’E (Outer) about 5 miles W of the light on Gantheaume Point and 17°59.25’S 122°09.90’E (Inner).

The pilot vessel is equipped with VHF radio. The calling frequency is VHF channel 16; the working frequencies are VHF channels 6 and 14.

Broome—Port Contact Information	
Pilots	
VHF Channels	6, 14 and 16
Telephone	618-919-43100
Facsimile	618-919-43188
E-mail	operations@broomeport.wa.gov.au
Port Authority	
Call sign	Port of Broome
Telephone	618-919-43100
Mobile	61-417-173679 (Duty Call Officer)
Facsimile	618-919-43188
E-mail	operations@broomeport.wa.gov.au
Web site	http://www.broomeport.wa.gov.au

Regulations.—Vessels should send their ETA 7 days in advance with sent updates 48 hours and 24 hours prior to arrival.

Vessels may berth day or night depending on tidal conditions.

Vessels should report to Port of Broome on VHF channel 16 when passing position 17°59'28.8"S, 122°09'52.2"E.

Signals.—Depth signals may be displayed from the signal mast at the SW end of the wharf.

Anchorage.—Anchorage may be taken in Roebuck Deep as convenient. Vessels may anchor in the pilot boarding area. The holding ground is reported good, but the position is exposed. Large vessels can anchor S of Middle Ground, in depths of 15 to 16m, about 3.5 miles ESE of Entrance Point Light.

Vessels can anchor in depths of 13 to 16m in the Inner Anchorage; at low water this anchorage is protected by Middle Ground, but at high water, with strong E winds, a troublesome sea may be experienced. There is a mooring buoy in the Inner Anchorage, 2 miles ENE of the NE end of the wharf at Broome.

Anchorage in smooth water with good shelter can be found during E winds in a depth of about 12m about 2 miles NNE of Gantheaume Light, and about 1.5 miles offshore.

A prohibited anchorage area is situated in the vicinity of the wharf and is shown on the chart; beacons in line on the shore about 1 mile N of the wharf indicate the NE limit of the area.

Directions.—When approaching Roebuck Bay, keep to seaward in not less than 15m until the light on Gantheaume Point bears 094.5°, then steer for it and approach the pilot station, which is about 6.5 miles W of the point.

Caution.—Declaration Rock, with a depth of 4.9m, lies 3.75 miles NNW of Gantheaume Point and Disaster Rock, 8 miles SW of the same point, is a pinnacle rock with a depth of 1.5m. Numerous isolated depths of less than 11m lie outside the 11m curve for distances up to 20 miles off the salient points on the coast in this area.

Pearl culture areas are situated in the coastal waters between the Lacepede Islands and Cape Bossut. The farms, which may be floating or fixed structures, and their associated moorings should be avoided. The farms are generally marked by buoys and beacons, which may be lit.

Roebuck Bay to Port Hedland

4.14 Gourdon Bay (18°27'S., 121°55'E.), located about 13.5 miles SW of Cape Villaret, is about 10 miles wide and open W. The S shore of the bay dries, but depths of 5.5m are charted 2 miles N of the S shore. Two prominent points, Church Hill, 58m high, and Barn Hill, lie about 5 miles NE of Cape Gourdon. The 10m curve lies about 4 miles NW of Cape Latouche Treville; Justice Shoal, a patch with a least depth of 3.6m, is located about 8 miles W of the cape.

From Cape Latouche Treville, the coast trends 20 miles SSW to Cape Bossut and is indented by Port Smith, a creek which dries, and Lagrange Bay. A sand bank, which dries at low water, extends 1.5 mile W of Port Smith.

Lagrange Bay (18°38'S., 121°41'E.) is entered between False Cape Bossut and Cape Bossut, about 10 miles SW. False Cape Bossut is a rocky projection, 18m high, which appears to be an island. From False Cape Bossut, the rocky shore of the bay trends SE for about 3 miles to a mangrove swamp, then S about 4 miles to Black Rock Point, which dries 6.1m. A ridge of sand hills backs the shore SW to Cape Bossut, which is a low, dark, rocky cliff with a ridge of sand hills, 14m high, partly covered with scrub close within.

The waters of Lagrange Bay, E of a line joining the two entrance points, has depths of less than 5.5m. Outer Reef, which dries, lies on the 5m curve about 2.75 miles W of False Cape Bossut. Casuarina Reef, which dries 1.2m, is located inside the 5m curve about 2 miles W of Cape Bossut. Shell Patch, with a depth of 0.9m, lies 2 miles NNE of Casuarina Reef. Roy Bank, with a least known depth of 7.3m, lies between 5.5 and 8.5 miles W of Cape Bossut. A shoal, with a depth of 11m, was reported (1963) to lie 8 miles NW of Cape Bossut.

Tryon Point (18°44'S., 121°37'E.), located 2.5 miles S of Cape Bossut, is similar in appearance to that cape, and forms the SW extremity of the same peninsula. Admiral Bay, between Tryon Point and Cape Frezier, 8 miles S, is shallow throughout; there is a creek at the head of the bay and extensive swamps in the direction of Lagrange Bay. A hillock over Cape Frezier is 20m high and falls seaward in conspicuous red cliffs. Ledges, which uncover, extend 1 mile seaward of the cape.

Cape Jaubert (18°56'S., 121°33'E.), 5 miles S of Cape Frezier, has a remarkable white sand patch over it at a height of 14m, and some low dark-colored cliffs close S. Ledges, which uncover at low water, extend 1 mile seaward of the cape. The 10m curve extends up to 18 miles offshore W of Cape Jaubert.

4.15 Eighty Miles Beach (18°56'S., 121°33'E.) is a low sandy shore which commences at Cape Jaubert and extends in a SW direction 80 miles to Red Hill, 17m high. It presents no conspicuous objects except a high bare sandhill about 10 miles S of Cape Jaubert and another bare sandhill, 15m high, about 22 miles ENE of Red Hill. The coastal range of sand hills is from 4.5 to 6.1m high, some of the hills being covered with vegetation. Nothing of the interior can be seen.

The 20m curve lies from 10 to 20 miles offshore along Eighty Miles Beach. Patterson Shoal, with a least depth of 1.8m, has been reported to be about 13 miles SW of Cape Jaubert; this position is doubtful. A narrow ridge, with depths of 6.4 to 9.7m, extends from the vicinity of Patterson Shoal SW for a distance of about 60 miles to a position about 13 miles NW of Red Hill. Portions of these waters have not been examined and lesser depths than charted may be encountered.

Mount Blaze (20°00'S., 119°41'E.), about 52 miles WSW of Red Hill, is a sand hill, 18m high, located on a point. The coast between Red Hill and Mount Blaze continues to be low and sandy; there are occasional rocky points and low red cliffs, with a continuation of the low flat country inland. From Cape Keraudren, 6 miles NE to Mount Blaze, the shore consists of shoal mangrove bays, with areas of cliffs between them. The country behind Mount Blaze is swampy, with mangroves for a few miles, gradually rising S to cone-shaped hills with flat tops, from 60 to 150m high, some distance inland.

From Mount Blaze W to Larrey Point, about 35 miles distant, the coast is indented by a shoal bay and a number of creeks, which dry. Poissonnier Point, 5 miles E of Larrey Point, is the E side of the entrance to the De Grey River; the point is low and thickly covered with mangrove. The De Grey River, about 250 miles in length, extends in a general SE direction from its mouth; it has a number of tributaries.

4.16 The waters NW of Red Hill and WSW to Larrey Point are encumbered with numerous shoal patches of less than 9.1m, which lie up to 20 miles offshore. Solitary Islet, 9m high, lies 1 mile offshore, 14 miles ENE of Mount Blaze, it is formed of red sandstone and is connected to the coast at low water by a sand spit. Amphinome Shoals, which have not been thoroughly examined and which sometimes dry in places, have long lines of breakers, irregular soundings, and tide rips located within, and front the coast between Mount Blaze and Spit Point; they lie up to a distance of 23 miles offshore.

Spit Point (20°02'S., 119°00'E.) is located about 8 miles SW of Larrey Point. A sandspit, with depths of less than 5m, extends 8 miles NW from the point towards North Turtle Islet; the inner part of the sandspit dries out.

Bedout Islet (19°35'S., 119°06'E.), a coral islet, 4m high, covered with coarse grass, and surrounded by a coral reef that dries, is located 22 miles N of Larrey Point. Shoals, with depths of 3.3m, extend 4.5 miles WSW from the islet. These shoals are marked by overfalls during the strength of the tidal currents. Bedout Islet Light is shown from a stainless steel framework tower in the center of the island. A racon is situated at the light structure.

Caution.—A submerged well head lies about 56 miles WNW of Bedout Island.

Between Bedout Islet and the coast to the S, and then SSW to North Turtle Islet, there are many shoals with depths of 4.6 to 9.1m.

4.17 North Turtle Islet (19°53'S., 118°54'E.), 10m high, lies 10 miles NNW of Spit Point and is composed of sand, covered with coarse grass and some shrubs. A reef, about 3 miles in extent and dry at low water, surrounds the islet.

Little Turtle Islet, 9 miles SSW of North Turtle, is almost awash at high water springs, and is surrounded by a reef. The reef extends about 1 mile WNW of the islet. Shoal water, with a least depth of 3.6m, may be found 13 miles W of Little Turtle Islet.

Minilya Bank (20°11'S., 118°38'E.), a sand bank with a least depth of 1.9m and about 1.5 miles in extent, is located 9 miles N of Cooke Point.

Caution.—Magnetic anomalies have been reported in localized areas about 9 miles NW of North Turtle Island and about 5 miles N of Cooke Point.

4.18 Cooke Point (20°18'S., 118°38'E.), about 27 miles SW of Spit Point, is backed by hills about 15m high. The entire coast between Spit Point and Cooke Point is an extensive swamp and is fronted by sandbanks which dry up to 5 miles offshore in some places. The shoreline extending 17 miles to the SW of Spit Point consists of a ridge of sparsely covered sand hills which form a barrier about 12m high, between the sea and the low swampland behind.

Port Hedland (20°19'S., 118°34'E.)

World Port Index No. 54620

4.19 Port Hedland, an ore-loading port, is entered between Airey Point, an ill-defined point about 3.5 miles WSW of Cooke Point, and Hunt Point, about 0.35 mile NW of Airey Point. The port is approached through a channel, which is marked by lighted beacons, and which is entered about 20 miles offshore NNW of the harbor entrance. Offshore oil and gas rig servicing vessels also use the port facilities.

Port Hedland Port Authority Home Page

http://www.phpa.com.au

Winds—Weather.—The Southeast Trade Wind is the predominate wind throughout the year and is associated with fine dry weather, with practically cloudless days. The Northwest or West Monsoon is attended, especially at its onset, with considerable cloud, rain, and frequently thunderstorms. With the approach of the Northwest Monsoon, squalls occur at first at intervals of 4 to 5 days, but their frequency increases until they occur almost daily.

The transitional period from the Northwest Monsoon to the Southeast Trade occurs through March and part of April, and from the Southeast Trade to the Northwest Monsoon during the

Port Hedland

quarter October to December. The winds at these times are light and variable but usually blow from the direction appropriate to season that is to come.

The port is occasionally closed due to cyclones which occur between November and April.

Fog is rare, occurring only about 2 per cent of the time throughout the year. It occurs more often in summer and autumn; mist or haze is more common. Dust and smoke from brush fires are the common cause of haze. Visibility is also liable to be reduced to fog limits in some of the heavier downpours of the wet season.

Tides—Currents.—The tidal rise at Port Hedland is 6.8m at mean high water springs and 4.7m at mean high water neaps. Tidal currents in the harbor attain a rate of 3 to 4 knots; the outgoing current is the stronger and at the highest tides may reach a rate of 6 knots. At the offshore anchorage, the tidal currents attain a rate of 2.5 knots at springs.

Depths—Limitations.—Cornelisse Shoal (20°02'S., 118°22'E.), with a least depth of 3.2m, is located 20 miles NW of Port Hedland entrance and about 2.5 miles W of the approach channel; patches with depths of 6 and 8.1m lie 1 mile SW of the SW end of this shoal.

Coxon Shoal (20°04'S., 118°28'E.) has a least depth of 6.6m and lies on the E side of the approach channel, about 5 miles SE of Cornelisse Shoal. A shoal patch, with a least depth of 6.6m, lies 3.25 miles S of Coxon Shoal and about 0.45 mile W of the approach channel.

A spoil ground area extends about 6 miles N from the shore close E of Airey Point and E of the dredged entrance channel. Two additional spoil ground areas are situated 6.5 and 9.5 miles N of Airey Point; the limits of these areas can be seen on the chart.

Drying coral ledges, covered with a thin layer of sand, extend up to 0.75 mile in places off the coast on either side of the entrance.

An approach channel marked by pairs of buoys extends SE from a position about 22 miles NW of Cooke Point for about 12 miles, where it joins a dredged entrance channel, which leads into the harbor. The dredged channel, with a least depth of 14.1m as far as the Port Hedland Turning Basin, is entered 4 miles NE of Cornelisse Shoal. The width of the approach channel varies from 430m in the pilotage area to between 183m and 300m inside the port limits.

Owing to the incomplete nature of the surveys and silting in the approach waters, depths less than charted may exist and the approach channel should not be approached from NE if the vessel is in less than 20m. Vessels are cautioned not to enter the dredged entrance channel except by way of the approach channel. Lighted Beacon No. 3 and Lighted Beacon No. 4, moored 3 miles SSW of Lighted Beacon C1, mark the route through a shoal area close E of the channel.

In addition to the approach channel, a recommended track for inbound vessels of lighter draft is situated to the E of the outer lighted beacons. From a position about 5 miles NNE of the W outer lighted beacon, vessels should steer 146° for a distance of about 8.75 miles, then S for a distance of about 4.75 miles to the pilot boarding area. The inshore route has a least depth of 10.2m. A 9.6m patch lies 4 miles ENE of Lighted Beacon C1 and 0.75 mile E of the SE track.

There are three berths, all operated by the Port Hedland Port Authority (PHPA), with additional details given below.

Berth No. 1 is a steel and concrete structure situated about 0.2 mile W of the Shipping Control Tower. The berthing face is approximately 213m in length with a dolphin situated 58m from the N end. The berth can accommodate vessels up to 230m long. A basin for tugs lies close N of No. 1 Berth. The S part of the wharf is used by drilling rig service vessels. This land-backed berth lies in a NNW-SSE direction with a mooring dolphin 58m from the northern end. It is protected by a fender system. The height of the wharf deck is 9.5m. above datum with an apron width of 22m.

The berth and open area are all floodlit for security and cargo working. General cargo is normally handled by forklift vehicles to and from the vessels or loaded direct onto road trucks. This berth is equipped with diesel bunker points only, fresh water hydrants and power connections.

A mechanical bulk loading facility with a capacity of 1,000 tons per hour, is on this wharf.

Berth No. 2 is adjacent to Berth No. 1 and utilized for general cargo, containers, livestock, chemicals, and heavy-lifts. Height of berth above chart datum is 9.3m and above the apron is 22m. There is no air draft restriction.

Berth No. 3 lies close SE of Berth No. 1. This steel and concrete structure is 183m in length, and is oriented in a WNW-ESE direction with dolphins 46m off each end to facilitate the mooring of vessels. There is a charted depth of 13.2m alongside. Vessels up to 230m in length can berth here. A bulk salt loader is situated at the berth. The height of the wharf deck is 9.5m above datum with an apron width of 13m. The full length of the wharf is protected by a ‘‘Raykin’’ fender system. On this wharf is a cargo shed with an area of 1,600 square meters supported by a further open hard standing area of 4,200 square meters immediately behind the shed. As with Berth No. 1, all areas are floodlit, and cargo is handled by forklifts to or from the storage areas. The mooring basin is 275m long.

A mechanical bulk loading facility with a capacity of 1,500 tons per hour is owned and operated by the Dampier Salt Pty Ltd on this wharf.

Fresh water is available at 50 tons per hour and bunkers can also be obtained through 203mm outlets.

Charted depths for berths operated by the PHPA is as follows:

Port Headland Port Authority	Charted Depth
Berth 1 (FIA)	13.20m
Berth 2 (FIB)	13.20m
Berth 3 (FIC)	13.20m
Berth 4 Utah Point	14.50m

Nelson Point Wharf (BHP Iron Ore Limited Wharf.), privately owned, extends ESE in a continuous line from No. 3 Berth for a total length of 658m. The wharf is comprised of Berth A and Berth B. There is a charted depth of 18.7m and 18.3m respectively alongside. Vessels with a maximum length of 315m and a maximum beam of 55m can be accommodated. Vessels normally swing and berth starboard side-to.

BHP Iron Ore Finucane Island Pier, privately owned, is situated on the W side of the harbor on Finucane Island. The face of the pier, 220m in length, is extended by mooring dolphins to an overall length of 378m. The pier will accommodate vessels up to 260m in length and 33m in beam. Vessels normally berth port side-to, heading out to sea. The pier is divided up into 4 points (FIA, FIB, FIC, FID) for purposes of charted depth as indicated below:

BHP Iron Ore Finucane Island	Charted Depth
Berth A (FIA)	19.20m
Berth B (FIB)	19.20m
Berth C (FIC)	18.60m
Berth D (FID)	19.20m

Aspect.—The hill backing North Point, NNW of Hunt Point, on the W side of the entrance, has a white sand patch conspicuous from seaward. A conspicuous dome stands on North Point. A 66 meter tall conspicuous radio mast with a red light (20°18.0'S., 118°34.04'E) stands 0.4 mile WNW of Hunt Point. The Shipping Control Tower (20°18.90'S., 118°34.58'E), about 0.4 mile SSW of Airey Point, is prominent, standing 31m high. A crushing plant 60m high stands 0.75 mile E of the Shipping Control Tower and is the most conspicuous object in daylight. A radio mast, 76m in height stands 1.3 mile ESE of Airey Point. Conspicuous tanks stand about 0.25 mile SE and 1 mile WSW of Cooke Point Light and about 0.5 mile W of Hunt Point. A conspicuous communication tower (20°18.8'S., 118°36.0'E), 74m high, is located at the BHP Nelson Point Iron Ore facility.

The outer W lighted beacon situated about 4.25 miles NE of Cornelisse Shoal, is equipped with a racon.

Pilotage.—The pilotage area extends 10 miles beyond port limits to a distance of 20 miles from lighted beacon No. 47, situated 1 cable SE of Hunt Point (20°18.1'E 118°34.5'E). Pilotage is available 24 hours a day and is compulsory for all vessels of 150 gt and over, with the following exceptions:

1. Australian commercial fishing vessels of less than 35m in length.
2. Australian Defense Force vessels.
3. Vessels under the command of a master holding a valid piloting exemption.

Pilotage inbound is optional within the extended pilotage area, which extends 10 miles beyond port limits and can best be seen on the chart.

Pilotage outbound is compulsory for all vessels of 150,000 dwt out of port limits. to the limit of the extended pilotage area.

Requests for a pilot should be made to the Harbormaster Port Hedland 48, 24, and 2 hours prior to arrival. This request should include the last port call and estimated draft on arrival.

Pilots boards from helicopter or launch about 3.5 miles SE of lighted beacon No. 14 (20°10'S., 118°33'E.). The pilot boat is equipped with VHF and can be contacted through VHF channels 12, and 16. The call sign for the pilot helicopter is "Port Hedland Pilot Helicopter" and communication between the helicopter and the vessel will be on VHF channel 8 to coordinate landing.

Port Hedland Berths

Regulations.—All arriving vessels to Port Hedland will be automatically assigned an arrival number based on the vessel's AIS position. To ensure this automatic arrival process works as planned, all arriving vessels, including those that intend to anchor outside port limits must pass within a 2.5 mile radius of the reporting position at 19°57.2'S., 118° 28.5'E.

Inbound vessels should contact the Port Shipping Control Tower on VHF and obtain details of the movement of outbound traffic. Vessels should also report when at the beginning of the recommended inbound passage track position 19°56.4'S., 118°27.8'E. Vessels should then maintain a continuous listening watch on VHF channel 16. Port Control will advise vessels, depending on their radar position, information regarding berthing instructions, and other ship movements. Pratique is not granted by radio. No vessel may enter the dredged channel without the permission of Port Control.

Before entering the Pilotage Area, vessels must call Port Hedland Harbor on VHF channel 12 or 16 and receive approval to enter.

Any vessel not restricted in its ability to maneuver shall avoid impeding the passage of the vessel constrained by its draft. Vessels usually berth near slack water. Vessels over 100,000 tons do not sail on the ebb.

Vessels over 315m in length are berthed during daylight hours only.

Inbound vessels should take the necessary action to avoid impeding outbound vessels constrained by their draft or those restricted in their ability to maneuver. Such action should be taken by reduction of speed to avoid meeting in restrictive areas; the most restrictive areas lie in the vicinity of Lighted Beacon C9 and Lighted Beacon C10.

All inbound vessels, except those constrained by their draft, are to use the recommended E inward route. Vessels using the E approach should note the least depth is 10.2m between beacons 2E and 3E, and ensure that their is sufficient height of tide to provide safe passage. Information on the exact tide height can be obtained by calling Port Hedland Harbor on VHF channel 12. Vessel's bearing and distance from the Port Hedland Control Tower is given on request (maximum range 64 miles).

Signals.—The port is occasionally closed during cyclones, which occur between November and April. Signals are displayed at night from the Control Tower to show the state of the tide and to indicate port closure.

Port Hedland—Port Contact Information	
Control Tower	
Call sign	Port Hedland VTS
VHF	VHF channels 12 and 16
Telephone	618-917-30030 (24hours)
Facsimile	618-917-30031
E-mail	tower.control@pilbaraports.com.au
	shipping@pilbaraports.co.au

Anchorage.—Anchorage can be obtained in the following three areas containing designated berths as shown on the chart. Vessels shall use the radio reporting point (19°57.2'S., 118°28.5'E) when requesting an anchorage assignment upon arrival. The bottom is sandy and the holding is reported to be good with the following depths:

Anchorage Designator	Approx. Depth Range
A1 to A14 (Area W)	10 to 16m
B1 to B15	11 to 16m
F1 and F2	14.5 to 15m
D1 to D9 (Area E)	14.9 to 16.6m
G1 to G14 (Area E)	14.6 to 17.1m
H1 to H6 (Area E)	12.1 to 14.5m

Channel Escape Areas are established on either side of the channel 2.5 miles W of the pilot boarding area. Anchorage is prohibited in this vicinity.

When a vessel is required to anchor it should do so clear of the main channel but inside the Port Limits. The holding ground is reported as being good on both eastern and western sides of the channel.

Vessels should not anchor in the designated Spoil Ground Dumping Areas or in the Prohibited Anchorage as indicated on the chart.

Upon departure if a vessel needs to anchor outside prior to proceeding to sea, the pilot shall be informed when leaving the berth, and the pilot will advise suitable anchorage. The Master will advise the pilot of ETD in order that this may be reported to Port Control.

Port Hedland to Port Walcott

4.20 Cape Thouin (20°20'S., 118°11'E.) lies about 22 miles W of Port Hedland. The coast between is intersected by creeks which are backed by swamps. There are two hills charted about 9 miles SW of Port Hedland, 3 miles within the coast.

The coastal waters from Port Hedland to Cape Thouin are fronted by rocky ledges, which dry or have depths of less than 1.8m, and by drying sandbanks which extend up to 2.5 miles offshore; the 10m curve lies up to 7 miles offshore along this stretch.

The coast between Cape Thouin and **Cape Cossigny** (20°29'S., 117°56'E.), about 16 miles SW, is formed by sand hills from 9 to 12m high; the country inland is elevated and apparently thickly wooded. The coast is fronted by rocky ledges and sand flats, which dry at a considerable distance from the shore. A conspicuous tower stands on a sandhill, about 8.5 miles SW of Cape Thouin.

From Cape Cossigny to the entrance of the **Sherlock River** (20°43'S., 117°33'E.), about 26 miles SW, there are numerous islands and islets which lie up to 4 miles offshore. These islands and islets are connected to the mainland by sand banks which dry at low water. Between the entrance to the Sherlock River and Port Walcott, about 20 miles W, the land is low, flat and intersected by several rivers, which discharge into the swampy and mangrove-covered land bordering the coast.

The coastal waters have irregular depths of less than 10m up to 7.5 miles offshore and depths of less than 5m up to 4 miles offshore. Mount Wangee, 75m in elevation and the highest summit of a double ridge of grassy hillocks, is located about 2.5 miles inland from the shore S of Port Walcott. Mount Wangee and a lower summit, 53m high, located about 2 miles NE, are the only prominent features along this coast.

4.21 Weerdee Island (20°19'S., 118°28'E.), 9m high, lies 6.5 miles WSW of Hunt Point and 1 mile offshore; within this island is Oyster Inlet, which affords shelter for small vessels with local knowledge, but it should only be approached from the E at low water when the ledges can be seen.

A shoal, with a depth of 4.6m, lies 4.5 miles NE of Cape Thouin. A 3m patch lies 8.5 miles NE of Cape Thouin and an obstruction was reported (1936) to lie 2 miles NE of the patch. A shoal, with a least depth of 8.8m, lies 16 miles NE of Cape Thouin, with a 6.7m patch 3.5 miles WSW of it. In 1981, shoal depth of 7m and 8m were reported 12 miles NE and 10.5 miles NNE, respectively, of Cape Thouin. Depths of 3.5m, 3.4m, and 2.7m lie 8 miles N, 6 miles NW, and 4 miles WNW of Cape Thouin.

Geographe Shoals (20°16'S., 117°54'E.) are several rocky patches which extend up to 8 miles NNW of Cape Cossigny; the sea generally breaks over these shoals, and some rocks are visible at low water. The charted position of these shoals is approximate and they should not be approached in poor visibility in a depth of less than 30m.

Beagle Reef (20°23'S., 117°50'E.), the charted position of which is approximate, lies 8.5 miles NW of Cape Cossigny and has a depth of 0.8m. There is reported to be a clear channel between Beagle Reef and Geographe Shoals, however, the entire area is only partially surveyed and is best avoided. Shoals, with depths of 4.5m and 4.8m, lie 4.5 miles N of Beagle Reef. Shoals, with a depth of 5m and marked by tide rips, lie 3.75 miles and 5 miles WNW of Beagle Reef.

The **Forestier Islands** (20°32'S., 117°51'E.), the N extremity of which lies 1 mile NW of Cape Cossigny, form a chain of three narrow islands and reefs, extending SW, parallel to the coast and from 1 to 3.25 miles offshore for 15 miles. Reef Islet, the NE of the chain, has drying reefs extending 1.25 miles NE and SW from it. All of these islets are composed of narrow ridges of sand hills, covered with coarse grass and stunted shrubs. Rosnard, the center and largest islet, is 15m high and when seen from N, shows two peaks with a white patch under each.

Sable Islet (West Forestier Islet) (20°35'S., 117°45'E.) is divided into two parts which are connected by a rocky causeway awash at high water. The E part is 11m high, covered with grass and low bushes. The W part is a narrow strip about 1 mile in length, with Table Rock at its W end. Sable Islet is connected to the coast by a bank of sand and coral which dries. This bank extends from the W extremity of the islet and has some rocks with less than 1.8m over them on its outer extremity; depths less than 5m extend 3 miles NW, forming the E side of the approach to Depuch Island Anchorage.

4.22 **Depuch Island** (20°38'S., 117°43'E.) lies with North Point, its NE extremity, 2 miles SW of the W end of Sable Islet, and consists of an irregular pile of reddish-colored hills, in some parts resembling basaltic columns, rising to a height of 158m in the SW part. In the valleys, and on some of the more level parts near the summit of the island, there is a little soil, producing coarse grass and a few stunted trees. A bank of sand and coral, which dries, extends 4.5 miles SW from the N extremity of Depuch Island. On this bank are East Moore Islet and West Moore Islet, both having sand hills on them about 13m high; Sandy Islet, 3m high, is located between them. Black Rock, which dries 4m, lies on the drying flat close SW of the N extremity of the island.

The 10m curve extends up to 8 miles N of Depuch Island, and several shoal patches, with a least depth of 6m, lie up to 15 miles NNW of the island.

Depuch Island is an aboriginal reserve and landing is restricted.

Depuch Island Anchorage is located E of the N part of the island and is entered between North Point and the sand bank extending SW from Sable Islet.

Good anchorage may be taken about 0.65 mile ESE of North Point, in a depth of 8.5m; this anchorage is protected from the NE by the same bank extending SW from Sable Islet. Small vessels can find anchorage, in about 3m, off Anchor Hill, 1.5 miles SE of North Point, taking care to avoid the shoals which extend 0.5 mile N from the shore in the vicinity of this hill.

Tidal currents at the anchorage attain a rate of 3 knots at springs, causing tide rips off North Point and Anchor Hill; the flood current sets SE and the ebb current sets NW.

Balla Balla (20°40'S., 117°47'E.), a small landlocked harbor in the creek of the same, is entered 3 miles SE of Anchor Hill; all but the narrow and tortuous entrance channel dry out.

Picard Islet (20°11'S., 117°16'E.) is a bare rock, 40m high, located about 6 miles SE of Port Walcott. It is connected to the coast by a sand spit, which dries. Hat Rock, and an islet 4m high close SE, lie about 1.5 miles NE of Picard Islet.

Port Walcott (20°38'S., 117°13'E.)

World Port Index No. 54600

4.23 Port Walcott is entered between Picard Islet and Bezout Island, 9 miles NW. Port Walcott is a major iron ore-exporting port.

Winds—Weather.—The Southeast Monsoon prevails from March to September, and seldom blows hard for more than a few hours, being associated with fine weather. The Northwest Monsoon prevails from October to March, with variable winds in September and in the transition period during March. Cyclones occasionally occur during the Northwest Monsoon, usually in the months of November and December.

Tides—Currents.—Mean spring tides rise about 5.2m and mean neaps about 3.4m.

The flood current sets SSE at a velocity of 1.1 knots at spring tides, 4 hours after low water, in a position about 0.75 mile E of the ore jetty. The ebb current sets across the same position, in a reciprocal direction, at a rate of 1.3 knots, about 3 hours after high water.

Depths—Limitations.—Cape Lambert Ore Jetty extends 1.5 miles NE from Cape Lambert. Two berths, each 350m long, are situated at the seaward end of the jetty. Berth No. 1, on the SE side, has a dredged depth of 18.5m and can accommodate vessels up to 225,000 dwt with a maximum beam of 50m. Berth No. 2, on the NE side, has a dredged depth of 19.8m and can accommodate vessels up to 290,000 dwt and a maximum beam of 55m.

Berthing of ore carriers is usually carried out 2 to 3 hours before high water.

The Service Jetty, close W of the root of the Ore Jetty, extends about 0.3 mile NE and has a berthing face 155m long, extended by dolphins to a length of 210m, with a depth alongside of 10m. Vessels up to 190m in length can be accommodated at the jetty.

The inbound entrance channel and the outbound buoyed channel are described in Directions.

Aspect.—Cape Lambert (20°36'S., 117°11'E.) is rocky and about 11m high. About 1 mile S of the cape, there is a promontory, 26m high, faced on the NE by a red cliff. To the W of the promontory, an extensive swamp nearly separates Cape Lambert from the mainland. The swamp is backed by rocky hills from 30 to 60m high, mostly barren and of a dark, rusty color. Submerged reefs extend 1.5 miles NE from the promontory.

A disused wooden jetty, about 300m long, projects E from Point Samson, which is located 2.5 miles SSE of Cape Lambert. Reader Head, a dark bluff point about 2 miles S of Point Samson, is the N entrance point of Butcher Inlet. Cossack, an abandoned town, is situated near the entrance and the town of Roebourne is situated about 6 miles up the inlet.

Courtesy of Robe River Mining

Port Walcott—Cape Lambert

John's Creek, a fishing boat harbor, is entered close S of Point Samson by way of a short channel marked by lighted beacons. A Small Craft Mooring area exists approximately 0.5 mile ESE of Point Samson.

The most conspicuous landmarks are a tank near the root of the disused pier at Point Samson; the ore stockpiles at Cape Lambert; a radio mast with red lights situated 3 miles SW of Cape Lambert; and a number of chimneys, 56m in elevation, standing about 0.5 mile W of the ore stockpiles.

Bezout Islet (20°33'S., 117°10'E.), about 2 miles N of Cape Lambert, is dark-colored and has a height of 27m. Boat Rock, which dries 4m, lies 0.5 mile E of Bezout Islet.

Jarman Islet, 21m high, is located within the port, 1.75 miles SE of Point Samson. Pelican Rocks, consisting of two rocks, one of which has a height of 1m, are located 1.25 miles ENE of Jarman Islet. Popes Nose Rock, 15m high, lies in a drying bay about 0.5 mile SW of Point Samson. A reef, which dries 3.9m, lies 0.9 mile ESE of the root of the ore jetty.

Delambre Reef (20°26'S., 117°15'E.), composed of coral and sand, with a least depth of 3.6m, lies 10 miles NNE of Cape Lambert. A 6.7m patch was reported (1958) to lie 2.75 miles SW of the shallowest part of Delambre Reef.

Tessa Shoals, with a least depth of 7m, lie between 9 and 12 miles NE of Cape Lambert, on the S side of Bass Pass.

Pilotage.—Pilot boarding areas are situated close E of Lighted Buoy C1 and about 5.8 miles ENE of the seaward end of the ore jetty. Pilotage is optional for inbound vessels between Lighted Buoy C1 and the boarding area ENE of the oil jetty; between this position and the berths, pilotage is compulsory. Pilotage is compulsory for all vessels within the port area and for outbound vessels within the dredged channel. Pilotage is also compulsory for deep draft vessels needing to transit the Outer North Channel.

Vessels should send an ETA 7 days, 48 hours, and 24 hours in advance. The pilot boat is equipped with VHF, but there is not a continuous watch. Pilots may also board by helicopter for vessels with a landing area; tankers may not board the pilot by helicopter. Vessels unable to accept a helicopter should advise the port at least 48 hours in advance.

There is a port radio station at Port Walcott.

Regulations.—All vessels must keep clear of large bulk carriers that are moored or maneuvering within an area 2 miles wide, extending to 4 miles NNE of Port Samson and 2.5 miles N of Cape Lambert.

Anchorage.—Fifteen designated anchor berths are situated within an area from 2.75 miles NE to 8 miles ENE of Cape Lambert. Depths in these anchor berths vary from 11.5 to 15m, sand.

Directions.—Owing to the incomplete nature of the survey in the approaches to Port Walcott, vessels should navigate only in the recommended tracks. No reliance should be placed on the lighted buoys always maintaining their exact positions.

Vessels should approach Port Walcott by making for Lighted Buoy C1, which is equipped with a racon and moored 18 miles NE of Cape Lambert.

A recommended track, for inbound vessels only, leads S from Lighted Buoy C1 for about 7 miles, then leads WSW to the port and anchorage area. This recommended track passes to the S of Tessa Shoals, which are marked by a lighted buoy, and have a least charted depth of 7m.

A deep-draft channel, for outbound vessels, winds NE and E from the port to the vicinity of Lighted Buoy C1. This channel, which passes through Bass Pass and N of Tessa Shoals, is dredged to a depth of 16m and is marked on both sides by lighted buoys. It is about 210m wide at the inshore end and gradually widens to about 600m at the seaward end. Entry to the port by this dredged and buoyed channel is prohibited.

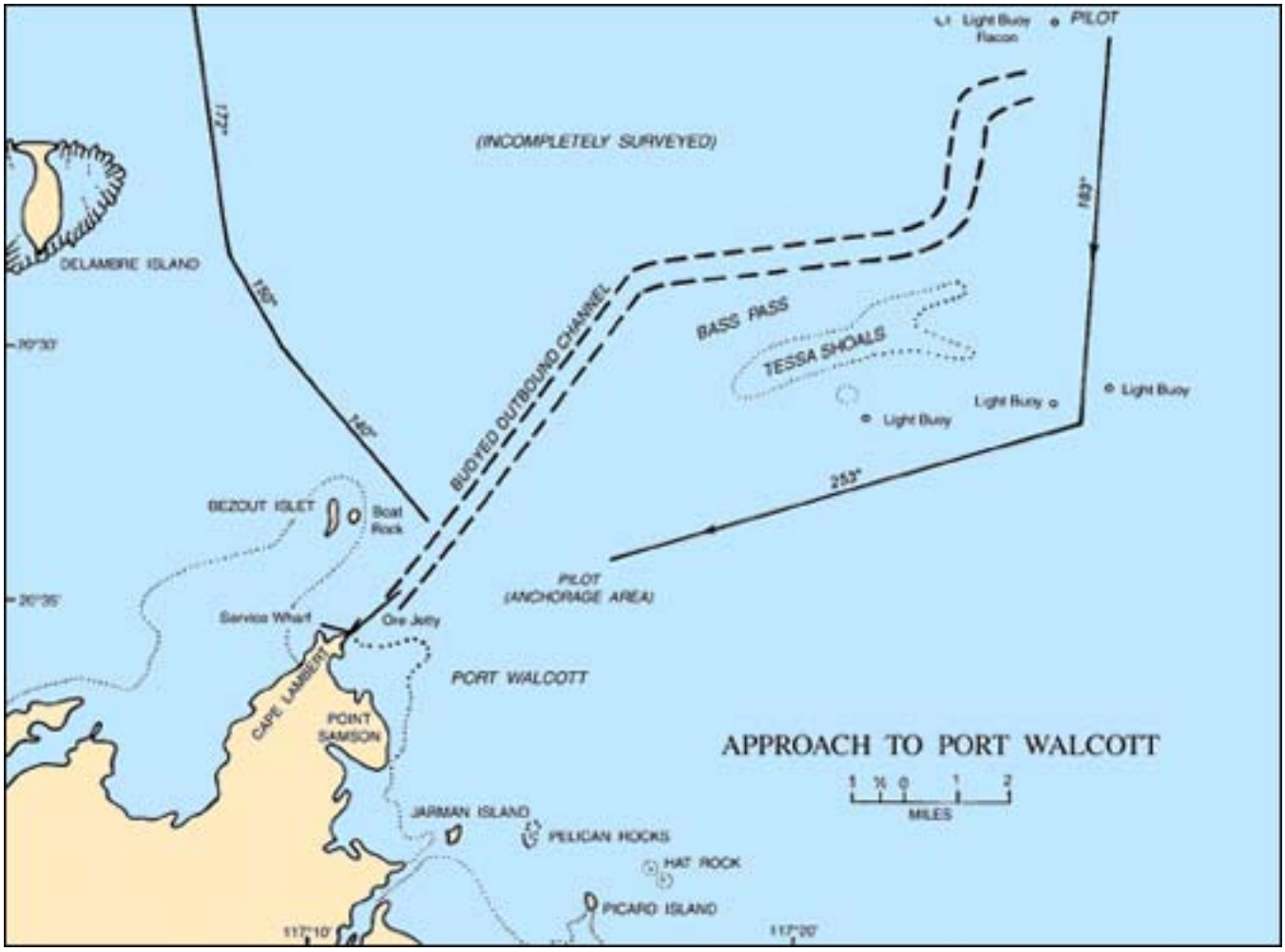
Caution.—Local magnetic disturbances have been found in the vicinity of a position 4 miles NNE of Cape Lambert, where the magnetic compass was deflected up to 55°.

Port Walcott to Dampier

4.24 From Port Walcott to Dampier, the coast is fronted by the islands that form the E part of the **Dampier Archipelago** (20°27'S., 116°47'E.). The islands of the archipelago are generally high, rocky, and of a dark red color, extending about 40 miles in an E-W direction.

Nickol Bay (20°35'S., 116°55'E.), consists of fourteen anchorages in an area centered 14 miles N of Delambre Island, as shown on the chart. These anchorages can be used by vessels that might need permission to immobilize their main engines. The depth of water is between 36 and 40m, and the diameter of each anchorage is 1 mile. Vessels up to cape size can be accommodated.

The area lying SW of Delambre Island has not been completely surveyed, but vessels with local knowledge may anchor, in depths of 11 to 12m, on the N side of the entrance, which is between Bezout Islet and the foul ground extending S



Port Walcott Approaches

from Delambre Island, then passing 5 miles N of **Dixon Island** (20°38'S., 117°04'E.). Dixon Island lies 7 miles WSW of Cape Lambert, in the E part of Nickol Bay. Port Robinson, a small harbor for vessels of less than 2.7m draft, lies close within the SW extremity of Dixon Island.

A marine farm has been established off the N side of Dixon Island and extends approximately 1 mile offshore. Marine farms are generally marked by buoys or beacons. The area should be avoided.

Delambre Island (20°26'S., 117°05'E.), the E island of the group, lies 10 miles NNW of Cape Lambert; it has a broken sandstone cliff 35m high, and a peculiar pinnacle rock at its N end, which, when approaching from the W, has the appearance of a square building. A drying reef extends from the E and W sides of the island; foul ground, irregular depths, and strong tide rips extend for 3 miles from the island.

Hauy Islet, 12m high and 5.5 miles W of Delambre Island, is connected to the SE extremity of Legendre Island by a reef. Heavy tide rips extend to Delambre Island.

Cape Legendre (20°21'S., 116°50'E.) is the NW extremity of Legendre Island and is the northernmost point of the Dampier Archipelago. Legendre Island, a rocky formation, is 17m high and sparsely covered with vegetation. Legendre Island Light is shown from a white hut situated about 0.5 mile SE of the cape. The N side of the island may be approached with confidence, but the SE extremity and the SW side are foul. Madeleine Shoals, 2.5 miles N of Cape Legendre, have a least depth of 14.1m, and Hammersley Shoal, which dries, extends 4 miles SW from the W end of Legendre Island.

Glomar Shoal (19°31'S., 116°47'E.), with a least depth of 22m, lies 50 miles N of the N extremity of Legendre Island and is located on a bank with general depths of 27 to 37m.

Numerous oil and gas production wells and foul grounds exist in all directions extending from Glomar Shoal and are best seen on the chart.

4.25 Wandoo Marine Terminal (20°09'S., 116°25'E.) is situated about 28 miles NW of Cape Legendre. The terminal, which consists of a CALM buoy, serves the Wandoo Oil Field. The facility is surrounded by a cautionary area, which is best seen on the chart.

Winds—Weather.—Four to five tropical cyclones develop in the area during the season, with one or two reaching storm force. The most active season is from December through April.

Tides—Currents.—The flood current sets SE, while the ebb current sets NW. Rates of 1.3 knots have been experienced at springs; rates of 0.4 knot have been experienced at neaps.

Seas are generally slight, except during cyclones or other isolated storms. Seas of 2m or less occur more than 95 per cent of the time; however, during the winter seas as high as 4m can occur during E gales.

Depths—Limitations.—Vessels up to 100,000 dwt can be accommodated.

Pilotage.—Pilotage is compulsory for all vessels. The pilot boards in the anchorage area, situated about 3 miles NW of the terminal and best seen on the chart.

Regulations.—Vessels are required to send their ETA 72 hours, 48 hours, 24 hours, and 12 hours in advance and to provide a Notice of Readiness upon arrival.

Anchorage.—Anchorage can be taken about 3.5 miles NW of the CALM buoy, as shown on chart.

Caution.—Extensive oil exploration activity is underway in the area between Glomar Shoal and Rankin Bank (19°44'S., 115°35'E.). Multiple wells and platforms exist. Details can best be seen on the chart. An danger circle with a legend "ODAS" and a depth of 20 meters lies 25 miles NW of Rankin Bank in 19°26.1'S 115°54.9'E.

4.26 Wanaea Marine Terminal (19°35'S., 116°27'E.) is situated 33 miles N of Wandoo Marine Terminal. The terminal consists of a 150,000 dwt tanker than has been converted into a Floating Production, Storage, and Off-loading (FPSO) facility and serves the Wanaea Oil Field and the Cossack Oil Field. The facility is surrounded by a cautionary area, which is best seen on the chart.

Winds—Weather.—See Wandoo Marine Terminal in paragraph 4.25.

Tides—Currents.—The terminal is situated close E of the Western Australian Current, which flows NE along the continental shelf, and W of the return current which flows along the coast. A rate of 1.5 knots can be expected during spring tides. A rate of 3 knots has been reported (1995) at the terminal.

Information on sea states around the terminal can be found in the description of Wandoo Marine Terminal in paragraph 4.25.

Depths—Limitations.—Vessels up to 150,000 dwt can be accommodated. Vessels are moored with their bow to the stern of the FPSO. The terminal stands in 78m of water.

Berthing takes place only between 0600 and 1630.

Pilotage.—Pilotage is compulsory. The pilot will board vessels off Dampier Port at a position situated 7 miles from Legendre Island Light, on a bearing of 246° from the light. The mooring operation will be assisted by a support vessel.

Regulations.—Vessels are required to send their ETA 72 hours, 48 hours, 24 hours, and 12 hours in advance. Vessels shall notify the terminal if the ETA changes by more than 1 hour after the submission of the 12-hour notification.

Anchorage.—Glomar Shoal, 20 miles E of the terminal, has been reported (1997) to have been used as an anchorage by tankers. A yellow mooring buoy lies 4.25 miles SE of the facility in a depth of 60m.

4.27 Mutineer-Exeter Marine Terminal (19°17'S., 116°37'E.) consists of the moored storage tanker FPSO Modec Venture II, which is connected by submarine pipelines to the Mutineer and Exeter production wells 1.7 miles ENE and 3.5 miles SW, respectively. Modec II is a converted 150,000 dwt double-hulled tanker with a storage capacity of 148,121 cubic meters. The facility lies 82 miles N of Dampier and is surrounded by a cautionary zone with a radius of 2.5 miles. Vessels moor to the stern of the FPSO Modec Venture II.

MODEC Home Page

http://www.modec.com/fps/fpso_fso/projects/mutineer.html

Winds—Weather.—The area is subtropical, and subject to cyclonic activity from November to April. The winds at the terminal are predominantly SW to S from November to March and S to SE between April and October.

Pilotage.—Pilotage is compulsory with the following procedures:

1. Vessels are required to send their initial notice of ETA 5 days in advance with an amended ETA sent 72, 48, 24, and 12 hours prior to arrival.
2. Vessels will board the pilot in a position 2 miles from the FPSO and will need to make a lee in preparation for pilot boarding.

Regulations.—The following regulations apply to vessels planning on utilizing this terminal:

1. Maximum size vessel to be handled at this terminal is between 30,000 and 40,000 dwt.
2. Anchoring is prohibited within 5 miles of Modec Venture II.
3. Vessels arriving from foreign ports must make prior arrangement for quarantine and customs clearance. The Australian Quarantine and Inspection Service (AQIS) is the controlling agency. Full details may be found in Pub. 160, Sailing Directions (Planning Guide) South Atlantic Ocean and Indian Ocean or on the AQIS web site.

AQIS Home Page

http:\\www.daff.gov.au.aqis

4.28 Stag Marine Terminal (20°17'S., 116°16'E.) is surrounded by a cautionary area, which has a radius of 3 miles. This area consists of a production platform (Stag Terminal), submarine oil pipelines, and a CALM (catenary anchor leg mooring) buoy.

The CALM buoy is situated 1 mile N of the platform in 50m of water. A storage tanker is moored at the bow at all times. A second tanker (astern) is only on location when oil is being off-loaded.

Regulations.—Vessels are required to send their ETA 10 days and 7 days in advance. Vessels should contact the Marine Facility on VHF channel 16 when within 40 miles and confirm ETA. On arrival, the vessel will be advised to proceed to the approved anchorage (20°15'S., 116°15'E.) or proceed directly to the berth.

Anchorage.—An anchor berth, as shown on chart, has been established 2 miles NW of the CALM buoy.

Courtesy of Apache Corporation
Stag Marine Terminal from S

4.29 Mermaid Sound (20°30'S., 116°45'E.) is approached from the N and its entrance lies about 7 miles SW of Cape Legendre. The main ship channel to Port Dampier transits the entire length of the sound, which has general depths of 6.4 to 16m. The sound is bound on the E by Gidley Island, Angel Island, and the mainland S to Dampier. Gidley Island lies 4.25 miles S of the W extremity of Legendre Island and extends SSW about 3.5 miles. Angel Island, close S of Gidley Island, extends 3 miles farther SSW and Conzinc Islet lies about 1.5 miles SSW of Angel Island. Drying shoals, encumbered with numerous rocks and islets, lie SSE of Hammersley Shoal to Gidley Island, then continue S to Conzinc Islet.

Caution.—A spoil ground lies about 1 mile W of Conzinc Island.

4.30 Flying Foam Passage, about 0.5 mile wide, runs NE, with Dolphin Island on the E side and Gidley Island and Angel Island on the W side. Many pearl culture farms obstruct this passage, which can only be used by small craft with local knowledge.

Withnell Bay, with a depth of 4.6m, is entered about 2.5 miles S of the Conzinc Islet Star Rock, depth 1.4m. Conzinc Islet Star Rock lies 1.25 miles W of the S entrance point of Withnell Bay and is marked by a lighted beacon. King Bay, entered between Phillip Point and Parker Point, lies 3.5 miles SW of Withnell Bay and has depths of less than 5m. The W side of Mermaid Sound is bound by the Malus Islands, West Lewis Island, and East Lewis Island.

Nelson Rocks (20°27'S., 116°41'E.) lie on the NW side of Mermaid Sound, 3.5 miles NNW of Courtenay Head. Courtenay Shoal, with a least depth of 3m, has a 3.3m spot located about 2 miles NNE of Courtenay Head. A lighted buoy lies 0.5 mile off the E side of Courtenay Shoal.

Courtenay Head (20°31'S., 116°41'E.), the NE extremity of the four Malus Islands, is a remarkable bluff. The Malus Islands are all connected by sand spits. West Lewis Island lies about 2.5 miles SSW of Courtenay Head. There is a height of about 120m in the S part of the island. A small islet lies close off the N extremity of West Lewis Island and Pueblo Shoal, with a depth of 2.7m, lies 1.75 miles SE of the N extremity. East Lewis Island, 71m high, is separated from West Lewis Island by a boat channel, which dries. Boiler Rock, 42m high, lies 1 mile N of the NE extremity of East Lewis Island and is connected to it by a reef. The E coast of East Lewis Island is fronted by a spoil ground between Boiler Rock and Roe Point, the island's SE extremity.

The head of Mermaid Sound, about 15 miles within its entrance, has several islands located within it. From E to W the principal ones are Tidepole Island, East Intercourse Island, Mistaken Island, and Intercourse Island. Tidepole Island, about 0.5 mile long N to S, with a height of 14m, has a spoil ground along the length of its W side. East Intercourse Island, 50m high, is about 1.5 miles in length, in a NE-SW direction, and is connected to the mainland by a causeway. Mistaken Island, 13m high, lies 0.5 mile W of the mainland by a causeway which extends SSE to East Middle Intercourse Islet, then on SSE.

The coast near the S end of the sound is generally high and rocky; the hills, like the islands. are of a dark reddish color.

Dampier (20°40'S., 116°43'E.)

World Port Index No. 54605

4.31 The port of Dampier is entered between the NW end of Legendre Island and Nelson Rocks, about 10 miles SW.

Dampier is one of the principal iron ore exporting ports on the NW coast of Australia; salt is also exported. Imports include general cargo and building materials.

Dampier Port Authority Home Page
http://www.dpa.wa.gov.au

Winds—Weather.—The Dampier Archipelago is located in the cyclone belt, with an incidence of about three cyclones per year in an area extending from Port Hedland to North West Cape. The cyclone season lasts from December to April.

Prevailing winds are easterly in winter and westerly in summer, but the surrounding hills give considerable protection and wind in excess of 20 knots are infrequent.

The port facilities are situated in sheltered waters and experience only slight seas and an occasional low northerly swell in the summer months.

Tides—Currents.—Spring tides at Dampier rise 4.5m; neap tides rise 3.2m.

Tidal currents are weak within the archipelago, the flood flowing to the S, with a maximum strength of less than 1 knot at spring tides in the berthing areas.

Depths—Limitations.—Masters and Pilots operating within the Port of Dampier are required to calculate the vessel's UKC, in advance, in the harbor channels for arrival and departure, and for the times they are alongside in the berth pockets at low water. Minimum permissible UKC's are shown in the table titled **Minimum UKC Allowable**.

Minimum UKC Allowable	
In Harbor Channel (on arrival or departure)	**Static:** 1.0m or 10% of draft, whichever is greater. **Dynamic:** 0.5m
In berth pockets	**Static:** 1.0m
Mermaid Supply Base	**Static:** 1.0m
King Marine Supply Base	**Static:** 0.75m

A recommended track, which is indicated on the chart, leads from Sea Lighted Buoy to the entrance of the dredged channel SSE of Courtenay Head. This channel, which is marked by lighted beacons, is maintained to a depth of 15.6m until it bifurcates about 1.5 miles N of the E extremity of East Intercourse Island. The SE channel, maintained to a depth of 15.3m and marked by lighted beacons, leads to the ore jetty at Parker Point. The SW channel, maintained to a depth of 15.5m and marked by lighted beacons, leads to the ore jetty on East Intercourse Island.

An unmarked channel, with a maintained depth of 11m, leads to Dampier Cargo Wharf (Woodside Materials Offloading Facilities). This channel runs in a SE direction between the Supply Vessel and Small Craft anchorage to the N and the S1, S2, S3, and S4 anchorage areas to the S.

Normally vessels proceeding to the loading jetties do so by passing straight across the bay from the area close E of the N entrance to the dredged channel. The dredged channel is used only by outbound loaded ships.

A recommended track runs directly from the pilot boarding station in a SSE direction into the sound, and is used by vessels proceeding to the LNG berth near Withnell Bay.

Courtesy of Dampier Port Authority

Dampier Cargo Wharf (Woodside Materials Offloading Facilities) from NW

Parker Point Ore Jetty, on the E side of the port, consists of a tubular steel pile structure with a slewing boom shiploader. The pier face is 269m in length; however, ships berth port side-to against eight dolphins, which stand clear of the jetty structure and increase the berth to about 355m. The berth has a maintained depth of 16.8m. By day, the berth will accommodate vessels up 140,000 dwt, with a maximum length of 270m; by night, vessel size is restricted to 115,000 dwt, with a maximum length of 260m. The maximum departure draft from this berth is dependent upon tidal conditions and adequate UKC.

The charted depth alongside Parker Point Ore Jetty in 2005 was 19.5m along the N side and 19.5m along the outer half of the S side.

Courtesy of Hamersley Iron Pty Limited

Parker Point Ore Jetty

A Service Wharf is situated about 0.5 mile E of the Parker Point Ore Jetty. The approach to the wharf is marked by a range and has depths of 7.0m. The wharf is 70m in length and can accommodate vessels up to 175m in length, with drafts up to 7.2m.

East Intercourse Island Ore Jetty is similar in design to Parker Point Ore Jetty, except vessels berth starboard side-to. The pier face is 341m long; the berthing length is extended to 430m by dolphins. The berth has a dredged depth of 21.5m. Vessels of up to 250,000 dwt, with a maximum length of 314m and beam of 47m, can berth at the jetty. The jetty is connected to the open sea by a channel dredged to 15.3m.

Mistaken Island Salt Wharf has a T-head and is situated about 0.75 mile WSW of East Intercourse Ore Jetty. The head, together with the dolphins at either end, forms a berth of 358m in length and is marked by two red lights at either end. Vessels of up to 40,000 dwt can be accommodated alongside the berth, which has a depth of 12m at the berth and in the approach. Due to the fixed nature of the loader, vessels must be warped alongside to bring each working hatch under the loading boom. Vessels less than 35,000 dwt must have an UKC of 1m; vessels greater than 35,000 dwt must have an UKC of 1.5m.

A channel, dredged to a depth of 5.5m, leads between East Intercourse Island and the spoil ground extending W from Tidepole Island. There is a basin, dredged to a depth of 7.1m, close NE of the causeway joining East Intercourse Island to the mainland; the basin provides a sheltered anchorage for small vessels.

Courtesy of Dampier Port Authority

Mistaken Island Salt Wharf

Withnell Bay Terminal (16°35'S., 116°46'E.) lies 1 mile WSW of the S entrance point to Withnell Bay and consists of two jetties. The E jetty contains an LPG dolphin berth, length 350m, width 75m and depth alongside of 13.5m; and the W jetty contains an LNG dolphin berth, length 425m, width 80m and depth alongside of 13.2m. Vessels usually berth port side-to; a turning basin marked by lighted buoys is situated about 0.4 mile N of the berth. The approach to the berths is maintained to a depth of 12.3m.

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Withnell Bay Loading Terminal

Dampier Cargo Wharf, also known as the Woodside Materials Offloading Facilities, extends 0.1 mile NNW from the shore about 0.5 mile NNE of Phillip Point. The berth at the head of the jetty, which has dolphins at either end, is 274m in

length, with a dredged depth of 10m on its W side and a depth of 6.5m on its E side. A second berth under construction (2004) just S of Dampier Cargo Wharf has a depth of 13m alongside. A turning basin, with a depth of 11m, extends NW between the two berths.

A shoal patch, with a depth of 7m and marked by a lighted beacon, lies about 2 miles WNW of the head of Dampier Cargo Wharf

A basin, with a charted depth of 5.5m, used by vessels which are employed on the natural gas projects, Woodside Petroleum Supply Base, is situated at Phillip Point in the N part of King Bay. The approach to the basin is marked by range lights. Mermaid Supply Base is accessed through a separate marked channel, depth 6m, just S of Woodside Petroleum Supply Base. A wharf extending SW from shore has a charted depth of 7.5m at its head. A boat slip is situated at the end of the channel with a charted depth of 2m.

Aspect.—The most prominent landmarks in Port Dampier are a group of tanks and a group of chimneys standing about 0.4 mile and 0.6 mile, respectively, SW of the root of the Service Wharf. A radio mast, 0.65 mile SE of the tanks, is also conspicuous, as are three tanks close WSW of the mast. White Peak, 157m, high, is located 3 miles S of Parker Point and Sharp Peak, 103m high, stands 2.5 miles W of White Peak. There are three peaks, close together, 96m high, located between White Peak and Sharp Peak.

A light is shown from the top of the port control tower, 45m high, on East Intercourse Island. A light is also shown from a structure, 58m in elevation, standing about 0.2 mile ENE of the control tower.

A conspicuous tower, marked by red lights and 240m in elevation, stands on a hilltop 1.75 miles E of the N entrance point to Withnell Bay. A gas flare tower, 149m high, stands about 0.75 mile SSE of the S entrance point to the bay and a tower, 118m high, is situated 0.5 mile N of the gas flare.

Pilotage.—Pilotage is compulsory for all vessels entering, leaving, and maneuvering within the port, except for those of 150 tons or less and those whose masters hold a valid pilotage exemption.

Pilots board in the following positions as shown on the chart:

a. 20°21.0'S., 116°44.0’E.—Boarding Position A
b. 20°23.7'S., 116°42.1'E.—Boarding Position B
c. 20°23.8'S., 116°43.7'E.—Boarding Position C
d. 20°28.6'S., 116°44.3'E.—Boarding Position D
e. 20°38.5'S., 116°39.0'E.—Boarding Position E

Pilots board via pilot boat or may also be embarked via helicopter. The pilot boat is equipped with radiotelephone. The port frequencies are VHF channel 11 for the port working channel, VHF channel 67 for emergencies, and VHF channel 72 for ship to ship communications. There is a port radio station and radar surveillance facility at East Intercourse Island.

Regulations.—Dampier is a first port of entry. All arrival notices and other communications from arriving vessels to the harbormaster should be directed via vessel’s local agents. The agent, in consultation with the relevant terminal operator, will send pilot boarding, berthing or anchoring instructions for the vessel by facsimile, telex or VHF radio. Vessels arriving from overseas are to provide their ETA 7 days in advance, confirming 72 hours, 48 hours, and 24 hours before arrival. Other vessels should provide their ETA 72 hours, 48 hours, and 24 hours before arrival. The 7-day or 72-hour message, as appropriate, should include the vessel’s arrival draft, fore and aft, and its deepest departure draft.

Vessels approaching the port or at anchor must maintain a continuous listening watch on VHF channels 11 and 16.

Vessels should contact Dampier Port Control 4 hours prior to arrival, on VHF channel 16, for pilot boarding information and anchoring or berthing instructions.

A restricted area, best seen on the chart, bounds Withnell Bay.

Vessel Traffic Service.—A vessel traffic service is in operation for the control of shipping. Position of two-way reporting point, is shown on the chart in 20°22.0’S 116°44.3’E.

Anchorage.—Anchorage can be obtained in the Western Anchorage, located 3.8 miles N of Nelson Rocks, and the Petroleum and Explosives Anchorage, situated 2 miles NW of Cape Legenre. Both areas have depths of 29 to 38m, with coarse sand and shell bottoms. These areas are best viewed on the chart. A supply vessel and small craft anchorage is situated just W of the LNG Wharf at Woodside Petroleum and has a depth of 8m, mud and sand. Anchoring is strictly prohibited between these anchorages and N of the pilot boarding area due to the presence of underwater pipelines. See table titled **Mermaid Sound - Dampier Designated Anchorages** for list of designated anchorages.

Mermaid Sound - Dampier Designated Anchorages

Designation	Center position with 0.25 mile radius swing circle
MA1	20°32.0'S 116°39.7'E
MA2	20°31.9'S 116°40.4'E
FDTS1	20°31.9'S 116°41.1'E
EII	20°38.5'S 116°39.9'E

Caution.—A submarine pipeline runs from a position about 0.25 mile SW of the S entrance point of Withnell Bay in a N direction to the entrance of the sound and then NW to the Rankin Gas Field. Within the port, anchorage is prohibited for 0.5 mile each side of the pipeline.

Dampier to Cape Preston

4.32 From Dampier to Cape Preston, about 28 miles WSW, the coast is low and swampy; the land within for some distance, except near Cape Preston, is flooded at high water.

Mount Leopold (20°59'S., 116°37'E.), 252m high, is located 25 miles ESE of Cape Preston and 12 miles inland. Mount Wilkie, 14 miles SE of the same cape and 6.5 miles inland, is 163m high. Mount Potter, 87m high, and Mount Rough, 69m high, are located 6 miles SSE and 5 miles S, respectively, of Cape Preston.

Cape Preston (20°50'S., 116°13'E.) is the N extremity of a portion of land rising to a height of 60m at Mount Preston, which is separated from the land about 3 miles S of the cape by a low strip, which is occasionally flooded.

The coastal waters from Port Dampier to Cape Preston are fronted by the islands that form the W part of the Dampier Archipelago. An extensive bank, with depths of less than 10m, extends WSW from Nelson Rocks, previously described in paragraph 4.31, for a distance of 10 miles. Miller Rocks, which dry 0.9m, lie 2 miles WNW of Nelson Rocks and Brigadier Islet lies 1.5 miles WSW of Miller Rocks.

4.33 Rosemary Island (20°29'S., 116°36'E.), which is about 76m high, lies on this bank; from the NNE the island appears as three hummocks. A light is shown from a white hut, situated on high ground, near the center of the island. The NW side of the island is fronted by Sailfish Reef, which breaks; the 20m curve runs close along the seaward side of the reef.

Kendrew Islet, 9m high, lies on the bank about 3.5 miles W of Rosemary Island Light. Roly Rock, 5m high, lies on SW extremity of the bank, about 2 miles SW of Kendrew Islet.

Enderby Island (20°36'S., 116°32'E.), about 7 miles in length E-W, has a height of 90m and lies with Rocky Head, its SW extremity, about 9.5 miles SW of Rosemary Island. Bare Rock, 9m high, stands on an isolated reef which extends about 3 miles S, and is located about 4 miles NNW of Rocky Head.

Goodwyn Island lies 2 miles N of Enderby Island and stands on a bank, with depths of less than 10m, extending N from a bay on the N side of Enderby Island.

It was reported (1999) that Fisheries Western Australia has granted permission for a pearl oyster farm to be established between the islands of Enderby and Goodwyn. A further site, E of Eaglehawk Island, is also under consideration. Mariners should navigate with caution when in the vicinity of these sites.

North West Reefs, which dry 4.2m, lie about 3 miles WSW of Rocky Head and South West Reef, which dries 1.2m, lies 3.5 miles S of North West Reefs.

Eaglehawk Island, 36m high, is located 3 miles SSW of Rocky Head and is fringed by a drying reef which extends up to 0.5 mile in places. Egret Islet lies close off the W extremity of Eaglehawk Island.

4.34 Enderby Reef (20°36'S., 116°32'E.), with depths of 2.8 to 4.2m, extends about 2 miles ESE from close S of Rocky Head. Dockrell Reef, with a least depth of 0.7m, lies about 1.5 miles SSE of the SE extremity of Enderby Reef. South East Reef, with a depth of 3.7m, lies 3 miles WSW of Dockrell Reef.

Mermaid Strait (20°39'S., 116°32'E.) is entered between Rocky Head and North West Reefs; the strait leads to the Port of Dampier. A recommended track is indicated on the chart. The strait should only be used in daylight by vessels with local knowledge; the least depth along the track was reported to be 6.4m.

Cod Bank, an isolated bank with a least depth of 8.2m, lies about 9 miles W of South West Reef; another shoal spot, with a depth of 10m, is located about 4.5 miles WSW of Cod Bank.

Regnard Bay, an extensive shoal bay, extends along the coast for a distance of about 22 miles in an ENE direction from Cape Preston. The 5m curve lies about 5 miles offshore of this bay. Several rivers and creeks flow into the bay, the principal one being the Maitland River, which flows into the E part.

Northeast Regnard Islet, a small sandy islet 13.1m high, lies 6.5 miles ENE of Cape Preston. Southwest Regnard Islet, 17.3m high, lies 2.5 miles ENE of the cape. A 1.8m patch lies 1.75 miles N of Northeast Regnard Islet.

Cape Preston to North West Cape

4.35 The coast between Cape Preston and James Point, 8.5 miles SSW, is backed by a rocky range of hills; Mount Rough and Mount Potter are located in these hills. Delaney Hill, 9m high, stands 6 miles SW of James Point and is prominent. Mount Nicholson, 154m high, is a conspicuous point located inland about 16 miles S of Delaney Hill.

From Delaney Hill to an unnamed point 10 miles SW, the coast is backed by sand hills. Mount Salt, a hillock 21m high, stands 1.5 miles inland from the coast, 6.5 miles SW of Delaney Hill. Between this unnamed point and **Robe Point** (21°20'S., 115°38'E.), 10m high, about 15 miles SW, there is a shoal bay; the shore of the bay is a mangrove swamp, flooded at high water and backed by low sand hills at its head.

Fortescue Road (20°53'S., 116°07'E.) is bordered on the S and E by the coastline between Cape Preston and the entrance to the Fortescue River, 12 miles SSW; on the W it is bordered by a chain of islets, shoals, and reefs which lie from 5 to 9 miles offshore and extend 15 miles SSW from McLennan Bank, 8 miles NW of Cape Preston.

McLennan Bank (20°46'S., 116°05'E.), the N danger in the approach to Fortescue Road, has a least depth of 1.2m.

4.36 Steamboat Island (20°49'S., 116°04'E.), 12m high, lies 8 miles W of Cape Preston; this island stands on an extensive shoal with a least depth of 0.6m, which extends 2.5 miles NE and 3 miles SSE from the island. The Man in the Boat Rock, which dries 3.6m, and Petersen Rock, with a depth of 1.5m, lie 1 and 2 miles NE, respectively, of Steamboat Island.

Fortescue Island (20°55'S., 116°02'E.), 12m high, lies 5.5 miles SSW of Steamboat Island and on the N part of the coastal bank with depths of less than 5m over it, which extends up to 7 miles offshore at this point. North Fortescue Reef and South Fortescue Rock, with depths of 2m or less over them, lie 1 and 1.75 miles SSW, respectively, of Fortescue Island.

Stewart Islet, 12.2m high, lies 11 miles SW of McLennan Bank and 10 miles offshore. Stewart Rocks, with a depth of 0.6m, lie on the NW extremity of a rocky ledge that extends 1.5 miles N of Stewart Islet.

The Fortescue River, entered about 4 miles WSW of James Point, is navigable by vessels of light draft for about 1 mile; a landing place is located on the W bank about 0.5 mile within the entrance.

The channel between Steamboat Island and Fortescue Island, although used by coastal craft, is not recommended.

Anchorage may be taken, in a depth of 6m, mud, about 4.5 miles ESE of Fortescue Island; considerable swell is experienced at this anchorage during strong winds.

Tidal currents in the anchorage set SW on the rising tide and NE during the falling tide, the rate being from 1 to 1.5 knots.

Vessels approaching Fortescue Road should keep Cape Preston bearing more than 135° until Steamboat Island bears 248°; then a SW course may be steered for the anchorage.

4.37 The **Passage Islands** (21°03'S., 115°48'E.) are a chain of seven islands that front the shore between Sholl Island and

South Passage Islet, about 16 miles SSW. Sholl Island, 15m high, is sandy, with small bushes on it. The island lies 4.5 miles SSW of Stewart Islet and about 8 miles offshore. Sholl Island is located on a reef, which dries in part, and is fairly steep-to on the NW; the reef extends 6 miles SSW. Round Islet, 9m high, and Long Islet, 13m high, lie on the reef 2.5 and 5 miles SSW, respectively, of Sholl Island.

Pearl culture areas are situated in the vicinity of Sholl Island. The farms, which may be floating or fixed structures, and their associated moorings should be avoided. The farms are generally marked by buoys and beacons, which may be lit.

The remaining islets of the Passage Islands lie on the coastal bank and from 4 to 7 miles offshore; in order from N to S, they are Middle Islet, Angle Islet, Passage Islet, and South Passage Islet. A reef, which dries 1.2m, lies between the two last-mentioned islets. All the islets in the group are of sandy formation and sparsely vegetated, with flat summits.

Meda Reef (21°03'S., 115°46'E.), composed of coral and with a least depth of 0.9m, is about 1 mile in extent and lies about 8 miles offshore.

North Sandy Islet (21°06'S., 115°39'E.), 11m high and located near the center of a reef, is partly dry at low water; a light is shown from a metal framework tower in the center of the islet.

Pup Islet, a rock 8m high, lies 3.5 miles S of North Sandy Islet and is surrounded by a reef.

Great Sandy Islet (Beagle Islet) (21°12'S., 115°38'E.), 11m high, lies on a drying reef about 6.5 miles offshore. The summit of the island near its SW end is covered with stunted bushes. Great Sandy Islet Light is shown from a white metal building near the SW extremity of the island; two conspicuous white masts stand near the NE end of the islet.

Anchorage can be taken, in 7.3m, sand and mud, about 0.5 mile SE of the summit of Great Sandy Islet, or, in 8m, about 1 mile E.

4.38 The **Montebello Islands** (20°27'S., 115°33'E.), about 45 miles NW of Cape Preston, are a group of islands, islets, and rocks extending about 10 miles N-S and 6 miles E-W. They are surrounded by an extensive coral reef, which is awash in places on its W side. The islands have been reported to give good radar returns up to 17 miles

Caution.—Pearl farms are prevalent around the Montebello Islands. These farms, which may be floating or fixed structures, and their associated moorings should be avoided. The farms are generally marked by buoys and beacons, which may be lit.

Extensive oil and gas operations are conducted in the vicinity of the Montebello Islands and Barrow Island. Dangers are best seen on the chart.

4.39 **North West Island** (20°22'S., 115°31'E.), 20m high, is surrounded by a reef which extends 1.5 miles N and NW from it. North West Island Light is shown from a white hut on the N side of the island.

Trimouille Island, 37m high, is located 0.75 mile SE of North West Island. The island has a partially drying reef which extends up to 1 mile off its NE side. A light is shown from a white hut on the S summit of the island.

Caution.—Unexploded ordnance lies in an area, with a radius of 0.5 mile, centered approximately 5 miles ENE of the light on Trimouille Island, in a depth of about 45m. The area is safe for surface navigation only; it is not safe for anchoring, trawling or seabed activities.

4.40 South East Islet, 21m high, is close off the SE extremity of Trimouille Island; it is grassy and has a well-defined summit on its NW end. Foul ground and depths of less than 10m extend 4.5 miles SSE from South East Islet and on it are a number of islets, rocks, and reefs.

Flag Islet, which is 10m high and covered with grass, lies 2 miles SSW of South East Islet, on the above-described foul ground.

Hermite Island lies 3 miles S of North West Island; between these islands there is a chain of islet and rocks. Hermite Island is covered with grass and has a height of 29m at the S end. The fringing reef, which has drying patches, extends up to 4 miles W of the island. A conspicuous shed stands near the SE extremity of Hermite Island, 0.5 mile SE of the 29m hillock.

Rocks, awash at high water, lie within 1 mile of the outer edge of the SW part of the Montebello Islands reef and 5 miles N of the N extremity of Barrow Island; they are difficult to see in the heavy breakers in the vicinity.

Anchorage.—During W winds, anchorage can be taken about 0.6 mile SE of Flag Islet, in depths of 6 to 9m. Anchorage can also be taken in Parting Pool, 1.5 miles S of South East Islet, in a depth of 16m, sand and shell.

There is anchorage, in a depth of 29m, in a position 1.25 miles NE from the SE extremity of North West Island, but there is a fairly heavy swell here and it is close to the shoal extending from Trimouille Island.

These anchorages should only be approached by vessels with local knowledge.

4.41 **Tryal Rocks** (20°17'S., 115°22'E.) consist of two coral reefs, close together, about 1.25 miles in length NE-SW; the S reef dries 2.7m. The rocks are located about 9 miles NW of the Montebello Islands.

Depths of less than 20m lie within 6 miles SW and 4 miles NW of Tryal Rocks; the sea breaks on these shallower depths in bad weather.

A 5.5m patch lies 3 miles W of North West Island Light.

The channel between Tryal Rocks and the Montebello Islands is 7 miles wide, with depths of 31 to 40m, and may be used by vessels proceeding to the E side of Barrow Island.

The **Lowendal Islets** (20°29'S., 115°35'E.), located about 8 miles E of Cape Dupuy, the N end of Barrow Island, extend for about 11.5 miles S from the SE extremity of Hermite Island and are of sandy formation in part and covered with grass. Shoal water lies between these islets and Barrow Island.

4.42 **Varanus Island Terminal** (20°37'S., 115°35'E.) serves Harriet Oil Field, which includes Harriet A, Harriet B, and Harriet C Production Platforms, situated 3.25, 4.25, and 5.25 miles NE, respectively, of the NE extremity of the islet. **Varanus Island** (20°39'S., 115°34'E.) is the largest islet of the group, being 20m high. Lighted Platform Linda, Lighted Platform Sinbad, and Lighted Platform Campbell lie 3, 7, and 12 miles NE, respectively, of the Harriet Production Platforms.

Barrow Island from NNE

A Cautionary Area surrounds these lighted platforms and is best seen on the chart. Entry is restricted. Submarine oil/gas pipelines are laid to Harriet A Platform from the other five wells and between Harriet A Platform and Varanus Island.

The offshore terminal, consisting of mooring buoys, is situated about 2 miles ENE of the NE extremity of the islet; a submarine pipeline extends SW from the terminal to the shore. A group of tanks and a radio mast were reported to be situated on the SE portion of the islet.

The waters N and S of the terminal are incompletely surveyed and vessels should approach the terminal from the E, with the terminal bearing between 240° and 300°. The port limits are those waters within a circle, with a radius of 3.25 miles, centered on the terminal.

A pilot will board in a position about 5 miles E of the mooring buoys. The terminal is equipped with VHF. Vessels up to 140,000 dwt, with lengths up to 300m, beam up to 46m, and drafts up to 17m, can be accommodated. the vessel's ETA should be sent 96 hours in advance and confirmed or amended 48 hours and 24 hours prior to arrival. The ETA should be confirmed by VHF with the terminal within 100 miles of the Lowendal Islands or as soon as practicable thereafter.

The recommended anchorage is 3 miles E of the terminal, in a charted depth of about 25m, variable holding ground.

Caution.—In the approach, there is a least depth of 20m, about 4.5 miles ENE of the terminal. A shoal with a least depth of 6m over it has been reported (2002) about 1.5 miles SE of the terminal and close to the S boundary of the terminal. Within 0.5 mile of the terminal, the least depth is 20.4m.

4.43 Barrow Island (20°47'S., 115°24'E.) is formed by irregular and steep sand hills, extending N and S, which are thickly covered with grass and small bushes.

The summit, 76m high, lies 9.5 miles S from Cape Dupuy, its N extremity, in about the middle of the island. An ill-defined hill, 67m high, stands 4 miles SSW of Cape Dupuy; from this hill, the land slopes down to some rounded hills at the cape.

A communication mast is situated 3 miles NW of Shark Point, the top of which stands 176m and is visible from sea. A high intensity flashing white strobe light is shown by day and three red lights vertically at night.

Entry to the Port of Barrow Island is restricted: contact Barrow Island Port Control on VHF channel 10 for transit of this area.

Multiple Military Exercise Areas are near Barrow Island and are noted on the chart with additional information. Proceed with caution in these areas.

Double Islet (20°44'S., 115°30'E.), with several small islets within 1 mile NW, lies 4 miles SSE of Surf Point, the NE extremity of Barrow Island, and 1 mile offshore. Double Islet Light is shown from a metal pipe.

Channel Rock is an isolated rock located about 0.5 mile SE of the southernmost Double Islet.

Latitude Point (20°47'S., 115°28'E.) is located 7 miles SSE of Cape Dupuy. The S extremity of the foul ground extending SSW from the Lowendal Islets lies 2 miles ESE of Latitude Point.

Boodie Island, 27m high, lies 4 miles S of the SW extremity of Barrow Island. Pasco Islet, 29m high, lies 0.5 mile E of the island described above; Poivre Reef, which dries, lies 3 miles SW of the same island. There are depths of 7.6 to 11m about 1.75 miles W, and a 13.5m patch 7.25 miles WSW, of Poivre Reef.

4.44 Barrow Island Shoals (21°05'S., 115°24'E.), with depths of less than 5m, extend nearly 17 miles S from the S extremity of Barrow Island, but only the S part of these shoals, which borders the N side of Mary Anne Passage have been surveyed. A sandy cay on the shoals, 12.5 miles SE of Pasco Islet, dries 1.5m. The sea seldom breaks on these shoals, but they can generally be discerned by an area of smooth water over them, or a tide rip near their edges.

Cape Poivre (20°49'S., 115°19'E.) is a sharp, craggy point on the SW side of Barrow Island; Cape Malouet is located about 7 miles farther NE, about 4 miles SW of Cape Dupuy. A shoal area located about midway between Cape Poivre and Cape Malouet extends about 1 mile to seaward.

Barrow Island Light, situated in the NE part of the island, is shown from a metal post on a concrete base.

Caution.—A number of well heads, best seen on chart, are situated 25 miles WSW of Cape Poivre along the 100m curve.

Woollybutt (20°52'S., 114°55'E.), a series of production wells and their associated pipelines and restricted areas, lie 25 miles WSW of Barrow Island.

4.45 Barrow Island Offshore Terminal (20°48'S., 115°33'E.), situated 6 miles ESE of Latitude Point, is connected to the shore by a submarine pipeline. The port limit is an arc of a circle, with a radius of 7 miles, centered on Latitude Point.

Winds—Weather.—The prevailing winds are from the SW in the summer and the E in the winter.

Tides.—Currents.—The tidal currents in the vicinity of the terminal attain a rate of about 1 knot at springs, with the flood flowing WSW and the ebb flowing ENE.

Depths—Limitations.—The terminal consists of a group of mooring buoys, which provide a berth for vessels up to 105,000 dwt, with a maximum length of 250m; the minimum depth in the vicinity of the berth is 13.2m. An UKC of 1.6m must be maintained.

Pilotage.—Pilotage is compulsory. A berthing master boards at either 2 miles E (Inner) or 5 miles NE (Outer) of the oil loading mooring buoys and remains on board throughout the stay. Pratique must be obtained before arrival at Barrow Island. Port Hedland is the nearest port where this can be obtained.

Regulations.—Vessels proceeding to the terminal should send their ETA 96 hours, 48 hours, 24 hours, and 12 hours in advance to WAPET, Perth. The 96-hour message should contain the following information:

1. Quantity of ballast water carried.
2. Quality of ballast water carried.
3. Arrival draft.

Berthing is only done on the ebb tide in calm conditions during daylight hours. Tankers with local knowledge may be allowed to berth at night if they carry adequate searchlights. A continuous listening watch on VHF channels 14 and 16 is to be maintained by tankers when within 100 miles of the terminal.

The FPSO Four Vanguard, moored 30 miles WSW of Barrow Island, is enclosed within a cautionary zone 2.5 miles in radius.

Directions.—The terminal should be approached by passing the Montebello Islands to the N and E, then proceeding to the berth on the due W recommended track, indicated on the chart. The waters to the S of this route have been incompletely surveyed.

Anchorage.—Anchorage can be obtained 2 miles E of the terminal, with good holding ground reported. Anchorage is prohibited in the vicinity of the pipeline, which is marked at the seaward end by a lighted buoy. See the table titled **Barrow Island - Designated Anchorages** for additional available anchorages.

Barrow Island - Designated Anchorages	
Designation	**Center position with 0.75 mile radius swing circle**
LNG1	20°46.1'S 115°44.6'E
LNG2	20°45.0'S 115°46.2'E
LNG3	20°44.0'S 115°47.8'E
LNG4	20°43.0'S 115°49.4'E
Designation	**Center position with 0.27 mile radius swing circle**
A1	20°44.1'S 115°29.3'E
B1	20°46.6'S 115°37.1'E

Caution.—Shoal depths of 10.3m and 10m lie 2.75 miles and 4.75 miles ESE of the terminal.

4.46 Rankin Bank (19°44'S., 115°35'E.), with a least charted depth of 11m reported in 1979, lies about 35 miles N of the Montebello Islands and is the outermost danger off the group. Several well heads are situated to the E and S of Rankin Bank.

North Rankin Gas Field is under development in the vicinity of Rankin Bank. A production platform, equipped with a racon (2013), is situated about 30 miles ENE of the bank with a restricted area, radius 5 miles, centered on the platform. A submarine pipeline runs SE from the platform to Withnell Bay within Dampier.

Caution.—Mariners are cautioned to exercise special care when navigating these waters due to production wells and gas pipelines.

Robe Point to North West Cape

4.47 Beadon Point (21°38'S., 115°06'E.) is located about 40 miles SW of Robe Point. The coast between is low and sandy, with an extensive coastal marsh which floods at high water for the first 24 miles; from this distance to Coolgra Point, another 8 miles, there is a ridge of sand hills to 12m high, partially covered with vegetation. The coast between Coolgra Point and Beadon Point, 8 miles WSW, is backed by sand hills up to 15m high, slightly covered with vegetation and broken occasionally by shoal mangrove creeks. Beadon Point, the W entrance point of Beadon Bay, has a conspicuous bare sandhill, 21m high.

The coastal waters from Robe Point to Beadon Point are shoal, and much encumbered with islets and drying shoals, the 10m curve lies up to 100.5 miles off the mainland in this area.

Mary Anne Reef (21°16'S., 115°28'E.) lies on the NW side of the Mary Anne Islets, about 14 miles W of Robe Point. Mary Anne Reef Light is shown from a white hut on a concrete base. Flinders Shoal, with a least depth of 1.8m, lies 1.5 miles NNE of Mary Anne Reef Light; overfalls and tide rips are seen on this shoal on the ebb current.

Nares Rock (21°26'S., 115°18'E.) lies on a shoal patch, with a depth of less than 1.8m, close within the 10m curve, about 14 miles SSW of Mary Anne Reef.

The Mangrove Islands lie SE of Nares Rock; an unexamined patch, with a depth of 5.2m, lies 5 miles NW of the same rock.

4.48 Direction Island (21°32'S., 115°08'E.) lies 6 miles NNE of Beadon Point; shoal water extends from Direction Island ENE to Nares Rock. The island is 12m high and covered with bushes. A conspicuous white building with black stripes, which is not visible from N, stands on the islet.

The dangers N of Mary Anne Passage along this section lie W and WSW of the S part of Barrow Island Shoals.

Ripple Shoals (21°11'S., 115°20'E.), with a least depth 3.3m, lie about 9 miles NW of Mary Anne Reef Light.

Taunton Reef, about 1 mile in diameter and on which the sea breaks, lies about 14 miles WSW of Mary Anne Reef; a submerged well head, marked close E by a buoy, lies close ESE of Taunton Reef.

Airlie Island (21°19'S., 115°10'E.) is small and sparsley vegetated with a flat summit 9m high. A sunken reef, which extends 2.5 miles W from the islet, seldom breaks, except with a heavy swell. Airlie Island Light is shown from a stainless steel framework tower, 21m high, near the center of the island; two conspicuous tanks lie close NE of the light. A shoal depth of 9.6m lies 6.5 miles W of Airlie Island Light.

Caution.—An underwater oil pipeline extends W from Taunton Reef to Airlie Island. Two oil production platforms, exhibiting lights and surrounded by a restricted zone, are situated 13 miles and 10.5 miles NNE of Airlie Island. A pipeline is laid between each platform and from the N platform

Thevenard Island from NNE

SSW to Airlie Island. Moorings are situated 1 mile N of Airlie Islet at the S end of the pipeline. A well head, exhibiting a light and surrounded by a restricted zone, lies 1 mile E of the N platform; a pipeline is laid between platform and well head.

4.49 Airlie Island Terminal (21°18'S., 115°10'E.) is situated 1 mile NNE of Airlie Island and services Chervil Oil Field. The terminal consists of six buoys and two swamped moorings. The berth is exposed from W and N and is about 0.75 mile from reefs to the S. A safety zone surrounds the terminal.

Tides—Currents.—Tidal currents may attain a rate of 4 knots at springs.

Depths—Limitations.—The depth at the terminal is 15.4m. The terminal is designed to accept vessels up to 120,000 dwt having a length of 300m, a beam of 50m, and a deep draft of 13.8m.

Pilotage.—Pilotage is compulsory. Tugs are not available. Berthing by night is preferred due to reduced wind and less heat. The pilot boards in position 21°10'S, 115°06'E.

Regulations.—Vessels should send their ETA to Western Mining Company 96 hours in advance, amending or confirming the ETA 72 hours, 48 hours, and 24 hours in advance. The pilot boards in position 21°10'S., 115°06'E

Anchorage.—Anchorage may be taken about 10 miles NNW of Airlie Island.

4.50 The **Rosily Islets** (21°16'S., 115°01'E.), 9 miles WNW of Airlie Island, consist of a rocky islet 1m high, with a sand cay 0.8m high close E. The islets are located on a sunken coral reef which extends 0.75 mile N and W. A bank, with a least depth of 5.3m, extends 3 miles SE.

Penguin Bank (21°12'S., 115°04'E.), of coral, with a least depth of 4.6m, lies 4.25 miles NNE of the Rosily Islets and seldom breaks, except with a heavy swell. There is an 11.3m patch 4.5 miles ENE of Penguin Bank.

Sultan Reef (21°25'S., 115°06'E.), a coral patch, lies 6.75 miles SW of Airlie Island. The sea only breaks on this reef when there is a swell.

Thevenard Island (21°28'S., 115°00'E.), 12m high on its W end, lies 12 miles NNW of Beadon Point. Three conspicuous oil tanks stand near the E end of the island. The island is surrounded by a drying reef, which extends 2.75 miles N and NW. A patch, which dries 1.2m, lies close within the edge of the reef, 1.75 miles S from the E end of the island. Leading lights mark the approaches to Thevenard Wharf. Spoiled ground exists approximately 8 miles NW of the island and can be best seen on the chart. Military operations are conducted in vicinity of Thevenard Island.

4.51 Saladin Marine Terminal (21°27'S., 115°03'E.) is situated on the E side of Thevenard Island. Saladin A and Saladin B, which are oil production platforms, are situated 2 miles and 1.25 miles ENE, respectively, of the E extremity of the island. Saladin C, an oil production platform, lies 2 miles SW of the E extremity of the island. Yammaderry, another oil production platform, lies about 1 mile SW of Saladin C. All the production platforms are surrounded by safety zones.

A lighted buoy marks the E side of a well head situated 0.75 mile S of the E end of the island; a lighted buoy also marks the W side of a well head situated 3 miles SW of the E extremity of the island.

A tanker mooring buoy is situated about 3.5 miles NE of the E end of the island. A restricted area, with a radius of 1 mile, surrounds the mooring buoy; vessels may enter this area only with permission.

Pilotage is compulsory. Vessels should contact the terminal and maintain a listening watch on VHF channel 14 when within 100 miles of the pilot boarding position. Vessels should send their ETA 96 hours, 48 hours, 24 hours, and 12 hours in advance. The Mooring Master boards about 2 miles W of Saladin lighted buoy.

Caution.—Oil pipelines connect Saladin A and Saladin B; pipelines also connect the E end of the island to Saladin A and Saladin B. A pipeline also connects the tanker mooring buoy to the E end of the island.

Pipelines also connect Yammaderry with Saladin C and Saladin C with the E end of the island.

Brewis Reef (21°30'S., 114°55'E.), 3.5 miles SW of Thevenard Island, is nearly awash at its W end; vessels in transit through the Inner Route pass S of this route.

Caution.—Cowle, a lighted production platform, which is surrounded by a safety zone and connected to the E end of Thevenard Island by a submerged pipeline, stands about 2.5 miles ESE of the E end of Brewis Reef. The platform lies close N of the charted preferred route to the port of Onslow.

4.52 Griffin Marine Terminal (21°13'S., 114°39'E.) is a Floating Platform and Storage Unit (FPSO). It is situated 23.5 miles NE of Thevenard Island and is the outlet for Griffin Oil Field. A safety zone surrounds the facility.

Winds—Weather.—As the terminal is an open and unsheltered mooring, there may be times when mooring operations may be difficult or inadvisable. Under these circumstances, the terminal will be closed until conditions improve. During the summer months, from October to March, the prevailing winds will be from the S and SW quadrant; in the winter months, June to August, the prevailing winds will be from the S and SE quadrant.

During the summer months, the area is subject to occasional cyclones; December through April is the most active period. In

January and February in particular, weather and sea state conditions may prevent mooring and unloading for periods of up to a few days. Weather conditions and forecasts are closely monitored before the arrival of a vessel and during loading. In the event of deteriorating conditions or the approach of a cyclone, the facility will be closed down and the vessel released.

Except during the cyclone period, or during other isolated severe storms, seas are generally slight. Seas of 2m and less can be expected 95 per cent of the time. Larger seas are more prevalent during the winter, when swells as high as 4m can be generated during E gales.

Depths—Limitations.—The terminal stands in 130m of water. Vessels up to 150,000 dwt can be accommodated. Berthing is done during daylight hours only; unberthing can be done at any time.

Vessels are moored bow to the stern of the FPSU facility. The FPSU with attached tanker can rotate a full 360° in response to current, wind, and wave conditions.

Pilotage.—Pilotage by the Facility Master is compulsory; the Facility Master board 3 miles from the FPSU. The pilot, berthing superintendents, and equipment will be transferred to the vessel by the facility workboat, weather permitting, or by helicopter.

Regulations.—Vessels should advise ETA to the agent and the terminal's marine supervisor 72 hours, 48 hours, and 24 hours before arrival. Vessels should contact the terminal on VHF channel 72 when 3 to 4 hours away from the terminal. Final berthing instructions will be advised by VHF. Vessels should remain at least 5 miles off the terminal until instructions to proceed are received.

Contact Information.—The marine supervisor can be contacted by e-mail (petgrv.marinesuper@bhpbilliton.com).

Anchorage.—The Facility Master will advise the vessel about anchoring. When passing SSE of Griffin Oil Field, anchoring should not be attempted due to pipelines extending SSE from the oil field to the shore.

4.53 Mary Anne Passage (21°12'S., 115°30'E.), at the NE end of the Inner Route, leads between Barrow Island Shoals and Ripple Shoals, on the NW, and the islets and dangers fronting the mainland from Fortescue Road and Coolgra Point, on the SE. Its narrowest part is 2.5 miles wide between Barrow Island Shoals and Flinders Shoal. The least depths on the track, as indicated on the chart, are to be found on Fairway Shoals, which has general depths of 5 to 10m. It is a convenient passage for vessels proceeding from E to Ashburton Road, for vessels with local knowledge, using care to avoid the previously-described dangers.

4.54 Onslow (21°38'S., 115°06'E.) (World Port Index No. 54580) is a lighterage port, the limits of which are described as the coast between Coolgra Point and Entrance Point, 17 miles WSW; then N to Ashburton Islet; then E to Direction Islet; then SE to Coolgra Point. In 1990, the port of Onslow was extended to include the oil terminals of Saladin and Thevenard Island.

The town of Onslow is situated on Beadon Point.

It has been reported (2001) that a salt-exporting terminal has been constructed in Onslow. The pilot for the terminal boards about 3.2 miles ESE of the E extremity of Thevenard Island.

Vessels bound for Onslow approach on the charted recommended track, passing S or SE of Thevenard Island, to a position 5 miles W of Direction Island, then alter course to bring Onslow Range Lights into line. This course leads W of Gorgon Patch, with a depth of 2.2m, and Koolinda Patch, with a depth of 2.5m, and E of Hastings Shoal, with a depth of less than 2m, and Ward Reef, which dries 0.9m. Weeks Shoal, with a depth of 1.9m, lies outside the 10m curve, 2.25 miles WNW of Direction Island.

Vessels departing the Port of Onslow may, when about 5 miles W of Direction Islet, steer W with Bessieres Island Light ahead and Direction Islet astern; then with Bessieres Island ahead about 3.25 miles, steer course 310°; then with Bessieres Island Light S, 2.5 miles distant, steer course as desired, clear of dangers, for their destination.

Vessels in transit of the described route should have local knowledge. Dangers other than those described above may be seen on the charts.

Anchorage.—Anchorages for vessels working cargo can be taken about 0.5 mile N of the ruined jetty off Beadon Point, in a depth of 7m, gravel and mud. See the table titled **Onslow Anchorages** for all designated anchorages.

Onslow Anchorages

Designation	Center position with 0.5 mile radius swing circle
A	21°31.00'S 115°04.00'E
B	21°30.02'S 115°04.36'E
C	21°29.02'S 115°04.71'E
D	21°29.55'S 115°05.80'E
E	21°28.50'S 115°05.80'E

4.55 The coast from Beadon Point to Tubridgi Point, 29 miles WSW, is low and generally backed by low sand hills, some of which are sparsely covered with vegetation; inland the country is low and flat, covered with grass and a few bushes, and is swampy in parts during the rainy season.

On this coast there are two conspicuous hills, one is 18m high, located on the SW extremity of a sand ridge, 3 miles SSW of Beadon Point. The other is Saddle Hill, 17m high and dark in color, which lies 8 miles SW of Beadon Point.

The coastal waters are encumbered by islands and reefs. There is a track through these waters for moderate draft vessels, but local knowledge is essential for safe passage.

Ashburton Road (21°39'S., 115°02'E.) is an open roadstead about 6 miles W of Beadon Point; it provides anchorage, in depths of 7 to 9m, sand and coral, but this anchorage is not recommended during the cyclone season, from December to April. See the table titled **Ashburton Road** for all designated

anchorages. The pilot boards in position 21°35.84'S 115°00.50'E.

Ashburton Road Anchorages	
Designation	**Center position with 0.22 mile radius swing circle**
A1	21°32.31'S 114°57.45'E
A2	21°32.32'S 114°57.94'E
A3	21°32.32'S 114°58.43'E
A4	21°32.78'S 114°58.45'E
A5	21°32.78'S 114°57.94'E
A6	21°32.79'S 114°58.43'E

Caution.—Four lighted production platforms stand from about 2 miles E to 3 miles SW of Ashburton Island. Spoiled ground, submerged oil and gas pipelines also lie in the road.

4.56 Roller Shoal (21°39'S., 114°56'E.), with a least depth of 1.5m, lies about 2.5 miles WNW of Entrance Point. This is the least depth in Ashburton Road.

The 10m curve lies about 6 miles offshore to a position N of Tortoise Islet; then the 10m curve lies up to 15 miles offshore to the mouth of Exmouth Gulf.

The islets and dangers along the Inner Route W of Onslow are described below.

Paroo Shoal (21°34'S., 115°00'E.), with a depth of 3.6m, is located on the S side of the Inner Route, about 7 miles NW of Beadon Point. Miles Shoal, with a depth of 3.3m, and Australind Shoal, with a depth of 3.4m, lie 2.3 and 4.5 miles W, respectively, of Paroo Shoal.

Tortoise Islet (21°35'S., 114°52'E.) is 10m high, sandy, and covered with bushes. Bowers Ledge, which dries 1.8m, lies close within the 10m curve, about 5 miles WNW of Tortoise Islet.

4.57 Bessieres Island (Anchor Islet) (21°31'S., 114°46'E.), 6 miles NW of Tortoise Islet, is 12m high, sandy, and covered with grass and a few bushes; it is surrounded by a reef which extends nearly 1 mile N and W from it. Bessieres Island Light is shown from a tower situated in the center of the islet.

Caution.—Unexploded ordnance lies in an area, with a radius of 0.5 mile, centered about 5 miles WNW of Bessieres Island, in a depth of about 60m.

An hazardous obstruction lies in position 21°13.3'S, 114°38.8'E, about 20 miles NNW of Bessieres Island. A gas pipeline extends SSE from the SBM to close E of Bessieres Island, and then continues almost due S to a point on the shore about 1 mile SW of **Rocky Point** (21°44'S., 114°51'E.).

4.58 Black Ledge (21°34'S., 114°42'E.) is awash at high water; it lies about 4 miles SW of Bessieres Island. Long Island, 12m high, formed by sand hills partly covered with vegetation, lies 6.5 miles SW of Bessieres Island; a submerged reef extends 1.25 miles N of the island.

Serrurier Island (Long Island) (21°37'S., 114°40'E.), 6.5 miles SW of Bessieres Island, is formed by sand hills partly covered with vegetation; its summit, 12m high, is located at its NW extremity. The greater part of the island is fringed by a submerged reef. Flat Islet, 8.5m high, lies 2.5 miles WSW of the N end of Serrurier Island. Peak Island, 10m high, lies 6.5 miles W of Flat Islet, and is surrounded by a coral reef.

The **Muiron Islands** (21°40'S., 114°20'E.), two in number, lie in a NE-SW direction, with the S extremity of the S island about 9 miles NW of North West Cape. The islands are encompassed by coral reefs; however, they are separated by a channel about 0.25 mile in width with depths of more than 7.3m. North Muiron Island, 19m high, is formed by irregular, sparsely vegetated, sandy ridges. There are some conspicuous reddish-colored limestone cliffs on the NW side. South Muiron Island, 18m high near the center, is formed by irregular sandy ridges, covered with coarse grass and small bushes.

Outtrim Patches, with depths of 6.4 and 8.7m, lie 2 miles E and ENE, respectively, of the N extremity of North Muiron Island.

There is an 8.2m patch 1.75 miles SE of the S extremity of South Muiron Island. A depth of 6.4m and a 10.1m shoal lie 1.25 and 3.75 miles E, respectively, of the S end of South Murion Island.

4.59 Exmouth Gulf (22°10'S., 114°19'E.) is entered between Tubridgi Point and North West Cape, 27 miles W; it is bordered on the E and S by the mainland and on the W side by the North West Cape Peninsula.

The gulf has an average width of 23 miles and recedes about 40 miles S. From a depth of 22m at its mouth, the gulf gradually shoals to mud flats at its head.

The E coast of Exmouth Gulf and off-lying waters for about 11 miles S of Tubridgi Point have not been surveyed, but the coast was seen to be low-lying and mangrove fringed. From this point to Giralia Bay, at the head of the bay, the coast is islands, sandbanks, and swamps, with the mainland 6 to 7 miles E. The charted shore is fronted with numerous shoals, islets, and reefs from the S extremity of South Muiron Island SSE for 15 miles to Y Islet, then SSW for 30 miles to the Sandalwood Peninsula at the head of Exmouth Gulf. A light is shown from the N shore of Y Islet.

The E side of the peninsula forming the W coast of Exmouth Gulf is formed of a ridge of sand hills, from 12 to 18m high, which extend along the coast SE from North West Cape to Point Murat.

Camp Hill (21°48'S., 114°10'E.), 19m high, is a sand hill 0.75 mile SSE of North West Cape. The coast from Point Murat to Heron Point, 27 miles S, is clear of mangroves and generally steeper than the rest of Exmouth Gulf.

From **Heron Point** (22°16'S., 114°08'E.) S to the head of Gales Bay, about 16 miles, the coast is low and backed by red sand hills.

Gales Bay (22°25'S., 114°11'E.) lies at the head of the gulf, on the W side of the Sandalwood Peninsula; Giralia Bay lies on the E side of the peninsula. The Centipede Mountains, 8 miles S of the N end of the Sandalwood Peninsula, are a small rocky conspicuous range of hills which rises to a height of about 107m.

The coastal waters on the W coast of Exmouth Gulf are fronted by coral reefs up to 0.5 mile offshore, from North West

Cape S to **Point Lefroy** (22°18'S., 114°11'E.), about 3.5 miles SE of Heron Point. The 11m curve lies about 1 to 1.5 miles offshore, with the exception of the S part, where the line lies up to 6 miles N of Point Lefroy.

Bay of Rest (22°17'S., 114°08'E.) is entered between Point Lefroy and Heron Point; there are depths of 5.5 to 7.3m in the entrance, but the bay is shallow and consists for the most part of drying sands.

4.60 Point Murat (Port Exmouth) (21°49'S., 114°11'E.) **(World Port Index No.** 54575**)** lies on the W side of Exmouth Gulf; the port limits are defined by a line extending from the N extremity of North West Cape, E for 4.8 miles, then S for 27.8 miles and then 231° to Point Lefroy. Within the port limits, Point Murat is located about 2.25 miles SE of North West Cape. The small town of Exmouth is situated 1 mile inland, about 8 miles SSW of Point Murat, but is not clearly visible from seaward.

A T-head jetty extends about 0.15 mile ESE from the coast close SW of Point Murat; the jetty head is 49m in length with depths of 12m alongside. Dolphins at both ends of the jetty extend the length to 320m. Light-hulled vessels are cautioned not to lie alongside overnight as sea conditions may deteriorate quickly without warning. It is recommended that vessels berth heading S, 2 to 3 hours after the start of the ebb, making use of the port anchor; the ebb current sets the vessel onto the jetty.

The jetty is situated within a restricted area and prior permission is required before entering it.

Pilotage.—Pilots may be arranged through the Port Authority, Fremantle. The pilot embarks 1 mile NE of Point Murat Jetty. The ETA of a vessel should be sent 24 hours in advance.

4.61 Learmonth (22°13'S., 114°05'E.), 24 miles S of Point Murat, in the S part of the port area, there is a jetty, known as Wapet Jetty, which extends about 183m from the coast. A group of fuel tanks at the root of the jetty is prominent. A fish factory, about 0.8 mile NW of the jetty, and a solar observatory, about 0.5 mile SSE of the jetty, are conspicuous.

Bundegi Reef, with depths of less than 1.4m, lies 2 miles SSW of Point Murat; it is steep-to on its E side. Cooper Shoal, with a least depth of 2.7m, lies 14.5 miles S of Point Murat. Camplin Shoal, with a depth of 8.2m, lies 1.5 miles WSW of Cooper Shoal. Bennet Shoal, with a depth of 6.4m, and Stewart Shoal, with a depth of 4.3m, lie 4 and 8 miles SW, respectively, of Cooper Shoal. Wapet Shoal, with a least depth of 1.9m, lies 1.75 miles E of Wapet Jetty.

Anchorages.—In general, the holding ground in the anchorages of Exmouth Gulf is good, with fine brown sand having almost the consistency of mud.

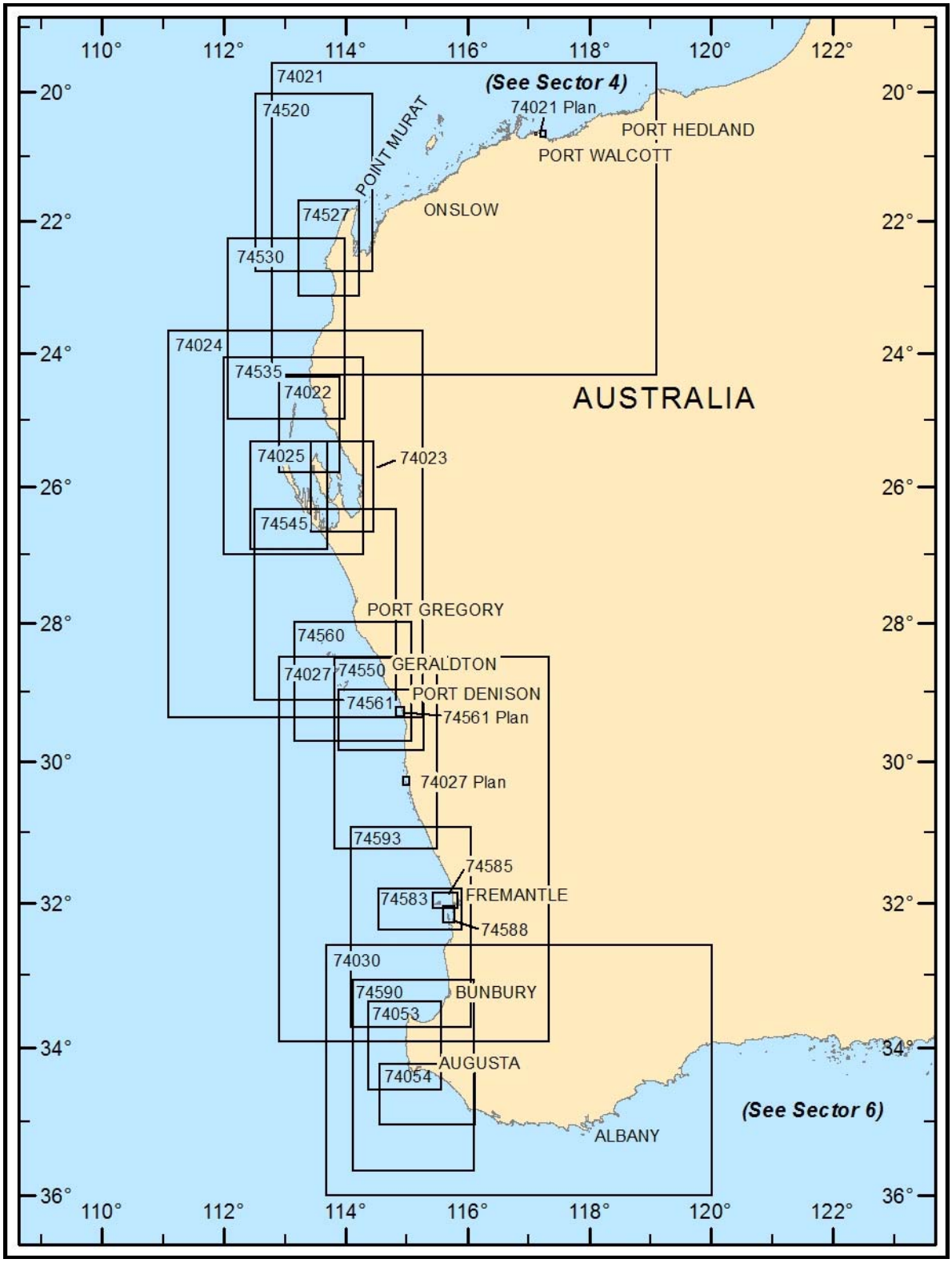
4.62 North West Cape (21°47'S., 114°10'E.) is a low sandy point at the N extremity of the peninsula forming the W side of Exmouth Gulf. North West Reef, which dries 1.2m, lies 2 miles N of North West Cape. The seas generally break heavily on the reef and there are heavy tide rips between the reef and the cape; vessels should pass well outside the reef.

North West Cape Light is shown at an elevation of 137m from a radio tower, one of a group up to 392m high, standing 1.75 miles S of the cape. The radio towers are very conspicuous, visually and on radar, by day and night.

4.63 Eskdale Oil Field (21°23'S., 113°49'E.) is situated approximately 31 miles NW of North West Cape. The area has an obstruction, enclosed by a danger circle, with a depth of 40m.

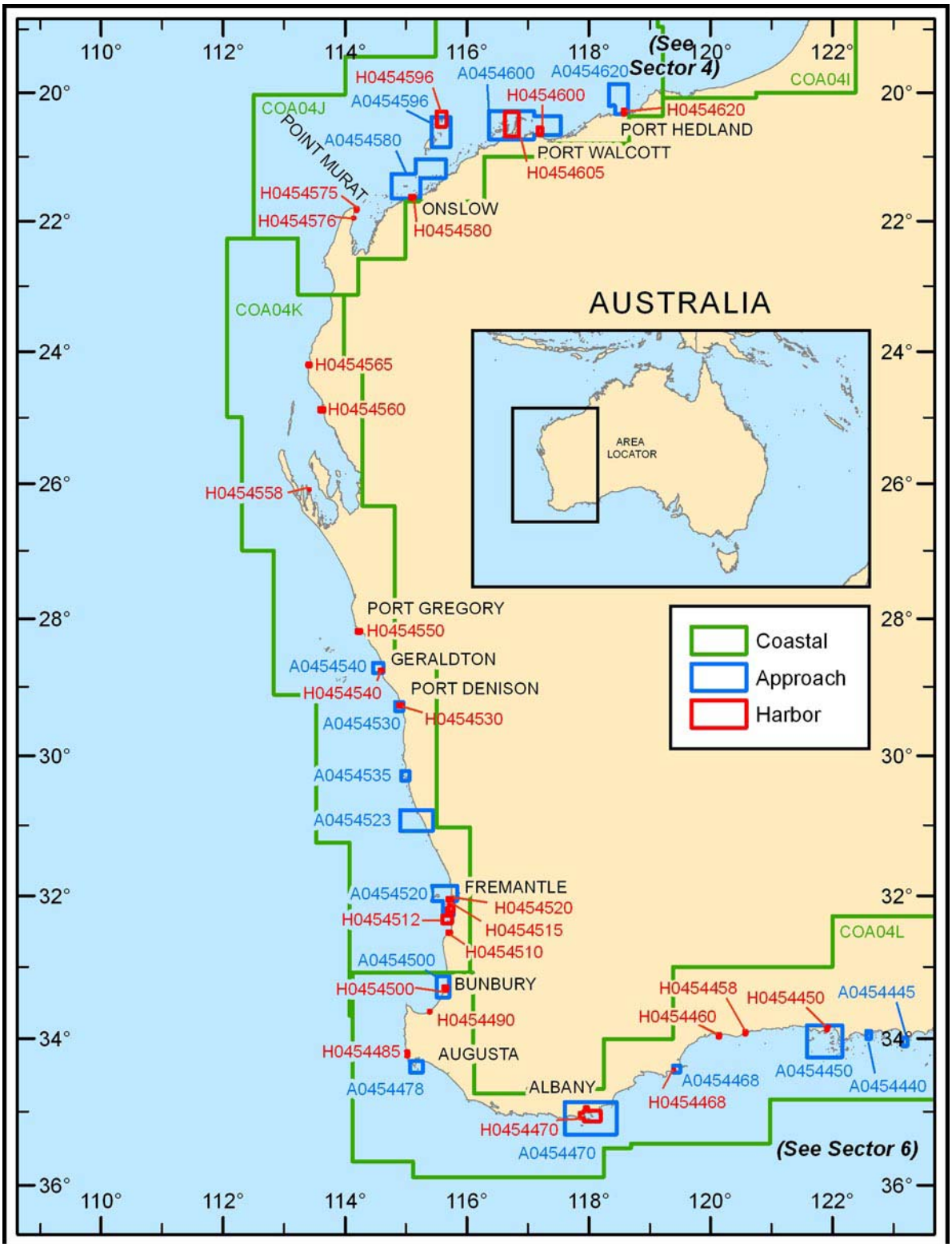
Vincent Oil Field (21°28'S., 113°50'E.) is situated approximately 20 miles NW of North West Cape. The area is surrounded by a 2.5-mile wide cautionary zone.

Enfield Oil Field (21°29'S., 113°59'E.) is situated near Vincent and Van Gogh Oil Fields; the FPSO Nganhurra is located here. The area is surrounded by a 2.5-mile wide cautionary zone in which fishing, anchoring, and navigating are prohibited.



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

SECTOR **5** — CHART INFORMATION



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SECTOR 5 — DNC LIBRARY INFORMATION

SECTOR 5

WEST COAST OF AUSTRALIA—NORTH WEST CAPE TO CAPE LEEUWIN

Plan.—This sector describes the W coast of Australia from North West Cape to Cape Leeuwin. The sector includes the ports of Cape Cuvier, Shark Bay, Carnarvon, Geraldton, Fremantle, and Bunbury. The descriptive sequence is from N to S.

General Remarks

5.1 The coast of Australia from North West Cape, 755 miles SSE to Cape Leeuwin, is generally low, indented by a few bays and rivers, and backed in places by mangrove swamps through which water flows at high tides. In other places there are cliffs which front the coast backed by hills and rise to elevations of 244m. Near Bunbury, in the S part of this sector, there are mountains with heights to 515m about 18 miles inland and rise from an apparent level range. There are few good anchorages along this coast. Effective December 1st 2016, a Traffic Separation Scheme (TSS) has been implemented. The scheme covers the SW coast of Australia with the northern limit being off the coast of Cape Leeuwin and may best be seen on the chart.

Winds—Weather.—The winds on the W coast of Australia, between North West Cape and Cape Leeuwin, are generally from the S, usually between SSW and SSE. During the summer, the winds are almost constant from this quarter, but in the winter, their regularity is interrupted by occasional winds between N and W, which at times blow with considerable violence and are accompanied by heavy rains and misty weather.

In most seasons, the frequency of gales increases from N to S along the coast S of Shark Bay (25°35'S., 113°32'E.). A more rapid increase is to be found from N to S over the ocean in the area S of 30°S in the winter and S of 35°S in the summer.

The gales associated with tropical revolving storms are important because of their violence rather than their frequency. Gale force winds are most commonly experienced in squalls, and the more violent of these are usually associated with thunderstorms.

The severity of the gales of Cape Leeuwin, and the rapidity with which they succeed one another during the winter months, are well-known. The barometer always foretells these gales and generally begins to fall 1 or 2 days before they commence. A S current, and the rising of the water above the normal sea level, are also signs of an approaching NW gale.

Through most of the year, the driest region is a wide coastal belt from near North West Cape N to Broome.

Rainfall generally increases to the S from North West Cape; in winter there is a rapid increase to the S from Shark Bay to Cape Leeuwin. In general, rain becomes more frequent with increasing distance from the shore, though this is less noticeable S of 30°S, where the amount and frequency of rainfall increases with increasing latitude.

South of North West Cape, as the rainfall increases, its character also changes At Cape Leeuwin, the rain is spread over a longer period, from May to October, with the rain less intense, although more frequent.

At Perth, most of the rain falls in heavy showers at night. Thunderstorms occur about twice a month, during the passage of cold fronts in the wet season.

Fog is rare. In coastal waters its frequency is usually nil or less than 2 per cent. Mist or haze is more common, with visibilities of less than 5 miles reported 40 per cent of the time in the area around North West Cape in January and February.

Radiation fog, which occasionally forms towards dawn near the coast, clears quickly after sunrise.

Tides—Currents.—Between North West Cape and Cape Leeuwin, the tides are generally influenced by the winds, varying as much as 0.6m with offshore and inshore winds, with the former reducing the water level. The rise and fall varies from 0.6 to 1.5m. The higher sea level is attained in June.

There are known seasonal changes in sea level in this sector. These changes are the most noticeable where the tidal range is small. Seasonal changes can usually be seen where they exceed the range of the tide.

The currents of this sector show considerable variability, largely due to the variable wind conditions which prevail over most of the area for the greater part of the year. Caution is necessary because they may be modified or even reversed by the prevailing wind.

At distances of more than 60 miles from the coast, the predominant direction of the current is NE to E in the winter and N in the summer. Closer inshore, though there is no continuous countercurrent, clockwise turning branches of the N or NE currents in the offing set E towards the coast or S along the coast. The S set is more continuous in the winter than in the summer, especially between 28°S and Cape Leeuwin.

The mean rate of the current in the waters covered in this sector is less than 0.5 knot, but the S inshore current reaches a rate of 0.5 to 1 knot between 30°S and 32°S.

South of 30°S, there is an onshore current more often than not. This current mainly sets between NE and SE, sometimes at a rate of 1 to 2 knots, although rates in excess of 2 knots have been reported.

Between Cape Leeuwin and Cape Naturaliste, a N set at a rate of 1 knot has been experienced. In January and February, a strong E current setting towards land has been reported in the offing between Cape Leeuwin and Fremantle. A current of considerable velocity has also been experienced year round setting towards the land in the vicinity of Cape Leeuwin. A confused sea has been experienced just outside the 200m curve, with smoother water both seaward and inshore.

On detached reefs, the tidal currents usually set towards the reef from all sides during the flood tide and away from the reef during the ebb tide. The currents are particularly noticeable in the channels through the reef, where the rates may be considerable. A strong onshore current is usually experienced before the onset of NW or W gales. The possibility of onshore sets throughout the year should be kept in mind.

Caution.—Between November and June, extensive lobster fishing takes place on the continental shelf between 24°S and

34°S. When passage permits, vessels are requested to transit the area in depths greater than 200m. It has been reported that the lobster fishing can be a hazard to navigation as the buoys are numerous and unlit; the buoy lines are long and there are generally no gaps between the lines.

An obstruction was reported (2004) to lies approximately 60 miles WSW of Cape Leeuwin at the terminus of a submarine cable. A danger circle, with a radius of 1 mile, is centered on position 34°53.0'S, 114°09.0'E and marks the obstruction on the chart.

The Australia Maritime Safety Authority (AMSA) has established a network of shipping routes off its northwest coast to direct large vessels such as bulk carriers and LNG vessels trading to the major ports, into pre-defined routes that will keep them clear of existing, planned off-shore infrastructure. The fairways aim to reduce the risk of collision between transiting vessels and offshore infrastructure. such as oil and gas platforms. Use of the shipping route fairways is encouraged but not required.

North West Cape to Shark Bay

5.2 From North West Cape to False Island Point, about 9 miles SW, the coast is fronted by a coastal reef extending 0.5 to 1 mile offshore; the sea breaks heavily on this reef.

Vlaming Head (21°48'S., 114°06'E.), 3.5 miles WSW of North West Cape, is the N extremity of a conspicuous ridge of hills that extend about 50 miles SSW; it is rocky, of a rugged outline, and from 61 to 305m high. The slopes are vegetated with coarse grass and bushes. A conspicuous unused light, 12m high and made of gray concrete, stands on Vlaming Head.

Helby Bank (21°48'S., 114°01'E.), with a least depth of 14.9m, lies 4.75 miles W of Vlaming Head; the sea has been seen to break on this bank with a heavy W swell. A 4.4m shoal lies about 0.9 mile offshore, about 2.75 miles WSW of Vlaming Head. There is a 10.6m patch 3.75 miles W of Vlaming Head. The sea breaks over both these shoals occasionally.

False Island Point (21°51'S., 114°01'E.), 5.5 miles SSW of Vlaming Head, appears as an island when seen from NE or SW.

From False Island Point to Point Cloates, 55 miles SSW, a barrier reef fronts the coast; the reef lies between 1 and 3 miles offshore and should not be approached within 1 mile. Depths of 183m lie from 3 to 10 miles off this stretch of coast.

Caution—Two ODAS buoys, each with a depth of 10m, lie in close proximity to Tatabiddi Passage which can best be seen on the chart**.** One of these ODAS buoys (21°52'S., 113°54'E.) is located just to seaward of the 50m depth curve; the second ODAS buoy (21°51'S., 113°54'E.) lies just seaward of the 100m depth curve.

Point Cloates (22°43'S., 113°40'E.), which is sandy, rises to Cloates Hill, 41m high. A disused lighthouse,14m high, stands on the summit of Cloates Hill. Point Cloates Light is shown from a white hut about 0.5 mile S of the disused lighthouse.

Wealjugoo Hill (22°33'S., 113°43'E.) rises to a height of 142m about 10.5 miles NNE of Point Cloates; it is located at the S end of a ridge extending S from Vlaming Head.

5.3 **Norwegian Bay** (22°37'S., 113°39'E.) affords anchorage for vessels with local knowledge. The bay lies 7.5 miles NNW of Cloates Point. Range beacons, in line bearing 117°, lead to the anchorage; there is a least depth of 5.5m on the range and a depth of 4m close S. It was reported (1985) that the range beacons were difficult to identify and in bad repair.

Frazer Islet (22°39'S., 113°38'E.), a sandy islet, lies just within the barrier reef, 5 miles NNW of Cloates Point. Radar returns from the islet have been reported up to 12 miles. A stranded wreck and the remains of a derelict framework tower are situated on the islet.

Black Rock, a pinnacle rock 2m high, on which the sea always breaks, lies 4 miles SSW of Cloates Point Light.

Point Maud (23°07'S., 113°46'E.) is the S entrance point of a slight bay that extends 24 miles S from Cloates Point.

A radio tower stands 1.5 miles SSE of Point Maud. Entrance Hill, 85m high, lies 5.5 miles E of Cloates Point; other conspicuous hills on the range extending S to Point Maud are Camp Hill, 51m high, 6.5 miles SE of Cloates Point, and Whaleback Hill, 70m high, 6 miles farther SE. Airey Hill, 68m high, lies 7 miles NE of Point Maud.

The barrier reef follows the curve of the coast from Cloates Point S to Point Maud and lies 3 to 4 miles offshore. Passing vessels should not approach the barrier reef within a distance of 1 mile.

From Point Maud the coast trends SSW 29 miles to **Cape Farquhar** (23°38'S., 113°37'E.), which is low and sandy with a bare patch of sand. Yalobra Hill, 71m high, about 5 miles S of Point Maud, has a conspicuous sand patch on its seaward side. There is a conspicuous white sand hill at Alison Point, 12 miles NE of Cape Farquhar. Bulbarli Point is located 6 miles NE of the cape.

The barrier reef lies about 1.5 miles off the coast between Point Maud and Cape Farquhar. North Reef, with a depth of less than 1.8m, and on which the sea occasionally breaks, lies 2 miles N of Bulbarli Point.

The coast from Cape Farquhar to Red Bluff, 28 miles SSW, is low and sandy. About 10 miles N of Red Bluff, there are some red cliffs fronted by rock, the land being level.

Red Bluff (24°02'S., 113°25'E.) is level, rocky, and of a dark reddish color, rising abruptly from the sea to a height of about 91m.

Cape Cuvier (24°13'S., 113°24'E.), 12 miles S of Red Bluff, is 58m high, with light reddish cliffs, and is readily identified when seen from the N. A large dark colored storage shed stands on the cape and is conspicuous. Radar returns from Cape Cuvier and Red Bluff have been reported up to ranges of 21 and 22 miles, respectively.

Reefs, on which the seas break, extend 2 miles from the coast, from Cape Cuvier to a position 8.5 miles N. A rock, 3m high, lies on the drying reef which extends 1 mile from the cape.

5.4 **Cape Cuvier** (24°13'S., 113°24'E.) (World Port Index No. 54565) lies close within the cape. There is a port radio station at the port. The port lies within the port limits of Carnarvon.

Berthing may be delayed due to strong winds or heavy swell, and vessels may be required to return to anchor before completion of loading if the berth is affected.

Cape Cuvier

Vessels of up to 65,000 dwt and 250m in length, with drafts up to 14.4m, have been accommodated within the port.

Depths—Limitations.—The port consists of a salt-loading berth, with a depth of 15.2m alongside. There is a least depth of 18m in the approach to the wharf. Vessels secure to six mooring buoys and warp themselves into position for loading each hold.

Aspect.—A light is shown from the head of the wharf.

Pilotage.—Pilotage is compulsory; there is no night berthing. The pilot embarks about 1 mile N of the Cape Cuvier Jetty and remains on board while the vessel is at the berth. Pilotage should be requested from the Fremantle 10 days, 7 days, and 4 days prior to arrival.

Cape Cuvier—Contact Information	
Pilots	
VHF	VHF channels 6, 8, and 16
Telephone	618-995-63277
Telephone	618-994-26055
Facsimile	618-995-63205
E-mail	sbr@sbr.com.au
Port Authority	
Telephone	618-994-26003
Facsimile	618-994-26050
Web site	http://www.dampiersalt.com.au

Regulations.—The vessel's ETA should be sent to the terminal operators 10 days, 7 days, 4 days, 48 hours, 24 hours, and 12 hours in advance. The 48-hour report should include the vessel's estimated draft fore and aft.

The vessel's ETA should also be sent to the harbormaster at Carnarvon 48 hours and 24 hours in advance.

Anchorage.—Anchorage may be taken NNE of the wharf, about 1.5 miles distant, in a depth of 28m, good holding ground. It has been reported there are depths of 16m about 0.3 mile offshore, in the vicinity of the anchorage.

Point Quobba (24°29'S., 113°24'E.), 16 miles S of Cape Cuvier, is the N entrance point to Shark Bay. Three miles S of Cape Cuvier are some high sand patches. Beagle Hill, 0.5 mile E of Point Quobba, is a conspicuous sharp peak. Point Quobba Light is shown from the summit of Beagle Hill.

Shark Bay

5.5 Shark Bay (25°35'S., 113°32'E.) extends S for a distance of 130 miles from Quobba Point, and is from 20 to 50 miles wide. It is bound on the E by the mainland and on the W by Bernier Island, Dorre Island and Dirk Hartogs Island, and the peninsula of Edel Land. The S portion of the bay is divided by the Peron Peninsula into two arms; the E arm leads through Hopeless Reach to Hamelin Pool and Lharidon Bight at the head. The W arm leads through Denham Sound and Freycinet Reach into Freycinet Estuary. The N portion of the bay has depths of 18.3 to 37m.

Source: Earth Science and Image Analysis, NASA

Shark Bay

The E shore of Shark Bay, from Quobba Point, trends SSE for a distance of 26 miles to the Gascoyne River, and is mostly barren. A prominent sand patch is located 9 miles SE of Quobba Point; Whaleback Hill and South Beejaling Hill are located 1.5 and 5.5 miles, respectively, farther SE. Pelican Hill, 51m high and 6 miles S of South Beejaling Hill, is conspicuous.

Fitzroy Reefs (24°33'S., 113°24'E.), two detached dangers on which the sea always breaks, lie between 1.75 and 3.75 miles S of Beagle Hill; the NW patch has depths of less than 1.8m, while a portion of the SE patch dries.

Darwin Reefs (24°36'S., 113°26'E.), with depths of less than 1.8m, lie on the extremity of a ledge extending 4 miles SSW

from a point 4 miles SE of Beagle Hill; the sea only breaks on them in heavy weather.

Beejaling Shoals (24°39'S., 113°28'E.), with depths of 3.7 and 5.5m, lie from 3 to 4 miles WSW of Whaleback Hill; the sea only breaks on them in heavy weather. An 8.8m patch lies 5.5 miles WSW of the same hill.

Blowfish Banks (24°48'S., 113°34'E.), with depths of 4 to 8.2m, extend up to 5.5 miles offshore from a point about 5 miles N of Point Whitmore, the N entrance point of the Gascoyne River.

Geographe Channel (24°40'S., 113°16'E.), the N entrance into Shark Bay, is 21 miles wide between Point Quobba on the E and Bernier Island on the W, and has depths of 31 to 42m.

Caution.—It has been reported that a strong S current or set towards the land is experienced at times in the approach to Geographe Channel, between Cape Cuvier and Bernier Island; this usually occurs prior to W or NW winds

5.6 Bernier Island (24°52'S., 113°08'E.), on the W side of Shark Bay, is the northernmost of the three principal islands forming the W side of the bay. Bernier Island is about 15 miles long N to S and has a height of 37m. The W coast of the island consists of high perpendicular cliffs, with a level outline; the coast is steep-to, with depths of 50m being found 0.8 mile from the cliffs. Cape Rosnard Light, in a white circular steel housing, is situated on the N end of the island. Koks Islet, about 7.6m high, is located close off the N extremity of Bernier Island.

Bernier Island from SSE

Dorre Island (25°08'S., 113°06'E.) lies about 0.5 mile S of Bernier Island. The island is about 17 miles long N to S and has a height of 46m. Dorre Island has the same aspect as Bernier Island. Observation Hillock rises over Cape St. Cricq, the S extremity, and is conspicuous. A light, shown from a white hut, is situated on Observation Hillock.

Uranie Bank (25°10'S., 113°10'E.), of sand and rock, with depths of 1.8 to 4.8m, lies off the E side of Dorre Island. The S extremity of the bank extends about 11 miles E of Cape St. Cricq.

Naturaliste Channel (25°22'S., 113°00'E.), the W entrance into Shark Bay, between Dorre and Dirk Gartog Island, is 14 miles wide. Dampier Reef, with a reported depth of 3.6m and on which the sea breaks in heavy weather, lies with its E extremity about 5 miles S of Cape St. Cricq; there are strong overfalls over this danger with the W tidal current, and it should be given a wide berth. There are depths of 3.1 to 9.6m up to 9 miles ENE through S of Dampier Reef.

5.7 Carnarvon (24°53'S., 113°39'E.) **(World Port Index No.** 54560**)** lies about 23 miles within the N entrance of Shark Bay, on the E shore within the Gascoyne River. The port is closed to commercial shipping and is now used only by fishing vessels and small craft.

Depths—Limitations.—Babbage Island, in the mouth of the river, has a jetty which extends 1,500m WSW and has a berth on the N side 110m in length that will accommodate a vessel 107m in length, in depths of 5m. A harbor exists for commercial fishing boats which can accommodate 30 vessels.

Aspect.—A group of tanks stands on the N end of Babbage Island and a light is shown from the NW end of the island. An aeronautical radiobeacon and an aeronautical light are situated on the mainland, about 1.25 miles E of the root of the jetty. A conspicuous dish aerial is situated 4 miles E of Babbage Island Jetty. Radio masts, each with an elevation of 124m and each marked by a red fixed light, stand 5 miles ESE of Babbage Island Jetty. There is a Coast Radio Station at Carnarvon.

Carnarvon—Contact Information	
Port Authority	
VHF Channels	16
Telephone	618-99411830
Mobile	614-18906876
Mobile	614-07993831
Facsimile	618-99411067
Web site	http:\\www.dpi.wa.gov.au\imarine

Anchorage.—Anchorage may be taken, in 6.4m, sand, 0.5 mile W of the jetty head. Vessels with deeper draft must anchor in Gascoyne Road, some distance offshore.

Directions.—A vessel approaching Carnarvon from the N, by Geographe Channel, should give the E shore a berth of at least 8 miles to avoid the reefs and shoals off that shore; Babbage Island Light must be kept bearing less than 130° to avoid the occasional set toward the shore.

Vessels bound for Gascoyne Road or Carnarvon from the S, having passed through Naturaliste Channel, may pass on either side of Dampier Reef, steer to clear the shoals NE, E, and SE of that reef, and keep Cape St. Cricq bearing more than 260° until **Quoin Bluff North** (25°03'S., 113°06'E.) bears less than 320° to avoid Uranie Bank, then steer for Gascoyne Road, allowing for the effects of the tidal current.

In approaching the jetty from either N or S, head for a position 4 miles W of Babbage Island Light; then steer for the

jetty, keeping the light on Babbage Island open N of the light on the head of the jetty.

Carnarvon—One Mile Jetty

5.8 The E coast of Shark Bay from **Mangrove Point** (24°54'S., 113°38'E.), close S of Carnarvon, to Grey Point, 13 miles S, is low. From Grey Point to Greenough Point, 10 miles SE, there are low shores, thickly covered with mangroves and intersected by many salt water creeks; Denham Hummock, 18m high, is the central of three hummocks dominating Greenough Point.

Gascoyne Flats (25°00'S., 113°38'E.), which dry in patches, extend up to 4 miles from the coast between Mangrove Point and Greenough Point. Elbow Shoal, with a depth of 4.9m, lies 9 miles SW of Mangrove Point and 6 miles offshore.

The E shore of Shark Bay, from Greenough Point to the Wooramel River, about 42 miles SSE, is low, intersected by creeks, and lined with mangroves, through which the tide flows at a considerable distance inland in some places. A range of low sand hills extends along the greater portion of this coast; the country inland, being low and flat, is in some part subject to flooding.

From Greenough Point to Long Point, 14 miles SSE, the coast is fronted by islets lying close offshore. From Long Point to the Wooramel River, the coast is fronted by a drying bank, with shoal water extending up to 7 miles offshore.

5.9 **Hopeless Reach** (25°40'S., 113°42'E.), in the SE arm of Shark Bay, lies SE of the Cape Peron Peninsula. There are depths in the reach of 12.8 to 16.5m, sand and shell, in the fairway between the coastal banks on either side.

A fish research area is situated about 4 miles NE of Cape Peron. Pearl farms, which may be floating or fixed structures, exist in this area. They, and their associated moorings, should be avoided. The farms are generally marked by buoys and beacons which may be lit. The shallows bordering the Southern Flats, 2 miles NE of Cape Peron, are utilized for mussel cultivation. All vessels should navigate with caution in the area.

Herald Bight (25°34'S., 113°33'E.) lies close SE of Cape Peron. Herald Bluff, at the SE corner of the bight, is 39m high. A submerged ledge, with depths of less than 1.8m, extends 5 miles N from Herald Bluff.

Anchorage can be obtained in Herald Bight, in a depth of 8m, W of the ledge described above. Anchorage can also be obtained N of Herald Bight, in a depth of 12.8m, 3.75 miles ESE of Cape Peron; and in a depth of 16m, 5 miles NE of the same cape.

There are a number of islands and dangers in the bay S of Hopeless Reach which may best be seen on the chart.

Faure Island (25°51'S., 113°53'E.) lies 6 miles E of the E extremity of the Peron Peninsula; its central summit is 38m high. A narrow spit, with a least depth of 1.2m, extends 11 miles NNW from the island.

Faure Flat, on which Faure Island lies, extends almost across the width of the SE part of Shark Bay, and has depths less than 1.8m over a large portion of it; this flat extends S and connects Faure Island with Petit Point, the N extremity of the peninsula which separates Hamelin Pool and Lharidon Bight.

Disappointment Reach (25°45'S., 113°55'E.), with a least depth of 9.1m in the fairway, is the passage on the E side of Faure Island and forms the approach to Hamelin Pool. Herald Loop, with a least depth of 3.7m, leads SSE from Disappointment Reach to Hamelin Pool, which has regular depths of 7.3 to 10.1m.

Herald Gut (25°47'S., 113°45'E.), on the W side of Faure Island, lies at the N end of a narrow channel which leads S to Lharidon Bight; the bight has depths from 9.1 to 11m.

The channels which lead to Hamelin Pool and Lharidon Bight are narrow and difficult to transit; only those vessels with local knowledge should attempt passage.

Dirk Hartog Island—North Extremity

5.10 **Dirk Hartog Island** (25°51'S., 113°07'E.), which forms the SW side of Shark Bay is about 43 miles in length N to S and has a height of 185m. Cape Inscription, the N extremity of the island, is a remarkable jagged headland, 36m high. On the W side of the island, heavy breakers extend for about 1 mile from the coast between Cape Inscription and a point about 4 miles SSW, but the remainder of the coast appears to be steep-to. Quoin Head, on the W coast about 20 miles S of Cape Inscription, is a conspicuous, bold point.

Herald Heights (25°57'S., 113°06'E.), the highest peaks on the W coast, attain a height of 185m; the cliffs between them and Cape Inscription vary from 30 to 90m high. Surf Point, about 10 miles SE of Herald Heights, has a conspicuous sand hill, 107m high, 0.75 mile N of it.

Cape Ransonnet (26°10'S., 113°13'E.), the S extremity of Dirk Hartog Island, is a bare wedge-shaped, sandstone point, with two bare rocks, 2m high, close off it; there are shoal depths between the ledges extending from Surf Point and the extremity of Cape Ransonnet.

5.11 **Steep Point** (26°09'S., 113°09'E.), the NW extremity of Edel Land, consists of a bold cliff projection, 35m high, which lies 2 miles SW of Surf Point. Edel Land, S of Dirk Hartogs Island, forms the W coast of Freycinet Reach and Freycinet Estuary.

South Passage, leading from seaward to Denham Sound and Shark Bay, is about 1.5 miles wide between Steep Point and Surf Point. The entrance to the passage is obstructed by Outer Bar, which has a low water depth of 3.8 to 5.5m. The passage should not be attempted without local knowledge, and then only by small craft.

Denham Sound (25°41'S., 113°15'E.), the outer part of the SW part of Shark Bay, is entered between Cape Levillain, the NE extremity of Dirk Hartog Island, and Cape Peron, the N extremity of the Peron Peninsula, 26 miles E.

The **Peron Peninsula** (25°53'S., 113°35'E.), which forms the E coast of Denham Sound, is about 45 miles in length N to S and 12 miles in breadth at the center. A light is shown from Cape Peron, the N extremity of the Peron Peninsula. A rock, awash, was reported (1975) to lie 9 miles SW of Cape Peron.

Cape Peron Flats (25°25'S., 113°31'E.), with irregular depths of less than 9.1m, extend about 12 miles N from the cape; the shallowest part, with a depth of only 0.3m, lies about 2 miles N of the cape.

Caution.—Shoaling has been reported (1994) over this bank

5.12 Cape Lesueur (25°44'S., 113°23'E.), on the W side of the peninsula 14 miles SSW of Cape Peron, is a bright sandy bluff; Peron Hills, 43m high, are within.

From Cape Lesueur, the coast trends SSE 13 miles to Lagoon Point, which is 26m high, then S for 11 miles to Eagle Bluff, the SW extremity of the Peron Peninsula.

From Eagle Bluff, a bold sandstone cliff, 42m high, the remaining portion of the W coast of the Peron Peninsula trends SE 10 miles to **Goulet Bluff** (26°13'S., 113°40'E.), 27m high, on the W side and near the center of Taillefer Isthmus.

The W side of Denham Sound is bound by the E side of Dirk Hartog Island. The sound has general depths of 14.6 to 18.3m as far as Herald Bay. A few isolated patches of 7.3 to 9.1m, which may best be seen on the chart, lie in or near the fairway.

Turtle Bay (25°29'S., 112°58'E.), entered between Inscription Point and Cape Levillain, 3 miles ESE, provides good anchorage, in 15m, about 0.75 mile offshore. The anchorage is protected from all winds from ESE through WSW, but should be avoided during the period of NW gales which occur from May to October.

From Cape Levillain, the E coast of Dirk Hartog Island trends S 24 miles to Quoin Bluff South. The coasts consists of red cliffs, from 6.1 to 18.3m high, with occasional sandy beaches and is bordered by a reef. Quoin Bluff South is a bold projection, 27m high, that appears as a wedge-shaped island when seen from N.

Levillain Shoal (25°31'S., 113°01'E.), with a least depth of 4m and having some rocky heads with depths of less than 1.8m, on which the sea breaks at times, extends 3.5 miles from a position about 1 mile E of Cape Levillain.

Herald Bay (25°53'S., 113°09'E.), on the N side of Quoin Bluff South, provides anchorage, in a depth of 7.3m, sand and shells, about 1 mile NNW of the bluff. Depths of 4.9m and 5.8m lie 0.75 mile NW and 1.5 miles NNE, respectively, from the anchorage.

Notch Point (25°57'S., 113°08'E.) lies 3.5 miles SSE of Quoin Bluff South. There are depths of less than 5.5m for a distance of 3.5 miles NNE of Notch Point, terminating in a spit with a depth of 3.6m, which lies 2 miles E of the N side of Quoin Bluff South. A patch, with a depth of 0.9m, lies about 2 miles SE of Notch Point.

Dirk Hartog Homestead (26°00'S., 113°09'E.) is situated on a point 4 miles SSE of Notch Point.

Anchorage may be taken, in a depth of 7.3m, about 3.25 miles SE of the homestead; anchorage can also be taken in the same depth, about 1.5 miles NNE of the homestead. Care is necessary when anchoring here as the coastal bank is steep-to.

5.13 Cape Bellefin (26°01'S., 113°16'E.) lies in the S part of Denham Sound, 8 miles SE of Notch Point, and is the N extremity of Bellefin Prong, a narrow tongue of land, 62m high. Bellefin Prong forms the E side of Blind Strait.

Blind Strait (26°07'S., 113°13'E.), with depths of 7.3 to 9.1m, leads SSW from Denham Sound to South Passage, previously described in paragraph 5.11. North Sand, consisting of sand and streaks of dark seaweed, has depths of 1.2 to 1.8m and lies about 4 miles SSW of Cape Bellefin. Inner Bar has a least depth of 3.4m, coarse shells and sand. South Sand, consisting of sand and streaks of dark seaweed, has depths of 0.3 to 1.8m, and lies about 1 mile offshore on the outer edge of a flat fronting the coast of Dirk Hartog Island for a distance of 4 miles NNE of Cape Ransonnet. East Sand, of white sand, extends 1.5 miles from Bellefin Prong; it has depths of 0.6 to 1.8m and forms the E side of the N part of Blind Strait. The strait leads between the shoal water fronting the W side of Bellefin Prong and East Sand on the E and Edel Land Island to the S.

Cape Heirisson (26°01'S., 113°20'E.), the N extremity of Heirisson Prong, is located 3.5 miles E of Cape Bellefin.

Bellefin Flats (25°58'S., 113°17'E.), with a least depth of 0.3m, extends about 5 miles NNW from Cape Bellefin, joining **Heirisson Flats** (25°57'S., 113°18'E.), which has depths of less than 3.7m and some drying patches on them. Together, Bellefin Flats and Heirisson Flats extend N to a position 5 miles E of Quoin Bluff South. The channel between these spits and the coastal bank extending from Notch Point forms the N approach to Blind Strait.

Bar Flats, which occupy most of the area between Cape Lesueur and Heirisson Flats, have a least depth of 0.9m and so encumber Freycinet Reach, the channel leading from Denham Sound into Freycinet Estuary, as to render navigation difficult for other than light-draft vessels. The flats are reported to be subject to considerable change.

Denham Channel (25°57'S., 113°12'E.) is a narrow passage, about 125m, wide between Heirisson and Bar Flats. A cut dredged to a depth of 9.8m in 1979, which extends for nearly 1 mile SE from the light beacon marking the NW extremity of Heirisson Flat, gives access to Denham Channel. The cut and channel are marked by lighted beacons and unlit beacons.

A pile lighted beacon, 3 miles NNE of Cape Heirisson, marks the NE side of the S entrance to Denham Channel.

5.14 Useless Loop (26°07'S., 113°24'E.) (World Port Index No. 54555), situated on the E side of Heirisson Prong, 7 miles SSE of Cape Heirisson, is the site of a salt works.

The jetty to the salt works E of Slope Island (Topper Island) is approached through Naturaliste Channel and Denham Channel, which lead to an anchorage off the jetty.

Useless Loop lies within the port limits of Carnarvon. There is a coast radio station at Useless Loop.

Depths—Limitations.—A dolphin-type jetty is laid out in a N-S direction, 0.2 mile E of Slope Island. The jetty is 190m long between the dolphins and has a depth of 10m alongside. The berth will accommodate vessels up to 183m in length, with

a maximum beam of 25m and a maximum draft of 9.75m. A pipeline, 2.5 miles in length, extends N from Useless Loop to Slope Island.

Aspect.—A conspicuous light (29°27'S., 114°52'E.) stands on the salt works jetty.

Pilotage.—Pilotage is compulsory for the approaches to the jetty and are available only during daylight hours. Pilot boards in position 25°51'S, 113°15'E.

Useless Loop—Contact Information	
Port Authority	
VHF	VHF channels 12 and 16
Telephone	618-942-04320
Facsimile	618-942-04322
E-mail	sbr@sbr.com.au

Regulations.—The following regulations apply to arriving vessels:

1. Vessels should send their ETA to the terminal operators 72, 48, and 24 hours in advance, with any amendments being sent as soon as possible.
2. Vessels must arrive in a ballasted condition, permitting optimum ship-handling capabilities, or the vessel may be unable to berth.

Directions.—Vessels proceeding to Useless Loop enter Shark Bay by Naturaliste Channel. When Cape Inscription Light bears 218° distant about 3.5 miles, steer course 128°. When Cape Inscription Light bears 287° distant about 10 miles, alter course to 166° for the lighted beacon marking the W end of Denham Channel. Then follow the marked channel, steering to pass about 1 mile off the lighted beacon marking the E end of the channel until the lighted beacon bears 345°, distant 2.5 miles. Then steer to a position about 0.5 mile off the jetty at Slope Island.

Caution.—Strong S winds can sometimes cause abnormal low tides and may require a vessel to leave the berth prior to the completion of loading.

5.15 Henri Freycinet Harbor (Freycinet Estuary) (26°25'S., 113°43'E.) is the continuation of Freycinet Reach, and from Goulet Bluff extends 23 miles S to Disappointment Loop, the S extremity of Shark Bay. There appears to be a regular depth of water in the harbor, varying from 7.3 to 14.6m, but the approach through Freycinet Reach, as previously described, is difficult.

Caution.—Vessels are warned to proceed with caution because uncharted dangers may exist in the seaward approaches to the three entrance channels to Shark Bay.

Tidal currents enter Shark Bay by Geographe Channel and Naturaliste Channel on the flood tide, meeting near Uranie Bank; the maximum rate at spring tides is about 1.25 knots.

Shark Bay to Champion Bay

5.16 The coast from Steep Point to Zuytdorp Point, 17 miles SSE, is high and precipitous, but it has not been examined. Epineux Bay (False Entrance) lies 3 miles N of Zuytdorp Point; Dulverton Bay lies immediately N of that point.

Epineux Bay (False Entrance) (26°20'S., 113°17'E.) is a shallow inlet about 12 miles S of South Passage. As both openings take a SE direction, Epineux Bay is liable to be mistaken for South Passage when approaching from the S, but the light on Steep Point should identify South Passage.

The coast between Zuytdorp Point and the mouth of the Murchison River, about 90 miles SE, consists of a range of rocky cliffs 91 to 122m high for the first 50 miles and 183 to 244m high farther S. Zuytdorp Point was reported to be prominent on radar. The land at the cliff top is generally level and the coast is uniform, making it difficult to identify any particular part.

Mount Dorrigo (26°26'S., 113°20'E.), 35m high and 3 miles S of Zuytdorp Point, is conspicuous and **Womerangee Hill** (26°54'S., 113°47'E.), 286m high, and 40 miles SE of the same point, is prominent. This coast appears to be steep-to, with depths of 40m up to 1 mile offshore.

5.17 Gantheaume Bay (27°40'S., 114°10'E.), off the mouth of the Murchison River, is an exposed bight, with rocky and sandy shores backed by hills bearing stunted vegetation. Meanarra Hill, 203m high, stands 3 miles E of the river entrance and is prominent.

The Murchison River has a bar across the mouth, protected from the sea by a reef, which generally breaks heavily. There appears to be no passage even for a boat, except at high water, but in fine weather there is a convenient landing place under the shelter of the reef.

Meanarra Hill (27°42'S., 114°13'E.), 203m high, stands 3 miles E of the river entrance and is prominent.

Red Bluff (27°44'S., 114°09'E.), a short distance S of the Murchison River entrance, forms the N extremity of a range of reddish cliffs, about 61m high, which extend 7 miles SSW to Bluff Point. These cliffs are succeeded by a sandy shore with occasional rocky points and bays trending nearly S, 20 miles to Shoal Point. There is a dark bluff about 8 miles N of Shoal Point, and nearly midway between these are some remarkable sandhills of considerable elevation.

Shoal Point (28°07'S., 114°10'E.) is a low sandy projection, fronted with several rocks, awash, to a distance of 0.35 mile. A light is shown from a structure situated on a hill 3.5 miles NNE of the point; a racon is situated at the light. A depth of 11.5m lies 7 miles SW of Shoal Point; the edge of the charted 36.5m line, about 6 miles farther SW, is marked by tide rips.

From Shoal Point the low sandy shore trends SE about 5.5 miles to Hillock Point, the N point of Port Gregory, then 4 miles to the Hutt River entrance.

Hutt Lagoon extends from within and abreast of Shoal Point to Port Gregory about 8.5 miles distant; 0.5 mile SE of Shoal Point, the sea washes over the low sandy beach into the lagoon with heavy W gales. On the E side of Hutt Lagoon, there is a range of grassy hills attaining a height of 128m.

5.18 Port Gregory (28°11'S., 114°15'E.) is formed between the coast SE of Hillock Point and a ledge of rocks running parallel with this coast at an average distance of about 0.2 mile offshore. The main ledge of rocks which forms the

Courtesy of Geraldton Port Authority

Geraldton from E

seaward side of the port extends 2 miles ESE from Hillock Point and is about 1m high. Two detached ledges, Flat Rock and North Rock, each about 1m high, lie about 0.15 and 0.5 mile NW, respectively, of the N extremity of the main ledge.

Hero Passage, the best entrance to Port Gregory, is about 150m wide, with a least depth of 4.2m in the fairway between Flat Rock and North Rock. A shallow bank, over which the sea breaks in a heavy swell, lies nearly 0.5 mile NW of North Rock.

The position of the port can be identified by a bare white sand patch located about 0.5 mile N of Hillock Point, which is visible from a distance of 12 miles and Scrubby Hillock, close N of the same point.

Anchorage for vessels with a draft of less than 3.6m can be obtained about 0.1 mile ESE of Hillock Point, in 5.5m, rock and sand. This anchorage, between the shore and the shoal bank extending E from the ledge, does not afford sufficient room for swinging at a single anchor, so a vessel must moor with one anchor on the shoal bank and the other on the beach.

A current generally sets N through the passage, and at times may attain a rate of 3 knots. During the winter, with a succession of NW gales, the current runs in the opposite direction.

In the offing the current generally sets NW, with a maximum rate of 2 knots through most of the year; when N and NW winds prevail it runs in the opposite direction, though not so strong, but the tendency in both cases is to set a vessel toward the land.

5.19 The **Hutt River** (28°13'S., 114°18'E.) flows into the sea 4 miles SE of Hillock Point; its mouth is generally closed by a sand bar. About 3 miles NE of the river mouth there are two remarkable conical peaks, Mount Victoria and Mount Albert; the latter has an elevation of 162m and is distinguished by a conspicuous cone.

From the Hutt River, a rocky coast trends SE for a distance of 14 miles to the Bowes River. The first 10 miles has a steep, grassy ridge rising from the beach and varies from 116 to 133m high; this coast is fringed by a line of reefs extending up to 0.25 mile offshore. About 4 miles NNW of the entrance to the Bowes River are two prominent bare sand patches.

The mouth of the Bowes River is usually closed by a sand bar. The town of Northampton stands about 10 miles inland; it is connected to Geraldton by road and a railway.

Courtesy Geraldton Port Authority

Geraldton from N

For about 20 miles SE of the entrance to the Bowes River, the hills within the coast are table-topped, with perpendicular sides, varying from 183 to 244m high.

Archdeacon Ledge (28°14'S., 114°16'E.), with a least depth of 4m, lies 3 miles SSE of Port Gregory and 1 mile offshore.

From the Oakajee River, 12 miles SSE of the Bowes River, to the Buller River, there are several ledges awash; the Buller River is usually barred. There are several rocky ledges in Drummond Cove, close S of the Buller River.

Woolawar Gully (28°30'S., 114°32'E.), a narrow gap with a stream flowing through it, is 6.5 miles SE of the entrance to the Bowes River. Kings Table Hill (Table Hill), 241m high and conspicuous, stands 5 miles ENE of Woolawar Gully, and there is a grassy hill, 95m high, about 2 miles SE of the same gully.

Yellow Gully, the Oakajee River, and the Buller River lie 2.5, 6, and 9.5 miles, SSE respectively, of Woolawar Gully.

Wokatherra Hill (28°39'S., 114°39'E.), 210m high, with White Peak, 173m high, close SW of it, lies 17.5 miles SSE of the Bowes River entrance. The Moresby Range has a flat-topped peak at its S extremity, with a gap between it and Mount Fairfax, which is 185m high, and stands 24 miles SSE of the Bowes River entrance. A conspicuous television mast, 351m high, stands on Moresby Range 2.5 miles SSE of Wokatherra Hill. Wizard Peak, a conspicuous cone 215m high, is situated 7 miles SE of Mount Fairfax. There is comparatively low country between Wizard Peak and Mount Fairfax.

5.20 Sandy Point (28°41'S., 114°36'E.), the N entrance point of Champion Bay, is located 2.5 miles S of the entrance to the Buller River, with Drummond Cove (Smugglers Cove), a slight indentation in the coast, between them. The coast from Sandy Point extends 5 miles S, then W 1.5 miles to Point Moore, the SW extremity of Champion Bay.

The coastal waters from Port Gregory to Champion Bay are rather steep-to, with few charted dangers.

Champion Bay (28°44'S., 114°36'E.) is protected on its S and W sides by Point Moore and the reefs extending from it; Point Moore Reefs lie to the W of Point Moore and Four-fathom Banks extend from a position 1.75 miles NNW of Point Moore to Sandy Point.

Drying reefs extend up to 0.15 mile off Sandy Point and depths of less than 11m extend up to 1.5 miles offshore abreast this point. The Chapman River, 4 miles NE of Point Moore, is generally closed by a sand bar. A spoil ground lies centered 0.5 mile offshore, about 1 mile SW of the Chapman River.

A conspicuous radio tower, 76m high, stands about 0.5 mile S of the entrance to the river. A light is shown at Point Moore and an aeronautical radiobeacon is situated about 6.5 miles ESE of the point.

Vessels approaching Champion Bay may easily identify the locality by Mount Fairfax and Wizard Peak, which have been described in paragraph 5.19, if the landmarks are not capped with clouds.

Geraldton (28°47'S., 114°36'E.)

World Port Index No. 54540

5.21 Geraldton is situated on Australia's W coast, approximately 200 miles NNW of Perth in the SE corner of Chapman Bay and has a harbor which is protected by breakwaters. There is anchorage in Chapman Bay.

The port serves as a tanker terminal and supply platform for offshore rigs, and handles bulk grain, copper ore, talc, general cargo, and livestock for export.

Geraldton Port Authority Home Page

https://www.midwestports.com.au

Winds—Weather.—During the summer, prevailing winds are from the SE, and from May to November gales sometime blow with great strength from the NW through N to E. With a falling barometer, accompanied by an unusual rise in the sea level, a NW gale may be expected.

Tides—Currents.—The tides at high water springs are 1.1m. The sea level is greatly influenced by the winds. The land breezes, which prevail during the summer months from midnight to about 0900 or 1000, cause the lowest levels; W and NW winds, being more prevalent during the winter months, cause the highest levels. There is an unusual rise of the water before a NW gale, and during the continuance of the gale, the sea level remains from 0.9 to 1.2m above its ordinary level. The sea level is correspondingly lowered during S winds, with a maximum of 0.6m below datum having been recorded.

The currents during the summer months set in a N direction while during the winter months the currents set in a S direction; the ocean swell, however, being generally from the W, has a tendency to set a vessel toward the coast. Swells of up to 6m have been recorded in the seaward entrance to the outer approach channel.

Depths—Limitations.—The approach to Geraldton Harbor is through Champion Bay. The fairway through the reefs, which is indicated by a range and marked by buoys, leads into a dredged entrance channel, which is maintained to a depth of 12.5 to 14.8m, as shown on the chart. The channel then leads between the breakwaters into the harbor basin, which is maintained to a depth of 12.4m. Charted depths are based upon Lowest Astronomical Tide (LAT).

A channel, dredged to a depth of 3.2m and indicated by a range leads from the harbor entrance W along the S side of the W breakwater to a fishing harbor. There is a marina, with depths of 2.4m, situated in the SW part of the fishing harbor.

Vessels up to 225m in length, a width of 33m, with draft as deep as 12m, can be accommodated within the port.

Berth 7 began servicing Panamax Iron Ore vessels in October of 2012. Special requirements are in place regarding surge event limitations for mooring as well as specific mooring line configurations for this berth. It is recommended that the port authority website be checked for such limitations prior to arrival to ensure for the latest information is acquired for planning purposes.

Berth characteristics are given in the accompanying table titled **Geraldton—Berth Characteristics**.

Geraldton—Berth Characteristics

Berth	Utilization	Length	Depth
No. 1	Small Vessels	50m	8.7m
No. 2	Multi-Purpose/ Vessel Layup	225m	9.7m
No. 3	Grain, Layup after grain season, Self-Discharging mineral vessels	225m	12.9m
No. 4	Minerals, Fertilizer	225m	11.7m
No. 5	Iron Ore	225m	12.3m
No. 6	General and breakbulk cargo, Livestock, Fertilizer, Minerals, Fuel, able to utilize Rotainer Operations	190m	12.4m
No. 7	Iron Ore	250m	13.1m

Aspect.—A radio mast 0.5 mile S of the mouth of the Chapman River is conspicuous. Scott Hill (Mount Scott), 40m high and 2 miles E of Point Moore, is prominent on the skyline and a conspicuous rectangular silo, 58m high, stands about 1 mile W of Scott Hill.

Pilotage.—Pilotage is compulsory for vessels over 35m LOA and vessels larger than 150 gt. Pilots usually embark in the approach about 3 miles NW of Point Moore Light; if weather conditions prevent the pilot boat from reaching this position, the port authority will advise where the pilot will board. The pilot boarding positions are, as follows:

a. Boarding Position A—28°45.5'S, 114°30.9'E.
b. Boarding Position B—28°41.8'S, 114°32.5'E.

The vessel's ETA is required 48 hours, 24 hours, and 6 hours before arrival. The 48-hour ETA notice should include the vessel's maximum draft fore and aft. Vessels should advise ETD 12 and 4 hours before departure. If stay is less than 12 hours, ETD should be advised 1 hour after arrival and confirmed 2 hours before departure.

Regulations.—As a general rule, the berthing priority is based on the order of arrival at the pilot boarding ground or designated anchorage. Arriving vessels can get the latest

information regarding Berth Priority from the port authority website. Tankers are berthed during daylight hours only.

A Quarantine Pre-Arrival Report (QPAR) for is to be submitted to Australian Quarantine and Inspection Service (AQIS) no more than 48 hours and no less than 12 hours prior to the vessel's arrival in Australia.

Contact Information.—See accompanying table titled **Geraldton—Contact Information**.

Geraldton—Contact Information	
Pilots	
VHF	VHF channels 6, 11 and 16
Telephone	618-996-40505 (Duty Pilot)
Port Authority	
Telephone	618-996-40520
Facsimile	618-996-40555
E-mail	mail@gpa.wa.gov.au
Harbormaster	
Telephone	618-996-40547
Facsimile	618-996-40548
E-mail	harbourmaster@gpa.wa.gov.au

Anchorage.—There are many outer anchorages off Geraldton, named and positioned as described in the table titled Geraldton Port—Anchorages.

Geraldton Port—Anchorages		
Name	Center Position	
	Latitude	Longitude
S1	28° 47.0' S	114° 32.0' E
S2	28° 47.5' S	114° 31.0' E
A1	28° 44.3' S	114° 33.0' E
A2	28° 44.3' S	114° 32.0 'E
A3	28° 44.3' S	114° 31.0' E
A4	28° 44.3' S	114° 30.0' E
A5	28° 43.5' S	114° 32.5' E
A6	28° 43.5' S	114° 31.5' E
A7	28° 43.5' S	114° 30.5' E
A8	28° 43.5' S	114° 29.5' E
A9	28° 42.7' S	114° 33.0' E
A10	28° 42.7' S	114° 32.0' E
A11	28° 42.7' S	114° 31.0' E
A12	28° 42.7' S	114° 30.0' E
B13	28° 41.0' S	114° 33.5' E
B14	28° 41.0' S	114° 32.5' E
B15	28° 41.0' S	114° 31.5' E
B16	28° 41.0' S	114° 30.5' E
B17	28° 41.0' S	114° 29.5' E
B18	28° 40.0' S	114° 33.5' E
B19	28° 40.0' S	114° 32.5' E
B20	28° 40.0' S	114° 31.5' E
B21	28° 40.0' S	114° 30.5' E
B22	28° 40.0' S	114° 29.5' E
QN	28° 42.5' S	114° 35.6' E

Anchorages will be assigned, based on vessel size, expected time of stay at anchor, other vessels at anchor, other vessel movements and the current and expected weather conditions.

Caution.—Swells up to 6m high have been observed in the approaches to the outer channel; at such times deep laden vessels should not attempt to enter.

During W weather, the sea breaks in depths of 7.3m and less, and vessels are not to proceed inside the pilot boarding grounds without instructions from harbor authorities.

A wreck lies at the NE edge of the swinging circle radius for anchorage A1, in depths of 9.1m, and can best be seen on the chart.

Houtman Abrolhos

5.22 Houtman Abrolhos (28°39'S., 113°47'E.) consists of three groups of islets and rocks, surrounded by reefs, extending NNW-SSE about 49 miles, with a breadth of 10 to 13 miles. They lie about 30 miles offshore and are separated from the mainland by Geelvink Channel.

The basis of all these islands, rocks, and reefs is limestone, consisting chiefly of coral and shells; the islets on the E side of Easter and Pelsaert Groups are merely ridges of dead coral and shells, while those on the W side are flat blocks of limestone, about 1.5m high, covered by stunted vegetation.

On their E sides, the islets rise steeply from depths of about 45m; on their W sides, the barrier reef is steep-to off Pelsaert Group, but becomes increasingly less steep-to farther N, off Easter Group and Wallabi Group. There are off-lying dangers NW of Easter Group and W of West Wallabi Islet.

Zeewyck Channel and Middle Channel, between the groups, have a generally flat sandy bottom, with depths from 40 to 60m.

The passage between North Islet and Wallabi Group contains many dangers; local knowledge is advised and a sharp lookout is essential.

5.23 Wallabi Group (28°22'S., 113°42'E.) lies at the N end of Houtman Abrolhos group; it is comprised of North Island, East Wallabi Islet, West Wallabi Islet, and several islets and rocks, mostly connected by reefs.

North Island is on the E edge of a reef that extends 2.5 miles N and 4.5 miles S. A light is situated on the island.

An oval-shaped bank, with a least depth of 11.4m, lies about 13 miles NW of North Island; heavy breakers have been observed on the shoal during bad weather. An isolated coral patch, with a depth of 16.3m, lies 11 miles NNW of North Island.

East Wallabi Islet and West Wallabi Islet lie 11 miles SE and SSE, respectively, from North Island. The islets lie in the central part of a reef about 8 miles in length N to S and a width of 12 miles. East Wallabi Islet, 15m high, has been reported to give radar returns up to 20 miles.

North East Reef (28°25'S., 113°49'E.), awash and which often breaks, lies about 3.75 miles ENE of East Wallabi Islet. Acute Bank, with a depth of 14.3m, lies 2 miles N of North East Reef. Beagle Knoll, with a depth of 12.8m, and Assail Bank, with a depth of 10.6m, lie 5 miles and 7.5 miles NW, respectively, of the reef.

Morning Reef and Noon Reef, about 4 miles ESE and SSE, respectively, from East Wallabi Islet, form the SE extremity of the Wallabi Group and are separated from each other by a clear passage up to 0.5 mile wide, with depths from 35 to 42m. Broken ground extending 0.6 mile SW of the S extremity of Morning Reef constricts the width of the channel to about 0.3 mile.

Morning Reef has several islets on it and the historic wreck of a vessel lies on its S extremity. A light is shown from Eastern Island, close to the reef's NE extremity. Noon Reef has numerous islets and rocks on it and is separated from the reefs joining the two Wallabi Islets by two narrow channels which enclose a large triangular reef, the E side of the reef forming the W boundary of a lagoon. A light is shown from Dick Island, in the reef's S part. Evening Reef, a circular patch of rocks, underwater and awash, which always break, is located 6 miles SSW from East Wallabi Islet and forms the S extremity of the Wallabi Group.

Recruit Bay, protected on the W by East Wallabi Islet, affords anchorage to small vessels with local knowledge, in a depth of 22m. The bay is encumbered by numerous coral patches.

5.24 Easter Group (28°43'S., 113°47'E.) lies SSE of the Wallabi Group and is separated from that group by Middle Channel, with a least width of 6 miles between Evening Reef and the dangers NW of Easter Group, and general depths from 42 to 60m, sand bottom in the fairway. A reported depth of 23.2m lies 4 miles ESE of Evening Reef.

Rat Island (Rat Islet) (28°43'S., 113°47'E.), about 2m high and the largest of the Easter Group, lies nearly in the center of a lagoon which is entered through Good Friday Bay, N of the islet. The reefs which surround Rat Island extend about 3 miles N of the island and about 7 miles in all other directions; the reefs may best be seen on the chart.

Good Friday Bay, including its entrance from the N, is bordered on both sides by reefs. A steep-to 5.5m patch lies 4 miles N of Rat Island.

Good Friday Bay is a secure anchorage, but local knowledge is desirable. The anchorage, in 24 to 27.5m, lies about 0.35 mile NE of the jetty head on the NE side of Rat Island. There are several patches in the vicinity of the anchorage and scattered throughout the navigable waters between Rat Island and the E side of Easter Group.

Dart Shoal (28°40'S., 113°54'E.), with a depth of 7.6m, lies 1 mile E of Easter Group.

Snapper Bank (28°41'S., 114°00'E.), with a least depth of 8.2m, coral, is 5.75 miles ESE of Dart Shoal.

5.25 Pelsaert Group (Pelsart Group) (28°55'S., 113°55'E.) is separated from the Easter Group by Zeewyk Channel, which is about 4 miles wide in the narrowest part and has depths of 40 to 60m in the fairway. A shoal, with a least depth of 5.4m, lies at the S side of the channel, 10 miles N of Wreck Point Light. Shoal patches, with depths of 3.4 and 6.7m, lie 1 mile and 0.5 mile N of Wreck Point.

The main body of the Pelsaert Group is triangular in shape, and encloses a lagoon which has its opening on the N side. Middle Islet lies in the middle of the lagoon and Square Islet, which is easily identified, lies 2 miles ENE of Middle Islet.

The **Mangrove Islets** (28°52'S., 113°59'E.) lie about 2 to 3 miles NE of Square Islet and form the E entrance to the lagoon; they are surrounded by reefs and rocks, awash in places.

Pelsaert Islet forms the greater part of the E side of the lagoon. The islet is a narrow ridge of coral about 6 miles long, and terminates at Wreck Point. Wreck Point Light is shown from a white metal column.

The SW and W barrier of Pelsaert Lagoon is formed by a narrow reef which extends about 11.5 miles NW of Wreck Point.

Batavia Road is formed by a slight curve in the SE part of Pelsaert Islet. Temporary anchorage, with local knowledge, may be taken in the road, in depths of 22 to 24m, sheltered from winds between SSE through W to about NE. A coral patch, with a depth of 3.7m, lies 0.75 mile N of Wreck Point.

Hummock Islet (28°48'S., 114°03'E.), 9.5 miles NE of Middle Islet, has a small mound 5m high on its SE extremity; a reef, with depths of less than 1.8m, surrounds the islet. A light is shown on the islet.

King Reef, with depths of less than 9.1m and on which the sea seldom breaks, lies 2.75 miles SSE of Hummock Islet; other shoal patches, some of which have been previously mentioned, lie to the E in Geelvink Channel.

5.26 Geelvink Channel (28°45'S., 114°15'E.), between Houtman Abrolhos and the mainland, from Shoal Point to Champion Bay, is about 30 miles wide, with depths of 19 to 48m, over a bottom of sand and shell. Mid Reef lies in the channel 23 miles W of Point Moore Light; the reef consists of at least two rocks awash. Another submerged rock which breaks is located approximately 2 miles SW of Mid Reef. There are shoal depths of 8.6, 9.1, and 10.1m 4.5 miles NNW, 1.25 miles ENE, and 3 miles WNW, respectively, from Mid Reef. Other shoal patches in this vicinity may be seen on the chart. Mariners are requested to navigate with caution when passing the shellfish cultivation area, best seen on chart.

Turtle Dove Shoal (29°21'S., 114°12'E.) has a least depth of 9.1m. It is composed of coral and sand, and can be seen easily on sunny days with clear water. Breakers, 12m high, have been observed over the shoal, and blind rollers higher than this have been seen on its edge. The sea breaks heavily at times on Turtle Dove Shoal; less water than charted probably exists on this shoal. Clio Bank, with a depth of 25.3m, lies 4 miles NNE of this shoal.

Pelsaert Bank (29°27'S., 114°14'E.) has charted depths of 33 to 55m, coarse sand, coral and shell; it is probable that less depths exist on the bank. The least known depth, 33m, lies 6 miles SSE of the 9.1m patch on Turtle Dove Shoal and a depth of 29.6m lies 15 miles SSE of the 33m depth. Areas of broken ground, rising from a general depth of 49m to a least depth of 32m, lie E of the Pelsaert Bank.

Champion Bay to Fremantle

5.27 The coast from Point Moore trends 5.5 miles SSE to Cape Burney, which is smooth and of moderate height, then 29 miles SE to Leander Point. A conspicuous water tower stands about 3 miles ESE of Point Moore.

From Cape Burney to Leander Point, the coast is formed of sand hills varying from 40 to 92m high; inland there are several scattered table-topped hills upwards of 244m high. Mount Hill, with an elevation of 182m, stands 15.5 miles N of Leander Point; Mount Horner, a conical peak 241m high; is 13 miles NE of the same point.

From Point Moore to abreast Cape Burney, the shore is fronted by reefs up to 2 miles offshore. The coastal reefs lie between 9 and 15 miles SE of Cape Burney and again from a position 20 miles SE of the cape they continue nearly to Leander Point.

African Reef (28°58'S., 114°37'E.) lies between 5 and 7 miles S of Cape Burney. The least depth over the reef is a 2m patch located 4 miles offshore; a patch of greater extent, with a least depth of 2.2m, lies on the reef 1.75 miles offshore and a historic wreck in 28°58'6"S., 114°36'30"E. The sea breaks over the reef in moderate to heavy swell.

Between Point Moore and Freshwater Point, 53 miles SSE, the coastal waters have not been fully examined inshore of the 30m curve; uncharted shoals may exist within this area and mariners should not enter it without local knowledge.

North Bank (29°12'S., 114°52'E.) lies with its S extremity 2 miles WNW of Leander Point; from this position it extends about 7.5 miles N and has several patches on it with depths of less than 1.8 to 5.5m. The sea generally breaks on portions of North Bank, especially in a swell.

Irwin Reef extends about 3 miles S from a position 3 miles WSW of Leander Point; the sea usually breaks in places. The reef forms the S side of Main Passage.

Leander Point (29°17'S., 114°55'E.), low and rocky, with an elevation of 10m, lies 34 miles SSE of Champion Bay. Reefs, which dry 0.3m with offshore winds, extend 0.3 mile NNW from the point.

5.28 **Port Denison** (Dongara) (29°16'S., 114°55'E.) is a fishing boat harbor enclosed by breakwaters close NE of Leander Point. There are two small jetties within the harbor. Depths in the harbor range from 5.8m in the entrance to 2m in the middle. The harbor provides moorings for a crayfishing fleet, for craft up to 25m in length.

The approach to the harbor is made through Main Passage, which is about 1.25 miles wide and lies between the S limit of North Bank and the N extremity of Irwin Reef. There are depths of 11 to 14.6m in the passage, except for an 8.8m patch lying almost in mid-channel about 2.25 miles W of Leander Point. Main Passage is indicated by a range. To enter the harbor vessels pass N of Leander Point and turn onto the range, which leads in a S direction between the breakwaters.

Anchorage may be found NE of the harbor entrance, but it is unsafe in winter or with strong winds from NW or W. Anchorage, in 15.5m, good holding ground, may be found 1.25 miles SW of Leander Point.

Leander Reef (29°23'S., 114°50'E.) lies about 9 miles SW of Leander Point and about 7 miles offshore; the sea generally breaks over it. The reef extends S for at least 1.25 miles.

From Leander Point, the coast trends S for 7.5 miles to White Point, a bare sandy projection, then 8 miles S to Cliff Head, 42m high, which has conspicuous dark cliffs. Freshwater Point, 5 miles S of Cliff Head, is a limestone cliff. A light is shown from Freshwater Point. Knobby Head, 82m high, is located 3 miles S of Freshwater Point.

An oil production platform is situated off the coast of Cliff Head in approximate position 29°27'S, 114°52'E.

The **Beagle Islets** (29°49'S., 114°52'E.), about 7.6m high, lie SSW of Knobby Head, about 5 miles offshore. Breakers have been reported about 2 miles NW of the two islets. It was reported that these islets are inhabited by seals and are a nature reserve.

Caution.—From the coast opposite the Beagle Islets to North Head, 22 miles S, numerous limestone reefs, with depths of less than 1m, extend up to 3 miles offshore.

A dangerous wreck lies about 0.8 mile SSW of the islets.

5.29 From **Knobby Head** (29°40'S., 114°58'E.) to Green Head, 24 miles S, the coast recedes a little and is lower. About 6 miles SE of Knobby Head is Woodada Hill (Wudada Hill), 98m high, the N end of a range 12 miles in length with a hill 106m high, near its S extremity. To the S of this range, the hills join those E of Jurien Bay. The coast for about 16 miles N of Green Head is low with moderate cliffs; Green Head is a round grassy-topped hillock, 29m high. Snag Islet, 6m high, lies 8 miles N of Green Head and close offshore. Drummond Rock, above water, lies 0.5 mile S of Snag Islet. A range shown at Leeman indicates a passage between Snag Islet and Drummond Rock.

Anchorage.—Green Head Anchorage, which is well-protected, is located about 1 mile N of Green Head. The approach is indicated by two ranges and has a least depth of 3.1m. There is a jetty, with a refueling dolphin at the anchorage, which is used by fishing vessels.

The **Fisherman Islets** (30°08'S., 114°57'E.), 10m high, lie nearly 3 miles offshore, 4 miles S of Green Head. The tops of the islets are covered with grass and scrub.

There is a remarkable sandy patch midway between Green Head and Sandy Point, 7 miles S. The coast for about 1.5 miles S of Sandy Point consists of bare ridges, terminating in a slight sandy projection. There are three indentations between Sandy Point and North Head, 3 miles to the S.

North Head (30°14'S., 115°00'E.), 21m high, is the N entrance to Jurien Bay. Middle Head, 15.5m high, is in the center of the bay, 3 miles SE of North Head. The hills S of Middle Head become much lower and the shore trends gradually round to Island Point, 4.5m high, the S extremity of the bay.

5.30 **Mount Peron** (30°07'S., 115°09'E.), 275m high, and Mount Lesueur, 309m high, are two conspicuous table-topped mountains located 10 miles NE and ENE, respectively, of North Head. Mount Benia, 14 miles E of North Head, is 257m high.

The coast from Leander Point to Jurien Bay is encumbered by rocks and reefs extending to 7 miles offshore.

Jurien Bay (30°17'S., 115°01'E.) is entered between North Head and Island Point, 5.5 miles SSE; it is protected on its S and SW sides by several islets and reefs which extend up to 4 miles offshore. North Tail is the N extremity of a rocky ledge, awash, which lies 2.5 miles SSW of North Head. A shoal, which breaks in a heavy swell, lies about 1 mile NE of North Tail.

Seaward Ledge, which dries, lies 2 miles S of North Tail; submerged rocks, with a least depth of 2.7m, on which the sea breaks at uncertain intervals, extend 1.5 miles S of Seaward Ledge. Favorite Island, 14m high, is located 2.25 miles NNW of Island Point, about 2 miles offshore.

Boullanger Island (Long Island) (30°19'S., 115°00'E.), 7m high, lies 0.75 mile W of Island Point. The island is covered with grass and scrub. An islet, 10m high, lies close off the N extremity.

Whitlock Island, 9m high at its S end, lies 0.25 mile SW of Boullanger Island, to which it is joined at low water. Tern Islet, 3.7m high, lies 0.3 mile N of Whitlock Island; foul ground, with some drying patches, extends from the islet NNE to Favorite Island.

Anchorage can be obtained in Jurien Bay, in a depth of 9m, about 0.75 mile NE of Favorite Island, sand and rock. A rock has been reported to lie about 0.5 mile NNE of the same island. Anchorage within the bar is available to vessels of not more than 3.6m draft, about 1.25 miles ESE of Favorite Island, in a depth of 11m. Lights, in range bearing 111.5°, are situated on shore about 0.7 mile SSE of Middle Head; the approach to the anchorages should be made on this range.

Jurien Boat Harbor is situated about 0.75 mile S of the front range light and is protected by breakwaters. Range lights situated in the SW corner of the harbor lead over the sand bar which fronts the harbor entrance.

5.31 From Jurien Bay, the coast trends SSE about 42 miles to Lancelin Islet, which is 16m high, and covered with grass; the islet lies about 0.5 mile offshore.

There are several conspicuous hills on this coast, the most prominent being Molah Hill, 64m high, located 5.5 miles SSE of Island Point. About 1 mile further SSE there is a bare sand hill, with a dome-shaped top, 57m high. Cowalla Peak (North Namban Flat), a conical hill, 241m high, lies about 13 miles ESE of Island Point.

Thirsty Point (30°31'S., 115°03'E.) is a low scrubby point located 12 miles S of Island Point. The land E of Thirsty Point rises suddenly, and about 2 miles inland, SE of the point, there is a long range of sandhills, with two remarkable dark bushy summits, North and South Hummocks, 120m and 121m high, respectively, near the S end. From near South Hummock, the ridges continue SSE for about 11 miles, covered with grass and shrub, the highest point, 157m high, being 5.5 miles SSE of South Hummock. A conspicuous sand patch lies 1 mile NNE of North Hummock.

A prominent sandy point is located about 20 miles S of Thirsty Point; from this sandy point an extensive tract of bare sand stretches along the coast for about 6 miles, extending inland about 3 miles to a sand ridge that attains a height of 133m. There are several conspicuous sand patches in this locality.

The coastal waters S of Jurien Bay are encumbered with many rocks and reefs; the shoals lie up to 3 miles offshore, from Island Point to Lancelin Islet.

Escape Island (30°20'S., 115°00'E.), 12m high, lies 2 miles WSW of Island Point, and is covered with grass and scrub. A light, shown from a 24m high metal framework tower, is situated near the center of the island.

Caution.—A local magnetic anomaly was observed in a position 8 miles WNW of Escape Island.

5.32 The **Cervantes Islets** (30°32'S., 115°02'E.) lie close off Thirsty Point; reefs extend 1.5 miles W from them. Several above-water rocks and ledges, which dry, extend 5 miles NW from Thirsty Point; the outer rock lies 5 miles offshore.

Ronsard Bay is 1.75 miles NNE of Thirsty Point; boats may land there in moderate weather. A range is shown from the head of the bay which has a least depth of 3m up to about 1.25 miles from the front range light.

A rock, 2m high, lies 4 miles S of the Cervantes Islets, about 2 miles offshore.

The **Green Islets** (30°41'S., 115°06'E.), two in number, lie 10 miles SSE of the Cervantes Islets and 1.75 miles offshore. Red Rock, 3m high, lies 1.5 miles SE of the Green Islets; from it a chain of reefs extend SSE to a position 0.5 mile from Wedge Islet. Flat Rock, 4.25 miles NNW of Wedge Islet and 0.5 mile offshore, is 12m high.

Wedge Islet (30°50'S., 115°11'E.), 21m high, is perpendicular on its S side, but slopes gradually N; in fine weather, landing can be made on the NE side of the islet. The inshore waters between Wedge Islet and the approaches to Fremantle have been incompletely surveyed and caution should be exercised accordingly. A tower, from which fixed red obstruction lights are occasionally shown, stands on the mainland, about 2.5 miles ESE of Wedge Island.

Numerous beacons and towers, some of which carry red obstruction lights, stand up to 2 miles inshore within an area which extends 8 miles SSE from Wedge Island.

Lancelin Islet (31°00'S., 115°19'E.), 17m high and covered with grass, lies 13 miles SSE of Wedge Islet, 0.5 mile offshore; on its E side there is a small sandy beach which affords safe landing.

Lancelin Islet Anchorage Range Lights are situated on the mainland about 1 mile NE of the islet. These lights are in range, bearing 075.5°. The anchorage should only be used by vessels with local knowledge. There are three small jetties at Lancelin, about 0.5 mile SE of Lancelin Islet. A military exercise area is situated along the coast N of Lancelin.

There is a fairly constant S or SE current, from about 30°S, past Cape Leeuwin. Strong variable currents are reported from 20 to 27 miles offshore between the Cervantes Islets and Lancelin Islet. These currents average from 2 to 3 knots and set in various directions, but the SE direction predominates.

5.33 From Lancelin Islet to Trigg Islet, 57 miles SSE, rocks and reefs extend to 5 miles offshore. Sand dunes, 15 to

30m high, extend 3 miles SSE along the coast from a point 1 mile N of Lancelin Islet. Within the coast, 1.5 miles SE of Lancelin Islet, the high ridges are covered with grass and scrub, attaining a height of 138m, 5 miles inland.

Edward Islet, 5.5 high, lies 1.5 miles S of Lancelin Islet and about 0.15 mile offshore. Numerous rocky ledges, most of them awash, lie between Edward Islet and Ledge Point, 5.5 miles SSE.

Ledge Point (31°07'S., 115°22'E.) lies about 7 miles SE of Lancelin Islet; a hill with a height of 59m, is located 3 miles SE of the point. Range lights are shown from a position about 0.5 mile SE of Ledge Point and lead through a gap in the coastal reef to an anchorage. Conspicuous water towers, 37m and 42m high, stand 0.3 mile ESE and 0.65 mile NE, respectively, of Ledge Point.

A dangerous wreck lies about 10 miles WSW of Ledge Point.

Cape Leschenault (31°17'S., 115°27'E.), 11 miles SSE of Ledge Point, appears as a dark bluff when seen from S; about 5 miles within the cape the hills reach a height of 65m. A sand patch, 44m high, stands 3 miles SSE of the cape and there is a conspicuous sand patch, 71m high, 3.75 miles farther SSE; the Moore River flows out between these two patches. A range marking a passage through the reef is situated on the cape; a light is shown from a position on the coast about 3 miles SSE of the cape.

Wreck Point (31°30'S., 115°35'E.) is located 10 miles S of the Moore River; a range marks the passage which leads to the marina. From Wreck Point the coast trends SSE 24 miles to Trigg Islet; the intervening coast is backed by sand hills which attain a height of 61m. Some conspicuous tanks stand about 4.5 miles SE of Wreck Point.

Leschenault Reef (31°17'S., 115°20'E.) lies from 6 to 7 miles W of Cape Leschenault; the sea only breaks over the reef in a heavy swell. The coastal reefs, with depths of less than 1.8m, extend nearly 3 miles off the mouth of the Moore River, about 6 miles SE of Leschenault Reef.

Direction Bank, with depths of 19 to 37m, is located with its least depth about 17 miles WSW of Wreck Point. A depth of 24m lies at the SE extremity of the bank.

Eglinton Rocks (31°38'S., 115°39'E.), 2m high, lie close offshore 9 miles S of Wreck Point; reefs, with depths of less than 1.8m, extend up to 3 miles offshore between Wreck Point and Eglinton Rocks. A conspicuous stranded wreck lies about 1 mile N of Eglinton Rocks.

Wanneru Beach, lying 3.25 miles SE of Eglinton Rocks, has a small craft harbor. The approach from the SW is indicated by a range.

5.34 Mullaloo Point (31°48'S., 115°43'E.) lies about 7.75 miles S of Wanneru Beach. Little Islet, 2.4m high, lies 1 mile off Mullaloo Point. Reefs with depths of less than 1.8m, extend up to 2.5 miles W, in the vicinity of Mullaloo Point, and continue S at the same distance offshore, for about 4 miles to Trigg Islet.

A small craft harbor, with depths of 1.5m and protected by breakwaters, is situated about 3 miles N of Mullaloo Point; the approaches from NW and SW are indicated by ranges. A small craft harbor lies about 1 mile SSE of Mullaloo Point.

A submarine cable extends in a W direction from a point on the shore about 0.5 mile NE of Mullaloo Point; a prohibited anchorage area, extending 0.3 mile each side of the cable, is indicated by beacons on the shore.

Trigg Islet (31°53'S., 115°44'E.) is 5m high and connected with the mainland at low water. A conspicuous building is situated near the shore, about 1 mile S of Trigg Islet. A prominent water tower, 82m high, stands on a hill 1.25 miles E of Trigg Islet and a radio mast, 178m high, stands 2.5 miles NE of the water tower. Centaur Reef lies 2 miles WNW of Trigg Islet and is marked by a lighted beacon.

From Trigg Islet to Cape Leeuwin, about 151 miles SSW, the coast trends in a general S direction to Cape Bouvard, then SSW to Cape Naturaliste, then S to Cape Leeuwin. The principal port, Fremantle, is situated about 11 miles S of Trigg Islet. The port is protected on the W by Rottnest Island, Garden Island, and the reefs and rocks which lie between the two islands.

From Trigg Islet to Cape Peron, about 24 miles SSW, the coast is indented by Gage Roads and Cockburn Sound, which recede about 18 miles in a S direction from their entrance between Rottnest Island on the W and the mainland on the E.

Reabold Hill, 84m high, is located about 4 miles SSE of Trigg Islet. The coast extending about 10 miles S from Trigg Islet to the entrance of Fremantle Inner Harbor is generally low and sandy.

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Rottnest Island from S

Approaches to Fremantle

5.35 Rottnest Island (32°00'S., 115°30'E.) is located about 10 miles WNW of Fremantle and is a good mark when making for that port. Rottnest Island has been reported to be a good radar target when approaching from the NW. The island is 5.5 miles in length E to W and 2.5 miles at its widest point N to S. The island is surrounded with rocks and shoals extending for a distance of up to 1.5 miles. Rottnest Island Light is shown from a white masonry tower situated in about the middle of the island. Two prominent windmills are situated about 0.75 mile ENE of the light structure. An aeronautical radiobeacon is situated at the E side of the island. Between November and June lighted fish aggregating devices are deployed at charted

sites. Mariners are requested not to navigate through the area during this period.

Cape Vlaming (32°02'S., 115°27'E.), the W extremity of Rottnest Island, is a narrow point consisting of cliffs 37m high. Submerged rocks, the outer rock having depths of less than 1.8m, extend up to 0.5 mile WSW of the cape; depths of 18.3m lie 0.1 mile beyond the rock. A light is shown from Cape Vlaming.

Caution.—Unexploded ordnance lies in an area, with a radius of 0.25 mile, centered about 17.5 and 20 miles NW of Cape Vlaming, in depths of 100m and 120m, respectively.

5.36 The NW coast of Rottnest Island from Cape Vlaming to North Point, 4 miles ENE, is skirted by Horse Shoe Reefs and other rocky ledges, many of which dry, extending up to 0.85 mile offshore. Horse Shoe Reefs consist of several rocks, with depths of 2.1 to 3.7m. About 2 miles offshore, N of Horse Shoe Reefs, there are several patches with depths of 16 to 18m; during heavy N and W gales there is a confused and dangerous sea on these patches.

North Point Reef, with a depth of 13.8m, lies 1 mile NW of North Point; the sea breaks on the reef in bad weather.

Bathurst Point (31°59'S., 115°32'E.), 1.5 miles E of North Point, is the NE extremity of the island. A light is shown from a gray stone structure on the point. Duck Rock, 5m high, stands about 0.1 mile N of Bathurst Point; a lighted beacon is situated on the rock.

Two small craft jetties are situated in Thomson Bay, about 0.5 mile S of Bathurst Point; ranges mark the approaches to the jetties.

Courtesy of Sophia M. McHarney and Malcom Macdonald's Lighthouses of Australia Page

Bathurst Point Light

Caution.—Unexploded ordnance lies in an area, with a radius of 0.25 mile, centered about 1.5 miles N of Bathurst Point, in a depth of about 15m.

5.37 **Roe Reef**, with a least depth of 4m, lies 1 mile N of Bathurst Point. A rock, with a depth of 6.1m, lies 0.15 mile SW of Roe Reef. Between Roe Reef and the N side of Rottnest Island, there are a number of detached shoals with depths of less than 11m. Depths of 17.7 to 18.9m lie up to 1.5 miles N of Roe Reef.

Phillip Point (32°00'S., 115°34'E.), the E extremity of Rottnest Island, is 16m high and is formed of scrubby hillocks. A light shown from a red beacon is situated on Phillip Rock, about 0.25 mile NNW of Phillip Point.

Kingston Reefs, consisting of numerous rocks, a sand bank awash, and several drying rocks, lie on a bank with depths of less than 5.5m, which extends about 1.25 miles offshore between Bathurst Point and Phillip Point. Kingston Spit, with depths of 9.1m, extends 2 miles ENE from the coast between Bathurst Point and Phillip Point; a 4.6m patch lies 1.25 miles NE of Phillip Point. Kingston Reefs is marked by a lighted beacon standing about 0.5 mile N of Phillip Point; Kingston Spit is indicated by a lighted buoy moored about 1.5 miles ENE of Bathurst Point.

Parker Point (32°02'S., 115°32'E.), the S extremity of Rottnest Island, is a round bare head, 24m high, connected with the shore by a low narrow ledge of rock; when seen from the E or W, it appears detached. From the point to Cape Vlaming, 4 miles W, the coast of the island is fronted by a reef and by numerous rocks extending to the 10m curve, which lies up to 0.75 mile offshore in places. The outermost danger off Parker Point is a 5.5m rocky patch about 0.45 mile SSW of the point.

Strickland Bay and Salmon Bay lie between Cape Vlaming and Parker Point; both are foul and rocky.

Mount Herschell, 34m high, and Tree Hill, 38m high, with a conspicuous tower on it, stand 2 miles and 0.5 mile N, respectively, of Parker Point.

Dyer Islet (Direction Islet) (32°01'S., 115°33'E.), 14m high, is located in Porpoise Bay, 1.25 miles ENE of Parker Point.

Porpoise Bay is entered between Parker Point and Bickley Point, 1.5 miles NE.

Duffield Ridge (32°02'S., 115°28'E.), a narrow ledge of rock, on which the sea breaks in heavy gales, has a least depth of 16.4m and lies 1 mile SE of Cape Vlaming and 0.75 mile offshore.

5.38 Pilot Reef (32°00'S., 115°35'E.), a rocky ledge with a least depth of 3m, lies about 1 mile ESE of Phillip Point, on the coastal bank which extends about 6 miles E of Rottnest Island. Other dangers lie S of Pilot Reef on the coastal bank.

Middle Bank, with a least depth of 3.6m, lies 0.75 mile S of Pilot Reef. Jackson Rock, with a least depth of 3m, lies 0.4 mile S of Middle Bank, on the N side of South Passage. Nineteen Feet Rock, which has two heads with a depth of 5.5m, lies on the N side of South Passage, 0.75 mile ENE of Jackson Rock.

From Middle Bank and the dangers in the vicinity, a reef, through which there are a few passages, extends SSE to the N end of Garden Island.

Champion Rock (32°02'S., 115°36'E.), with a depth of less than 1.8m, lies near the center of a shoal with depths of less than 5.5m, about 0.65 mile SSE of Jackson Rock. There are some patches, with depths of 1 to 5.5m, between Champion Rock and the N end of Straggler Reefs.

South Passage (32°02'S., 115°35'E.) leads into Gage Road S of Rottnest Island, and is 0.5 mile wide between Nineteen Feet Rock and the shallow patches extending NW from Champion Rock. The passage is indicated by a range, which has a least depth of 7.9m on the line, although the swell in this area limits the passage to non-commercial vessels with a maximum draft of 5m. This passage is not recommended.

Straggler Reefs (32°04'S., 115°38'E.), with numerous rocky ledges, some of which dry, extend, with depths of less than 5.5m, from 1 to 3 miles SSW from Champion Rock.

Straggler Rocks (32°04'S., 115°38'E.), consisting of several pointed rocks, the largest and highest of which is 12m high, are located 5.5 miles SE of Phillip Point.

Straggler Channel lies between the SE end of Straggler Reefs and the W end of Success Bank; it should only be used with local knowledge.

The Roarers (32°06'S., 115°39'E.), rocks with depths of less than 1.8m, lie 2.5 miles S of Straggler Rocks; there are many dangers on the reefs which extend S from Straggler Rocks to the N end of Garden Island, that may best be seen on the chart.

Carnac Island (32°07'S., 115°40'E.), 17m high, is located 2 miles N of Beacon Head, the NE extremity of Garden Island. Submerged reefs and foul ground extend 0.5 mile W, almost connecting it with the rocky ridge which extends N to The Roarers.

5.39 Garden Island (32°12'S., 115°41'E.), which forms the W side of Cockburn Sound, is about 5.5 miles in length N to S; its W side, which is described here, is bordered with reefs extending 0.2 to 0.4 mile from the shore. Entrance Point is the NW extremity of the island.

The hills on the W side of the island rise abruptly from the beach to a height of 56m, and are covered with grass and bushes. A light is shown from the W central portion of the island.

Careening Bay (32°14'S., 115°42'E.) lies on the S tip of Garden Island between Colpoys Point and Parkin Point. The bay is approximately 1 mile across, with a depth of 14m at its center.

Collie Head, the S extremity of Garden Island, is 19m high. Foul ground extends about 0.45 mile SE from Collie Head. Collie Ledge, with a depth of less than 2m, lies about 0.2 mile SE of Collie Head and is marked by a beacon.

Southern Flats (32°15'S., 115°42'E.) extend about 1.75 miles ESE of Collie Head and S to John Point, the N extremity of Cape Peron on the mainland. The flats are steep-to on their NE and SE sides; with a heavy W or SW swell, the sea breaks heavily on the flats.

A causeway has been constructed across Southern Flats from a position on the coast 0.75 mile SE of John Point, N to Garden Island. There are two gaps in the causeway, about 0.3 mile and 1.5 miles from its S end, each spanned by a bridge; the vertical clearance under the N bridge is 12m.

Minstrel Channel, about 40m in width and about 2.9m deep in 1989, has been dredged across Southern Flats under the N bridge of the causeway. The channel is subject to silting and to heavy swells in bad weather. In fine weather it can be used by small vessels with local knowledge, however, the water level is erratic and governed by weather conditions.

An area within 0.1 mile on either side of the causeway and an area on the N and E sides of Garden Island have been declared Naval Waters.

Caution.—Five Fathom Bank extends S from a position about 4 miles SE of **Parker Point** (32°02'S., 115°32'E.), for a distance of 16 miles. The bank lies 2.5 miles to the W of Garden Island and the reefs which extend N from Garden Island. There are a number of patches on the bank with depths less than 1m.

Seaward Reef, with a depth of less than 1.8m, lies on the bank about 4 miles NW of Entrance Point; isolated shoals, with depths of 4.6 to 8.5m, continue 2 miles S to Casuarina Shoal.

Casuarina Shoal, with a least depth of 3m, and Hawley Shoal, with a least depth of 4.9m, are located on the bank about 3 miles W and 3 miles WSW, respectively, of Entrance Point.

Between Hawley Shoal and Coventry Reef, 10 miles S, the patches on the bank are more scattered and have depths of 5.5 to 8.5m, except 3 miles N of Coventry Reef, where there is a rock with a depth of 4.6m. Other shallow areas may exist on the ridge and vessels should avoid crossing it.

Coventry Reef (32°20'S., 115°38'E.) consists of a small group of rocks, which dries about 0.9m, over which the sea always breaks; it is surrounded by submerged rocks extending 0.1 to 0.2 mile from it.

The extent of Five Fathom Bank S of Coventry Reef has not been defined.

There is a passage across Five Fathom Bank, with the obelisk S of Woodman Point Light in line with Entrance Rocks, off Entrance Point which leads between Casuarina and Hawley Shoals, through a least charted depth of 8.5m.

5.40 Gage Roads (32°02'S., 115°41'E.), in the approach to Fremantle, are protected from W and S by Rottnest Island and the reefs and shoals between it and Garden Island, as well as Success Bank, but the roads are open to N and NW winds.

The coastal waters NE of Gage Roads are bordered by a bank, with depths of less than 11m, extending up to 1.5 miles offshore.

North Rock (31°58'S., 115°44'E.), with a depth of 7.4m, lies 1.25 miles offshore, 5.5 miles N of the North Mole; a 6.1m patch lies 0.5 mile N of North Rock. A group of shoals, with a least depth of 5.8m, and another group, with a least depth of 8.2m, lie 3 miles NNW and 2.5 miles WNW, respectively, from North Rock.

Hall Bank (32°02'S., 115°43'E.), a rocky patch with a least depth of 5.4m, lies 1.75 miles NW of the North Mole and is marked on its W side by a lighted beacon.

The approach to Gage Roads from sea is open and readily accessible for ships in all weathers; the entrance between Rottnest Island and the off-lying dangers is about 8 miles wide.

Beagle Rocks (32°04'S., 115°44'E.), which are foul and on which submerged wrecks lie, are located about 0.4 mile SW of the South Mole; these rocks are marked by a lighted beacon. An area of foul ground, best seen on the chart, exists in the vicinity of Beagle Rocks.

Minden Reefs (32°03'S., 115°43'E.), with a least depth of 3.6m, lie 0.5 mile S of the head of North Mole.

Other dangers lie in the approaches, but are in general clear of the entrance channels and best seen on the chart.

Fremantle (32°03'S., 115°44'E.)

World Port Index No. 54520

5.41 Fremantle, the chief commercial port in W Australia, is situated on the S side of the entrance to the Swan River, on a low sandy flat connecting Arthur Head with the mainland. Perth, the capital of Western Australia, lies 11 miles upriver. The port has facilities for handling bulk cargo, general cargo, petroleum products, crew ships, containers, and ro-ro traffic.

Fremantle Port Authority Home Page

http://www.fremantleports.com.au/Pages/default.aspx

The port of Fremantle consists of an outer harbor and an inner harbor. The outer harbor is comprised of Gage Roads, Owens Anchorage, and Cockburn Sound. Gage Roads is accessible to most classes of vessels; the other two are only available for vessels which can negotiate the dredged channels across Success Bank and Parmelia Bank. The inner harbor consists of Rous Head Harbor, the North Quay, and Victoria Quay.

Winds—Weather.—The prevailing winds are from the SW. The barometer is a good indicator of the weather as a general rule, rising with S winds and falling with N winds. Gales generally commence from N and rapidly shift W with a falling barometer.

Tides—Currents.—The water level in Fremantle is erratic, being almost entirely governed by the weather. Before and after W gales, a high level of about 1.2m is maintained for possibly 6 days. In the summer months, especially during E weather, a very low level may be experienced for the same period. Tides normally range from 0.5 to 0.9m.

It was reported that after a period of heavy rains, the Swan River produced a strong freshet in Fremantle Harbor. This current set obliquely onto Berth No. 8 and Berth No. 9 at about 5 knots, then parallel with the jetties, then strongly out of the harbor entrance.

In the approach channel from Gage Roads, the current ran out of the harbor at about 4 or 5 knots, setting to the SW when clear of South Mole.

In Gage Roads, the N current runs for about 10 hours while the S current runs for about 14 hours; the rate is usually small, but may be as much as 2 knots in unsettled weather in the winter months.

Depths—Limitations.—The Inner Harbor of Fremantle is an artificial harbor constructed within the estuary of the Swan River. The entrance to Inner Harbor is a short channel having a depth of 13m, and is protected by two rubble moles extending WSW from the mainland.

The fully-protected inner harbor is safe for ships all year. Rous Head Harbor, a commercial boat harbor and industrial park, is entered from the S side of the North Mole to the Inner Harbor. The depth in the S part of the harbor is maintained to 6m.

The North Quay has number designations from 1 through 12, beginning from the W. This quay extends 2,216m in length; the ro-ro facilities are situated at Berth No. 11 and Berth No. 12. Two container terminal covers berths 4 through 10. The declared depths along the North Quay run from 13 to 11m.

The berths at Victoria Quay are lettered A through J from the entrance; the total length is 1,643m. The Fremantle Passenger Terminal is situated at Berth F and Berth G. The declared depths along Victoria Quay run from 13 to 11m.

The Swan River, at the head of Inner Harbor, is spanned by three bridges with a minimum clearance under the lowest of 7.6m; a channel, marked by lighted beacons and piles, extends about 11 miles up the river to Perth and is used by small craft.

A fishing harbor, enclosed by breakwaters, lies along the shore close S of Inner Harbor. There are general depths within the harbor from 2.4 to 4.6m.

Success Yacht Harbor has been constructed immediately S of Fishing Boat Harbor. The harbor is enclosed by a curving breakwater and has depths from 2.3 to 3.7m. Yacht marker buoys are moored within 3 miles of the entrance.

Owen Anchorage.—From Fremantle, the shore to Owen Anchorage is low and sandy, trending S to Woodman Point which is only a few feet above sea level. A light is shown from a stone tower standing on a hill about 1 mile E of Woodman Point.

Owen Anchorage, W of the coast between Catherine Point, 2 miles S of Fremantle, and Woodman Point, lies between Success Bank on the N and Parmelia Bank on the S.

Success Bank, with depths of less than 5m, extends 5.5 miles W from Catherine Point. The bank is composed of sand and weeds, with rocky patches; depths on the bank vary from time to time. Rowboat Rock, 4m high, and Mewstone, 16m high, lie on the SW side of Success Bank.

There are a number of rocks and shoal areas in Owen Anchorage which may best be seen on the chart.

There is a special berth, Woodman Point Jetty, provided for loading and unloading explosives, and is used exclusively for

Courtesy of Fremantle Ports

Fremantle—Inner Harbor

this purpose. The jetty, which lies about 1 mile NE of Woodman Point, has a length of 61m, with depths of 5.2 to 7.9m alongside.

Owen Anchorage is approached by a channel dredged through Success Bank, which has a dredged depth of 14.7m and a bottom width of 152m. The channel is marked by lighted buoys and beacons and indicated by a range.

The quarantine station jetty is situated close within the N side of Woodman Point.

Cockburn Sound.—The sound is formed between Garden Island, on the W, and the mainland and is sheltered from the N by Parmelia Bank.

Challenger Passage Range Lights, situated 0.75 mile N of Garden Island, lead between the dangers lying between Carnac Island and Garden Island into Cockburn Sound. These lights, in line bearing 109°30', lead through Challenger Passage passing between two lighted buoys moored close N of Challenger Rock; then between Flat Ledge and Stag Rocks and over Pinnacle Rocks, in a least depth of 5.2m

Parmelia Bank separates Owen Anchorage from Cockburn Sound and extends W from Woodman Point to beyond Carmac Island. There are depths of 1.5 to 4.9m on the bank. There are shoal patches 1.5 and 2.25 miles WNW of Woodman Point which break heavily in a W swell.

Fremantle

Fremantle Outer Harbor—Kwinana Oil Refinery Jetty

Fremantle Outer Harbor—Kwinana Bulk Jetty Berth 3 and Berth 4

Parmelia Bank Channel, 152m wide with a maintained depth of 14.7m, leads S from Owen Anchorage, across Parmelia Bank to Cockburn Sound. It is in line with, and forms a continuation of, Success Bank Channel. The channel is marked by lighted buoys and beacons and is indicated by a range bearing 169.2°.

East shore of Cockburn Sound.—From Woodman Point, a ridge extends about 5 miles S to James Point, parallel with the coast and 1.5 miles from it; there are shallow patches with depths of 2.1 to 4.9m on the ridge. There are depths of 10m in Jervoise Bay, close S of Woodman Point, and about 2 miles NNE of James Point.

There are several passages over the submerged ridge, but vessels with a draft of more than 3m, without local knowledge, should use only Woodman Channel, Calista Channel, or Stirling Channel.

It was reported (2002) that significant changes associated with Jervoise Bay Development have been made to the navigation aids in the Medina Channel. Mariners are advised to navigate with caution in the area.

Woodman Channel, leading to Jervoise Bay, is entered between two lighted beacons near the edge of the charted 10m curve, about 2.25 miles SW of Woodman Point Light; the beacons are about 125m apart. A directional sector light, for night use only, is shown from Woodman Point Light. A breakwater extends in a curve about 0.4 mile NW from a position on the shore 1.5 miles SE of Woodman Point.

Each jetty on the E side of the sound has been designed and constructed for a specific purpose. Alumina Refinery Jetty is situated about 2 miles NNE of James Point; the jetty has a berth 334m in length with a depth of 11.6m alongside. The approach to the berth is by Stirling Channel and Calista Channel, which are dredged to a depth of 11.6m and indicated by ranges.

The Kwinana Bulk Terminal, situated about 0.75 mile NE of James Point, is approached by Stirling Channel. The North Jetty (Kwinana Bulk Berth 1) has a length of 195m, with a depth of 11m alongside. This berth is not currently in use (2002). The South Jetty (Kwinana Bulk Berth 2) has a length of 268m, with a depth of 12.2m alongside, and is an operating berth.

Kwinana Oil Refining Jetty is situated about 0.5 mile S of James Point. Three berths are situated parallel with the shore; mooring dolphins extend the length of the jetty at either end. Each jetty has an alongside depth of 14.7m, and can accommodate vessels up to 270m long; however; the channel depth restricts the allowable deep draft to 12.6m. The approach to the jetty is indicated by a range.

A restricted area, shown on the chart, is situated in the vicinity of the Kwinana Oil Refinery Jetty; unauthorized vessels are not permitted within the area.

Kwinana Bulk Jetty, about 0.5 mile S of Kwinana Oil Refinery Jetty, has a jetty head 480m long, with 13.4m alongside. The jetty has two berths. Kwinana Bulk Berth 3 is the N berth. The other berth is Kwinana Bulk Berth 4.

Kwinana Grain Jetty is situated about 1 mile SW of the Kwinana Bulk Jetty. The jetty head is 291m long with a dredged depth of 16.8m alongside.

Mangles Bay (32°16'S., 115°43'E.), in the S part of Cockburn Sound, is protected from W and N by Cape Peron and Southern Flats extending from Cape Peron to Garden Island.

Fleet Base West, a facility for naval vessels, is situated W of Colpoys Point, in the N part of **Careening Bay** (32°14'S., 115°42'E.), on the SE side of Garden Island. Two lighted mooring buoys are situated in the NW approaches, 500m NE and SE of Colpoys Point respectively.

There are two piers at Colpoys Point; the E pier has a depth of 11m alongside and the W pier has a depth of 9.8m alongside. An angled breakwater extends 0.15 mile E and NE from Colpoys Point.

An armament jetty extends 430m from the shore at a point about 0.25 mile S of **Dance Head** (32°10'S., 115°40'E.); an area S of the jetty is reportedly dredged to 10.5m.

When ships draw 9.2m and over, a clearance of 10 per cent of the draft is required in transit of the channels.

Range lights, in line bearing 169°, situated in Cockburn Sound, lead through the channels dredged through Success Bank and Parmelia Bank; the channels are marked by lighted beacons and lighted buoys. In addition, the range beacons exhibit lights visible from S, which, in line astern, lead to the tanker anchorage and jetties in the S part of the sound. These channels are dredged to a depth of 14.7m.

Courtesy of Lighthouses of Western Australia
Fremantle—Woodman Point Light

Aspect.—The coast NNE to SSE of the Inner Harbor is low and sandy, and backed by a ridge of scrubby limestone hillocks in the SE sector.

Fairway Landfall Lighted Buoy, equipped with a racon, is moored about 7.25 miles NW of the entrance to Inner Harbor. A directional sector light is situated about 2.5 miles NE of the north mole.

Conspicuous landmarks within the vicinity of the Inner Harbor include a white obelisk, 71m high, standing on Buckland Hill, about 3 miles NE of the harbor entrance; a large silo situated about 1 mile NE of the root of North Mole; and the signal mast of the Port Authority Building standing about, 0.5 mile E of the head of South Mole. Buckland Hill Directional Light makes a fine visual aid on approaches to the harbor.

A war memorial standing on the summit of Church Hill, 62m high, about 1 mile E of the harbor entrance, is also very prominent.

Other conspicuous landmarks include a group of the windmills, 66m high, standing about 2.5 miles SSE of the harbor entrance; a white obelisk standing on a ridge with a windmill close N, about 0.75 mile S of Woodman Point Light; a chimney, 76m high, standing about 2 miles SE of Woodman Point Light; Mount Brown, 68m high and the highest point of the coastal ridge, standing about 2.75 miles NNE of James Point; a group of three chimneys, the tallest being 59m high, standing about 0.5 mile S of the Alumina Refinery Jetty; a number of chimneys in the vicinity of the Kwinana Oil Refinery Jetty and the Bulk Cargo Jetty, which are best seen on the chart; and a silo,114m high, standing at the root of the Kwinana Grain Jetty. A microwave tower standing about 1.25 miles SE of the head of Mangles Bay is prominent.

Pilotage.—Pilotage is compulsory for all vessels larger than 150gt and is available 24 hours.

There are two boarding grounds, as follows:

1. For vessels up to 11m in draft the pilot boards in Gage Roads, 1 mile W of Hall Bank Beacon, or 2 miles NW of the entrance to the Inner Harbor, in position 32°01.4'S, 115°41.3'E.
2. For vessels drawing 11m or greater, and for vessels that do not have the appropriate charts for the approaches to Fremantle, the pilot boards in an area with its center situated about 3 miles NW of the Fairway Landfall Lighted Buoy, in position 31°55.5’S 115°36.0’E.

The vessel’s ETA, including the request for pilot and details of any dangerous cargo, must be sent 48 hours and 24 hours prior to arrival at the Fairway Landfall Lighted Buoy and confirmed or amended 2 hours in advance.

Fremantle—Contact Information	
Pilots	
VHF	VHF channel 12
Telephone	618-943-36340
Facsimile	618-933-57449
E-mail	dutypilots@fremantlepilots.com.au
Web site	http://www.fremantlepilots.com.au
Port Authority	
Telephone	618-943-03555
E-mail	mail@fremantleport.com.au
Web site	http://www.fremantleports.com.au
Harbormaster	
Telephone	618-943-03313
E-mail	harbourmaster@fremantleports.com.au

Regulations.—All inbound vessels approaching Fremantle are to report to Port of Fremantle when crossing the reporting line.

The reporting line is drawn as a sector of an arc, extending between the coast N of Burns Rocks WSW to a position due W of Rottnest Island, with a radius of 15 miles centered on Fairway Landfall Lighted Buoy.

Vessels are required to report their confirmation of pilot requirements at either the Outer or Inner Pilot Boarding Place.

Vessels proceeding to the Inner Pilot Boarding Place or to anchorage in Gage Roads are required to indicate their intentions to use either East Channel or West Channel.

The port of Fremantle is able to provide VTS information relating to shipping movements.

A vessel carrying explosives or other dangerous cargo shall indicate this fact by radio in its ETA message; the draft should also be included.

All vessels requiring pratique anchor in Gage Roads and remain there until medical quarantine and customs requirements have been satisfied.

A complete set of port regulations is available from the Fremantle Port Authority, Fremantle.

A speed limit of 8 knots is in effect in the Inner Harbor and entrance channel. Vessels should avoid crossing the entrance channel, but vessels which do so are required to cross by the shortest possible route and obey the 8 knot speed limit.

Signals.—The signal station is situated on top of the Port Authority Building and is clearly visible to all ships in the vicinity.

All orders concerning shipping movements and related matters are passed to the ships through the signal station by VHF radio. Vessels not equipped with VHF radio are signaled with Aldis lamps.

Fleet Base West Port Control continuously monitors VHF channel 14; tug control monitors VHF channel 69.

Anchorage.—In the summer season, October to April, safe and convenient anchorage will be found in Gage Roads, in depths of 14.6 to 16m, fine sand, about 1 mile WSW of the entrance to Inner Harbor. In winter, vessels should anchor about 0.5 mile farther W or NW.

Designated anchorage areas, 300m in radius, are situated in Gage Roads E and W of the deep water channel and N and S of the prohibited anchorage area in the vicinity of the entrance to the Inner Harbor.

Anchorage may be taken in the center of Owen Anchorage, in depths of 14m, but there are several shallow patches in the anchorage. The SE part of Owen Anchorage, under Woodman Point, is preferable during the summer, when strong breezes prevail from S and W.

The NE part of Owen Anchorage, known as Beagle Anchorage, affords good shelter for small vessels of light draft, in all seasons.

Mangles Bay provides anchorage, in 18m, mud.

Anchorage is prohibited in the deep water channel extending SE from Fairway Landfall Lighted Buoy and in the vicinity of the entrance to Inner Harbor and are best seen on the chart as prohibited anchorage areas.

Directions.—Gage Roads should be approached by passing N of Rottnest Island, which should be given a berth of 4 miles.

Vessels approaching Gage Roads from the N should steer for Fairway Landfall Lighted Buoy. Least depths of 11m lie within the white sector of **Woodman Point Light** (32°08'S., 115°46'E.).

From Fairway Landfall Lighted Buoy, steer for Buoy No. 1, remaining in the white sector of Buckland Hill Direction Light.

Vessels with drafts of 11m or more must embark a pilot at the outer boarding area; they may then proceed through the buoyed channel.

Vessels with drafts of less than 11m may either pass to the E of the buoyed channel and then steer S; or if the channel is clear of a deep draft vessel, they may head directly S from Buoy No. 1 and cut through the buoyed channel.

Virtual AIS buoys were added along southern channel as well as out of position AIS buoys that mark the southern limit of the port entrance.

The approach to Gage Roads through South Passage should only be used with local knowledge. Due to heavy swell, the passage is restricted to vessels with drafts of 5m or less. The passage is not recommended. The S coast of Rottnest Island should not be approached nearer than 1 mile.

Caution.—Numerous disused submarine cables, as shown on the chart, extend from a position on the shore about 2.5 miles NNE of the North Mole in a W direction to Rottnest Island. Several disused submarine cables extend from the same position on the shore, to seaward in a NW direction.

A submarine turbine lies close E off the North Mole in position 32°02'S 115°43'E, and is connected to the shore to the E by a submarine pipeline. The turbine is surrounded by an exclusion area marked at each corner by a lighted buoy.

Fremantle to Bunbury

5.42 From Cape Peron to Cape Bouvard, 25 miles SSW, the coast is indented by Shoalwater Bay, Warnbro Sound, and an unnamed indentation which has a length of about 9 miles N to S.

Shoalwater Bay lies between Cape Peron and Mersey Point, 2.5 miles to the S; drying reefs and foul ground extend up to 1 mile off the shores of this bay.

Warnbro Sound (32°20'S., 115°43'E.) is entered between Mersey Point and Becher Point, 4 miles S. It is protected from the W by a chain of islets, reefs, and rocks.

The N shore of the sound is very low, and behind it are extensive swamps, which dry in the summer. The E shore is backed by sand hillocks, about 24m high. Warnbro Sound is used for mussel aquaculture.

Passage Rock (32°20'S., 115°41'E.), 6m high, is located 1.5 miles SSW from Mersey Point; the rock rises abruptly from the middle of a drying ledge. The bay N and S of Passage Rocks is fronted by sand banks, rocks, and drying shoals.

A channel, with a depth of 9.1m, is entered on range lights, which are situated SE of Passage Rock. The channel is narrow and tortuous, and local knowledge is necessary when entering. Port Kennedy, situated in the S part of the sound, offers good anchorage, in depths from 12.8 to 16.5m.

Caution.—A fish haven, with a least depth of 14.2m, was reported (1990) to lie about 1.75 miles NNE of Becher Point.

The 10m curve lies about 0.75 mile W of Passage Rock; Coventry Reef is located on Five Fathom Bank about 3 miles W of Passage Rock.

5.43 **Coventry Reef** (32°20'S., 115°38'E.) and Five Fathom Bank have been previously described in paragraph 5.39.

From Becher Point, the coast trends SE about 3 miles to a high sandy hillock, then SSW about 7 miles to Robert Point, a low sandy projection with a high wooded hill within it. Stake Hill, 46m high, stands 3.5 miles ESE of Becher Point. A conspicuous water tower, from which a light is shown, stands near the summit of a hill, 52m high, about 0.5 mile S of Robert Point; drying ledges extend about 0.3 mile off the point.

Shoals, with depths of 20m, 22m, and 27m, lie about 17 miles W, 18 miles W, and 20 miles WSW, respectively, of Cape Peron. An isolated shoal, with a depth of 27m, lies 16.5 miles WSW of Coventry Reef.

The Murray River, close E of Robert Point, is about 0.5 mile wide at its mouth and is fronted by sand spits extending nearly across it; lights are shown on each side of the entrance. The bar

is narrow and seldom has depths of more than 1.2 to 1.8m; the depths vary according to the weather, and at times the mouth is closed altogether. Peel Inlet is entered about 2 miles within the mouth of the river and, with Harvey Estuary, extends nearly 14 miles S from the river. Construction has been completed on a channel cutting through the mainland from the coast into Harvey Estuary at Dawseville, 5.5 miles SW of Robert Point. Lights have been established on the seaward ends of the breakwaters and the inner ends of the channel, which is named Dawseville Channel., a small town connected by road with Fremantle and Bunbury, stands on the E bank of the Murray River, about 0.5 mile within its mouth. There are several small jetties and a marina at Mandurah.

Murray Reefs (32°23'S., 115°41'E.), which extends about 6 miles SW from Becher Point, are an extension of the reefs that front Warnbro Sound; the sea occasionally breaks on the S extremity of the reef. An isolated patch, with a depth of 7.6m, lies outside the reef, 5 miles SW of Becher Point. There is a strong set towards these reefs, especially during W gales.

Shoal patches, with depths of 7.6m, lie 5.5 miles NW and SW, respectively, from Robert Point; a 6.7m patch lies 2 miles W of the point.

From Robert Point, a rocky coast with occasional small sandy beaches extends 10 miles SW to **Cape Bouvard** (32°41'S., 115°36'E.). A light, 51m high, stands close E of Cape Bouvard.

5.44 The coast from Cape Bouvard trends S for a distance of 37 miles to Casuarina Point; a narrow grassy-topped ridge, with an average height of 52m, extends 25 miles S of the cape; then for 3 or 4 miles the hills are about 21m high, rising gradually S toward Koombana Bay, E of Casuarina Point. At 6 and 16 miles, respectively, S of the cape are two conspicuous sand patches extending from the beach to the summit of the ridge. Within the coastal ridges are Lake Clifton and Lake Preston; farther inland the hills rise to a height of 75 and 108m, about 14 and 20 miles SSE, respectively, of the cape.

Reproduced with permission of Bunbury Port Authority
Casuarina Point Light

Bouvard Reefs (32°50'S., 115°35'E.) lie from 4 to 15 miles S of Cape Bouvard, at distances varying from 2 to 3.5 miles offshore; the sea only breaks on these reefs during a heavy swell. It has been reported (1988) that the reefs cannot be picked up on radar.

Casuarina Point (32°19'S., 115°38'E.), the W entrance point of Koombana Bay, is composed of sandhills gradually rising to a height of about 40m. A light is shown from Casuarina Point. A rock, with a depth of 1.4m, lies about 0.3 mile offshore, about 4 miles NNE of the point. A depth of 11m exists nearly 2 miles N of Casuarina Point Light; there are depths of 11.3m up to 0.75 mile farther NNW.

Caution.—The waters along this coast have been incompletely surveyed.

Naturaliste Reefs (33°14'S., 115°02'E.) lie about 31 miles W of Casuarina Point Light and consist of two patches 0.6 mile apart. The NE patch is awash; the sea does not always break on the SW patch in calm weather. An 11.9m shoal lies 2 miles NW and a 9.4m shoal lies 1 mile S of Naturaliste Reefs; a wide berth should be given these dangers as soundings give little warning.

Bunbury (33°19'S., 115°39'E.)

World Port Index No. 54500

5.45 The port of Bunbury, situated in the SW part of Koombana Bay, is the principal port of the Southwest District of Western Australia.

Bunbury Port Authority Home Page
http://www.byport.com.au

Winds—Weather.—In summer, the prevailing winds are from the SE. In winter, the prevailing winds are from the NW and SW.

Tides—Currents.—Tides in Bunbury are usually diurnal. The tide at mean higher high water is 0.9m.

Depths—Limitations.—Berth No. 1 and Berth No. 2 are situated in the Outer Harbor, along the E side of the breakwater.

The Inner Harbor is located in the SE sector of Koombana Bay. The Inner Harbor Basin is approached by a dredged channel which is marked by lighted beacons and indicated by ranges. The seaward part of the channel is dredged to a depth of 12.8m; the inner part, basin, and berths are dredged to a depth of 12.2m. The depth in the Outer Harbor approach is 9.6m. There are four berths situated in the Inner Harbor.

Berth details for the Inner Harbor and the Outer Harbor are given in the table titled **Bunbury Berth Information**.

Aspect.—Koombana Bay is entered between Casuarina Point and the coast about 2 miles NE. The E shore is backed by Leschenault Inlet which extends 7 miles N, parallel to the shore. The E shore of the inlet is backed by a ridge of hills from 30 to 60m high.

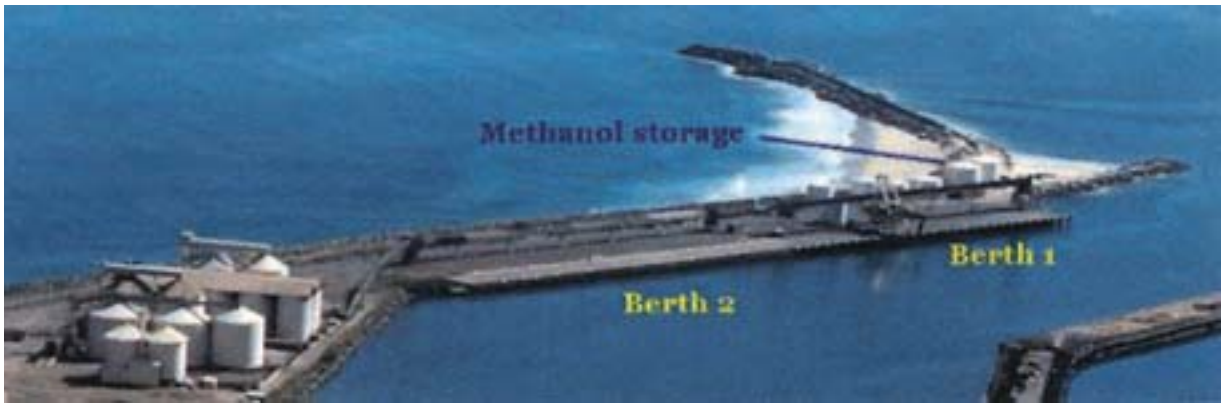
A light is shown from a structure standing about 100m S of the N extremity of the outer W breakwater. A light is also shown from a round metal tower, painted in black and white checks, about 0.35 mile SSW of Casuarina Point.

The W side of the outer harbor is formed by a breakwater, about 1 mile in length, which extends NE from Point

Bunbury—Outer Harbor from NE

Courtesy of Bunbury Port Authority

Bunbury—Berth No. 8



Courtesy of Bunbury Port Authority

Bunbury—Berth No. 1 and Berth No. 2

Bunbury—Inner Harbor

Casuarina, following the line of the reef. The E side of the outer harbor is formed by a disused jetty, about 1,150m in length, which extends NNE from a position about 0.3 mile SE of Casuarina Point.

The approaches to the dredged channel are marked by a range light and a directional light. The directional light stands close E of Point Hamilla.

Leschenault Inlet opens into the SW corner of the bay. The Preston River and the Collie River flow into the inlet.

Conspicuous landmarks include a group of tanks situated close NE of Casuarina Point Light, a row of concrete silos situated about 0.25 mile E of Casuarina Point Light, a building situated about 0.25 mile SE of Casuarina Point Light.

Pilotage.—Pilotage is compulsory for all commercial vessels over 150gt, except for vessels exempted by law. The pilot boards in position 33°15.85S, 115°37.4'E approximately 2 miles NW of McKenna Point. Pilot will contact vessel one hour prior to boarding.

The harbormaster's office, the pilot boat, and tugs are equipped with VHF radiotelephone. The harbormaster must be notified 24 hours and 4 hours prior to arrival; VHF channels are 6, 9, 12, and 16. The pilot boat and the tugs may be contacted on VHF channel 16. Pratique is not granted by radio.

The pilot boat should be contacted 1 hour in advance.

Regulations.—Vessels should send ETA 48, 24 and 6 hours in advance via the agent.

Vessels berth and sail, day or night, dependent on the priority of other vessels, labor available, and weather conditions.

Bunbury—Contact Information	
Pilots	
VHF	VHF channels 12 and 16
Telephone	618-972-96527
E-mail	pilot@byport.com.au
Port Authority	
Call sign	Port of Bunbury
VHF	VHF channels 12 and 16
Telephone	618-972-96500
Facsimile	618-972-18253
E-mail	byport@byport.com.au
Web site	http://www.byport.com.au
Harbormaster	
Telephone	618-972-96500
E-mail	hm@byport.com.au

There is a speed limit of 8 knots in Koombana Bay and the Inner Harbor.

Anchorage.—Vessels moor under the direction of the harbormaster.

A recommended anchorage off the port, in a depth of 15m, lies 3.5 miles NNW of Casuarina Point Light. The anchorage is indicated by range lights, in line bearing 089.5°.

The breakwater affords good shelter during NW gales, which are rather frequent from May to October. The usual anchorage,

in 7.3 to 8.2m, sand and mud, lies ESE and SE of the outer end of the jetty; the holding ground is good.

Directions.—In approaching Koombana Bay from the W, Mount Lennard, the highest hill on Roe Range, should bear no less than 103° in order to clear Naturaliste Reefs, which lie about 31 miles WNW of Casuarina Point.

The entrance channel is marked with beacons and range lights. Vessels enter the bay with the range lights on the E shore, in line bearing 157.25°, then steer as necessary for the Outer Harbor or the Inner Harbor.

At night, if from SW, a vessel should not cross depths of less than 15m until well N of Casuarina Point Mole.

Bunbury Berth Information			
Berth	**Length**	**Maximum draft**	**Remarks**
Outer Harbor			
No. 1	184m	9.2m plus allowance for tide	Mineral sands. Maximum vessel length is 210m.
No. 2	184m	8.0m plus allowance for tide	Methanol, general cargo, and grain.
Inner Harbor			
No. 3	381m	11.6m	Wood chips.
No. 4	123m	11.6m	Alumina berth and caustic soda. Maximum vessel length is 225m.
No. 5	240m	11.6m	Bulk cargo.
No. 8	250m	11.6m	Bulk cargo.

Caution.—A submarine pipeline, which is disused, extends in a W direction for 2.75 miles from a point on the shore about 4.25 miles NE of Casuarina Point Light.

A strong set is experienced, generally towards the breakwater, more especially during the winter months, and vessels should keep about 1 mile off the head of the breakwater when approaching the port.

Geographe Bay

5.46 Geographe Bay (33°31'S., 115°21'E.) is entered between Casuarina Point and Cape Naturaliste, 34 miles WSW; it is open to winds from N and NW.

From Casuarina Point, the coast trends 21 miles SW to Wonnerup Inlet; for the first few miles a grassy ridge rises from the beach, and nearly 3 miles S of Casuarina Point a double peaked grassy hillock, **Koombana Paps** (33°21'S., 115°37'E.), rises to a height of 64m. From a position about 7 miles S of Casuarina Point, a continuous swamp extends in a S direction immediately behind the coastal ridge, which varies from 0.1 to 0.5 mile in width. Minninup, a bare sand patch 30m high, is located 13 miles SW of Casuarina Point; it forms one of the conspicuous features in this locality. Mount Lennard, 335m high, about 13 miles E of the same point, is conspicuous.

The coast for a distance of 3 to 4 miles N of sand patch of Minninup is fringed with rocky ledges, some of which dry; about 2 miles N of the sand patch and 0.5 mile offshore, there is a sunken reef, on which the sea breaks during a heavy swell. The whole shore of Geographe Bay, SW of the sand patch of Minninup is fronted by sandy and rocky banks, with depths of 1.8 to 5.5m extending from 0.5 to 1.5 miles offshore; depths of less than 18.3m extend about 3 miles offshore abreast Casuarina Point and 5 miles offshore abreast Wonnerup Inlet.

Wonnerup Inlet has only sufficient depths for boats and is often completely barred. The inlet extends about 0.5 mile E, opening into Wonnerup Estuary, which extends 3.5 miles NE.

Vasse Estuary extends, from its entrance in Wonnerup Inlet, in a WSW direction and passes through Busselton.

5.47 Busselton (33°38'S., 115°20'E.) stands on the S shore of Geographe Bay. Busselton Jetty is about 1,800m in length, and has two berths at its head. The jetty is the longest wooden pier in the southern hemisphere. The jetty was closed to commercial shipping in 1974 and is currently used as a tourist attraction.

A light is shown from a wooden gallows at the head of the pier; a radio tower stands 5.5 miles W of the jetty.

A shoal, with a depth of 5.5m, lies 0.5 mile ENE of the head of the jetty; in 1967, less water was reported close W of this shoal. Patches of gravel, with depths of 4.9 to 5.5m, lie from 1.75 to 3 miles W of the jetty.

Anchorage can be obtained 0.5 mile W of the outer end of the jetty, in a depth of 9m, sand and weed.

Caution.—A dangerous rock is charted close to shore.

5.48 Toby Inlet (33°37'S., 115°09'E.), which is generally closed, is located 8.5 miles W of Busselton Jetty; Dalling Point lies 4 miles NW of the inlet. Castle Rock, nearly detached from the coast and 34m high, lies 1 mile N of Dalling Point. A fish haven, with a depth of 21m, lies about 3 miles ENE of Dalling Point.

Eagle Bay is a small indentation in the coast about 3.5 miles N of Dalling Point; the coast between them rises abruptly from the beach to heights of 107 to 131m. Anchorage can be obtained, with local knowledge, in Eagle Bay during S and SW winds, about 0.75 mile offshore.

Bunker Point appears dark with cliffs approximately 61m high and is located 1.5 miles E of Cape Naturaliste; Rocky Point, a bare rocky headland, is located 1.25 miles farther E. **Bunker Bay** (33°33'S., 115°02'E.) lies between the two points. A rock, with a depth of less than 1.9m, is located 0.6 mile NNE from Bunker Point.

5.49 Cape Naturaliste (33°32'S., 115°01'E.), 122m high, is the W headland of Geographe Bay; its extremity is formed of low sandy hillocks. About 6 miles S of the cape stands Mount Duckworth, 227m high, with a ridge of high land between them, which falls abruptly on its E and W sides. Cape Naturaliste Light is shown from a gray stone tower situated about 1 mile ESE of the cape. Radar returns from Cape Naturaliste have been reported up to 26 miles distant.

Caution.—There is a rock, with a depth of less than 1.8m, 1 mile NE of Cape Naturaliste Light; the sea does not always break on this rock. A similar rock lies about midway between this rock and Cape Naturaliste.

5.50 Wright Bank (33°30'S., 115°01'E.), with a reported (1985) least depth of 6m, consists of two patches 0.5 mile apart, from 1.5 to 2 miles N of Cape Naturaliste. The sea breaks over these patches in a medium swell; in strong gales, the rollers begin 0.5 mile W of these shoal spots, which indicates the edge of the shallow water. There is a depth of 42m, gravel and shell, 100m N of the bank. Vessels should not pass inshore of Wright Bank.

A fish research area, marked by a lighted buoy, is situated about 15 miles W of Cape Naturaliste.

Current.—After NW gales or a continuance of NW winds, there is a strong outset from Geographe Bay NW, which, meeting the swell off Cape Naturaliste, produces at times an appearance of broken water extending 3 to 4 miles from the cape.

Cape Naturaliste to Cape Leeuwin

5.51 Sugarloaf Rock (33°33'S., 115°00'E.), a remarkable crag 42m high, is located 0.1 mile offshore, 1.5 miles S of Cape Naturaliste. An unbroken coast with predominant cliffs extends 4.5 miles S of the rock, and 2 miles beyond lies the S entrance point of a small bight, with several rocks awash lying off it. A rock, 3.7m high, is located 0.4 mile NNW of the S entrance point of this bight.

Winjee Sam Rock (33°40'S., 115°00'E.), 6.5 miles S of Sugarloaf Rock, is 14.3m high, and is the outermost of a group known as Canal Rocks.

Cape Clairault (33°42'S., 114°58'E.), 10 miles S of Cape Naturaliste, is 36m high, and is formed of sandy hillocks sparsely covered with low scrub brush. The coastal ridge behind the cape rises abruptly to heights of 150 to 200m.

Between Cape Clairault and Cowaramup Point, 10 miles S, there are several breaks in the cliffs, through which brooks flow into the sea. A partially-wooded hill, 187m high, stands about 2 miles SE of Cowaramup Point. Along this rugged coast, several submerged rocks lie from 0.1 to 0.35 mile off its entire length.

Cowaramup Reef (33°50'S., 114°57'E.), with a depth of less than 1.8m and over which the sea breaks in a heavy swell, lies 2 miles NNW of Cowaramup Point, 1.5 miles offshore; the ground is foul between the reef and the coast.

Cowaramup Point (33°52'S., 114°59'E.) is a bare sandy projection, with rocky ledges extending 0.35 mile NW from it.

Cape Mentelle, 6 miles S of Cowaramup Point, is a dark green headland, 43m high, faced with a steep cliff to the W, and rising within to a height of 69m; rocky ledges, which dry, front the cape extending 0.3 mile offshore.

Cow Rock (33°58'S., 114°58'E.), 3.6m high, with a small submerged rock 0.1 mile N of it, lies 0.6 mile WNW of Cape Mentelle.

The mouth of the Margaret River, which is generally barred by sand, lies close S of Cape Mentelle; a high wooded hill rises abruptly from the S side of the entrance. A prominent building stands about 0.3 mile SE of the river mouth.

The coast from Cape Mentelle to Freycinet Point, 8 miles S, is fronted by drying and submerged rocks, which extend up to 1 mile offshore.

5.52 Freycinet Point (34°06'S., 114°59'E.) is a low, dark, rocky point, 18m high, with a flat-topped granite hill, 55m high, a short distance E of it. The sea breaks on a rock, awash, 0.2 mile SW of the point.

North Point lies about 4 miles SSE of Freycinet Point; there is a long dark rock, 12m high, on the rocky far shore close W of it. Boranup Hill, 196m high, stands 1.5 miles NE of North Point. A 10.3m patch is located outside the 20m curve, 1.25 miles SW of North Point.

Hamelin Bay (34°11'S., 115°01'E.) is entered between North Point and **White Cliff Point** (34°13'S., 115°01'E.), 4 miles S. Boranup Sand Patch, located in about the middle of the E side of the bay, is a conspicuous landmark which rises from 143 to 192m high, 1.5 miles from the coast; in clear weather it is visible from a distance of more than 20 miles. White Cliff Point is fringed by cliffs about 22m high.

The waters of Hamelin Bay are encumbered by numerous rocks and shoal patches which are awash.

Edith Rock, 1.75 miles NW of White Cliff Point, is 4.2m high. Two rocky ledges, which dry, lie 0.25 mile SW of Edith Rock; some rocks, with depths of 2.7 to 5.5m and on which the sea generally breaks, lie 0.5 mile SSW of the same rock.

5.53 Old Man Rock (34°12'S., 115°00'E.), 2m high, lies near the W edge of the ledges, which dry in places, extending 1.25 miles WNW from White Cliff Point; the ledges extend up to 0.5 mile around the rock.

Hamelin Island, 32m high, lies near the outer end of a reef which extends 0.75 mile W of White Cliff Point. The island, with the adjacent reefs, protect the inner harbor and also the bay to a certain extent, from S winds.

, with a depth of 4m, and South East Ledge, with a depth of 5.8m, lie 1 mile NNW and 0.9 mile N, respectively, of White Cliff Point.

Peak Islet (34°12'S., 115°01'E.), 13.1m high, lies 0.45 mile WNW of White Cliff Point. A reef, with depths of less than 5.5m, extends 0.2 mile E from the islet; its E end forms the NW side of the entrance channel to the Inner Harbor.

Mushroom Reef, about 0.2 mile ESE of Peak Islet, has several patches, awash, and one which dries 0.3m. The reef has a 1.2m patch about 0.35 mile N of White Cliff Point, which lies on the SE side of the entrance channel to the Inner Harbor.

5.54 Hamelin Inner Harbor (34°12'S., 115°01'E.) lies between Peak Islet and Mushroom Reef, on the N, and Hamelin Island and adjacent reefs, on the S and SW. A jetty, which has been condemned as unsafe for traffic, extends about 0.3 mile WNW from the shore, 0.2 mile NE of White Cliff Point. The harbor has been reported closed to shipping.

Vessels approaching the anchorage from the N should give Freycinet Point a berth of about 2 miles, and when the middle of Boranup Sand Patch bears about 085°, steer to pass 0.3 mile N of Edith Rock, and then to the anchorage.

From S, give Cape Hamelin a berth of at least 4 miles, keeping outside the 40m curve. When Hamelin Island summit bears more than 050°, Old Man Rock and Edith Rock will be visible. Steer to pass through Lisle Channel, about 0.3 mile WNW of Old Man Rock.

Anchorage may be taken in Hamelin Bay; vessels should ride with a long scope of cable. From the beginning of May until the beginning of November, upon the usual indications of a NW gale, vessels of too deep a draft to find protection in the Inner Harbor are advised to put to sea and seek shelter in Flinders Bay until the gale is over. Anchorage may also be taken 0.3 mile ENE of the SE extremity of Peak Islet, in a depth of 11m, sand and weed.

If passing outside Edith Rock from the S, give it a berth of 0.5 mile and steer into the bay, passing 0.3 mile N of the rock and then to the anchorage.

The coast from White Cliff Point to Knobby Head, 2 miles S, forms the E side of Foul Bay. Foul Bay is so encumbered with sunken reefs it is useless as an anchorage or place of shelter. Foul Bay Light is shown from a white square tower, 6m high, situated about 1.5 miles SSE of White Cliff Point.

5.55 Knobby Head (34°14'S., 115°02'E.) is smooth and grassy, 41m high, with a high reddish cliff to seaward. A short distance within the head are some dark bush-topped sand hills, from which a large bare sand patch extends to the SW, and is not visible from NW.

Seaward of Knobby Head there are several ledges, awash and submerged, with a rock with a depth of less than 1.8m, lying 1.5 miles W of the head; the sea breaks on this rock with a heavy swell.

Southwest Rock (34°14'S., 114°59'E.), 2m high, lies 1.75 miles NW of Knobby Head. Breakers have been observed for about 0.4 mile SW of Southwest Rock.

Cape Hamelin (34°15'S., 115°02'E.) is a low cliff-faced point, fronted with numerous drying ledges and sunken rocks which extend 1.5 miles W, 1.75 miles SW, and 2 miles S. There is a rock, 15m high, about 0.6 mile NW of the cape.

From Cape Hamelin, the coast trends SE 8 miles to Cape Leeuwin. Nearly 1 mile SE from Cape Hamelin, Turners Brook flows into the sea. On its S side and 0.5 mile above its mouth, a perpendicular cliff rises on the NW side of an 84m hill and is conspicuous when seen from SW.

A high and conspicuous sand patch is located 2.25 miles SE of Cape Hamelin, which, in hazy weather, may possibly be mistaken for Boranup Sand Patch in Hamelin Bay.

The coast between Cape Hamelin and Cape Leeuwin is fronted by reefs extending up to 4 miles offshore.

5.56 Cape Leeuwin (34°22'S., 115°08'E.), the SW extremity of Australia, lies 8 miles SE of Cape Hamelin. Cape Leeuwin is a small round head, about 21m high, joined to the mainland by a low swampy isthmus. Within the cape, the land rises abruptly to a height of 149m, in a position 1.25 miles NNE of the cape. From this position, the hills extend, with a few breaks, NNW beyond Cape Hamelin, attaining a height of 222m, 3.5 miles NNW of Cape Leeuwin.

Cape Leeuwin Light is shown from a gray round stone tower situated on the south summit of the cape. Cape Leeuwin has been reported to give good radar returns up to 17 miles.

Directions for rounding Cape Leeuwin.—The distance to which submerged dangers extend off a long stretch of the coast in the vicinity of Cape Leeuwin, and the frequent thick weather that prevails with strong onshore winds and a set towards the coast, renders it imperative to give this dangerous cape a berth of at least 15 miles in all but settled weather and good visibility.

When approaching the coast between Cape Naturaliste and Cape Leeuwin by day, in clear weather, vessels may navigate into a depth of 55m, the bottom being coarse sand mixed with shells and small stones.

Great caution should be used in navigating at night to make Cape Leeuwin Light; with reduced visibility the light may not be visible as far as Geographe Reef, 8 miles NW, due to mist hanging about the land when it is clear at sea. Soundings should not be neglected, and vessels should not venture into depths of less than 128m.

Caution.—Reefs extend up to 5 miles SE from the cape.

Off-lying Dangers

5.57 Geographe Reef (34°19'S., 114°59'E.), 4 miles offshore and 8 miles WNW of Cape Leeuwin, consists of two steep-to submerged rocks about 0.1 mile apart, close inside the 40m curve; in moderate weather, the sea breaks at uncertain intervals.

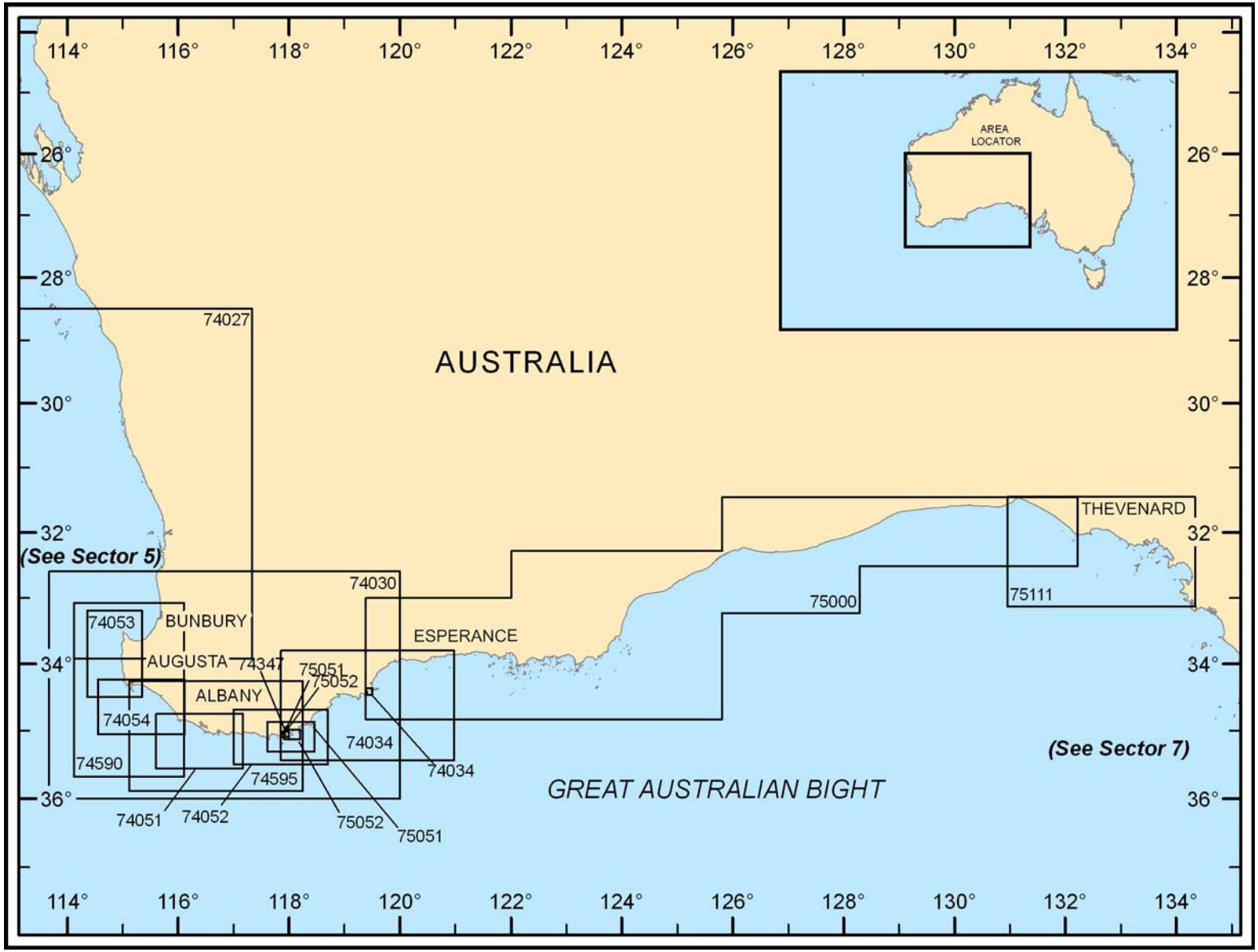
Minns Ledge, 2m high, lies about 2 miles ENE of Geographe Reef; there are many rocks between it and Cape Hamelin, 2.25 miles N.

Cumberland Rock, 10m high and of a dark color, lies 4.5 miles NW of Cape Leeuwin. The outer submerged reef in this vicinity lies 1.25 miles SW of Cumberland Rock; the reef breaks only during a heavy swell. Jacks Ledge lies inside Cumberland Rock. Between Cumberland Rock and Cape Leeuwin, there are many submerged rocks on which the sea breaks in heavy weather.

St. Alouarn Islet (34°24'S., 115°12'E.) lies 3.5 miles SE of Cape Leeuwin; Southeast Rocks extend 1.5 miles farther SE. A sunken rock lies about 0.1 mile E of them.

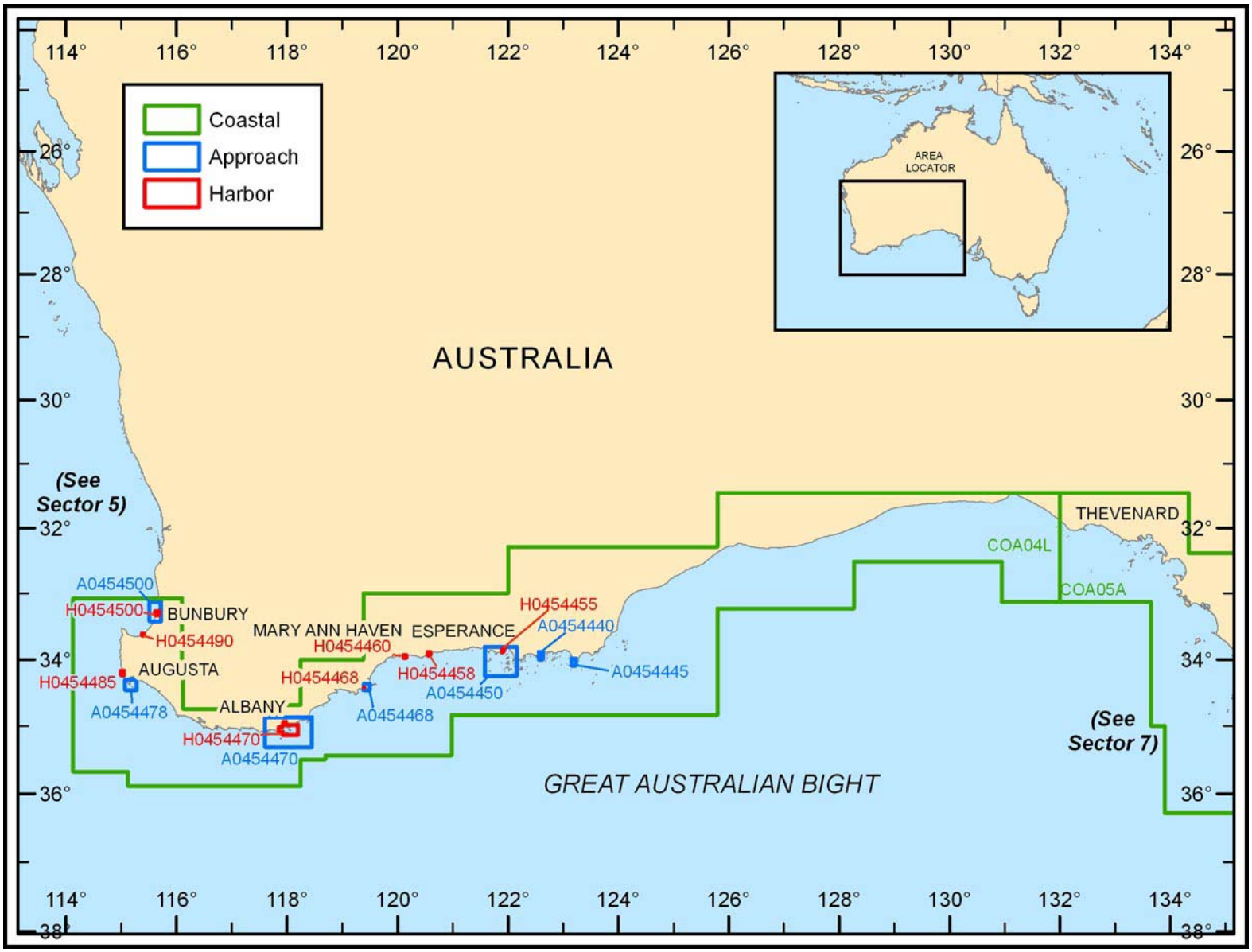
Southwest Breaker, on which the sea seldom breaks, is the S extremity of the reef; it has a depth of 3m, with 24m close seaward. The rock lies about 4.75 miles SSE from Cape Leeuwin Light.

The W rock of the rocky chain has a depth of 3.2m and lies about 2.5 miles SSE from Cape Leeuwin Light. The sea only breaks over this rock in bad weather. The position of the rocks may best be seen on the chart.



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

SECTOR **6** — CHART INFORMATION



Additional DNC library coverage may be found in NGA DNC 4 and 5 (Limited Distribution) discs within the README\GRAPHICS folder.

SECTOR 6 — DNC LIBRARY INFORMATION

SECTOR 6

SOUTHWEST COAST OF AUSTRALIA—CAPE LEEUWIN TO CAPE ADIEU

Plan.—This sector describes the SW coast of Australia from Cape Leeuwin to Cape Adieu, about 900 miles E. The port of Albany and other facilities are included in their respective positions. The arrangement is from W to E, including the offshore islands and dangers.

General Remarks

6.1 The coast of Australia from Cape Leeuwin E to Cape Adieu presents a varied front, from the mountains of the W to the low swampy salt marsh of W South Australia. In the SW part of the state of Western Australia, the Darling Range, with heights of less than 610m, parallels the W coast for about 300 miles N from the vicinity of D'Entrecasteaux Point. The highest peak of the Sterling Range lies near Albany and is 1,109m high.

The country descends gradually from the mountains toward the E part of the state, which is mainly tableland, where it gives way to the swamps and marshland of SW South Australia.

The ports of Albany and Esperance are the primary ports of importance described in this sector.

Winds—Weather.—There is a tendency along this coast for winds between S and E to predominate in the summer and for winds between N and W to predominate in winter. However, these seasonal tendencies are greatly complicated by the effects of the local sea breezes. Under suitable conditions, an onshore wind develops during the late forenoon and persists until dusk, blowing perpendicular to the general coastline. Late at night and in the early morning, an offshore wind tends to blow in the opposite direction.

At Cape Leeuwin, SE winds predominate in the summer, especially in the afternoon. In the winter, the winds are variable, mainly between SW and NE through NW. Near Eyre, the sea breeze occurs in the late afternoon and is generally from the SE from November to March. In July, winds from the NW are most frequent, with a high proportion of these winds caused by the land breeze effect.

These coasts are, for the most part, low-lying and therefore are not generally subject to the type of squalls associated with a mountainous coast. However, exceptions can be found, especially near Bald Head and Limestone Head, where gusts of great strength occur when the general wind direction at sea is between S and W.

Visibility is generally good, with exceptionally good visibility quite common; the limiting factors are rain, mist, and fog. Rain associated with s depressions, which most frequently occur from May to August, frequently reduces visibility below 2 miles and occasionally below 0.5 mile. On rare occasions, it may drop to 100m in very heavy rains.

Fog seems comparatively rare on the coast and over the adjacent sea. Observations indicate the highest frequencies occur during the winter months. Along the coast, where there are numerous inlets and profuse vegetation, there may be patchy drifts of shallow mist or fog occurring frequently during the early morning hours.

Tides—Currents.—The current setting E from Cape Leeuwin along the S coast of Australia appears to be influenced principally by the prevailing winds. Since the winds show considerable variability, the currents, too, must show a similar variability. The currents in the vicinity of Cape Leeuwin set predominantly SE from April to November; the currents are more variable from December to March. In all months, however, there is a moderate possibility of onshore sets, with rates of 2 knots in this area. Some vessels have experienced constant N and NE currents, at rates of 1 to 1.5 knots, while others have been set to the E but little to the N as they approach the SW coast of Australia.

In the area covered by this sector, the prevailing winds from between NW and S arrive after a long fetch over uninterrupted ocean. These winds are often strong and persistent, with resulting rough seas and spells of moderate to heavy swells. Rough seas may persist for several days, particularly from June to September. The maximum disturbances occur at the frontal troughs, with the severity increasing from N to S. The normal rate of movement of the high and low pressures is such that a vessel traveling E may experience rough seas from Cape Leeuwin to Gabo Island, at the SE extremity of Australia, while a vessel traveling W would pass through rough and smooth seas at comparatively short intervals.

Cape Leeuwin to King George Sound

6.2 Flinders Bay (34°20'S., 115°12'E.) is located between Matthew Point, 1 mile ENE of Cape Leeuwin, and Ledge Point, 5 miles farther ENE. The W shore is rocky and backed by a ridge from 30 to 45m high. The N shore is comparatively low and sandy, backed by hills covered with dense brush and attains a height of 40m. Barrack Point, 8m high, is located on the W side of the bay 1.5 miles NNE of Matthew Point.

Cole Rock, with a least depth of 4m, lies 0.4 mile SE of Barrack Point, and a rocky patch, consisting of two rocks with a depth of 5.5m, lie 1.25 miles NE of the same point.

Bessie Reef, with a least depth of less than 1.8m near its E end, lies with its shallowest depth 2 miles SE of Ledge Point; the depths increase rapidly to 16.5m S of the reef, which seldom breaks.

A similar reef lies between Bessie Reef and Ledge Point.

Augusta (34°20'S., 115°10'E.), a small township on the W bank of the Blackwood River, lies close N of Barrack Point. The Blackwood River discharges into the head of Flinders Bay 1.25 miles N of Augusta, and the coast is fringed by reefs and shoal patches extending up to 0.5 mile offshore. The bar across the mouth of the river is about 1m in depth, except during the winter months or with heavy rains when there are depths of 1.8 to 2.1m; boats should not attempt to cross the bar without local knowledge.

Anchorage.—Safe anchorage can be obtained in the NW part of Flinders Bay from October to May.

6.3 From Ledge Point for 6 miles E, the coast continues low and sandy, with hills behind ranging from 45 to 61m high, and covered with dense brush. From there to White Point, 7.5 miles farther SE, the land becomes higher with several patches of sand on their slopes. White Point is named from a long white patch of sand at its extremity. Reefs, some of which dry, extend up to 0.5 mile seaward from White Point.

Cape Beaufort (34°25'S., 115°32'E.), 43m high, 4.5 miles SE of White Point, with Black Point close W, is composed of dark basaltic rock, which is easily identified as the coast on either side for several miles is sandy. Dickson Peak, a dark conspicuous hill, 142m high, is located 2 miles NW of Cape Beaufort. There is a foul bight on either side of the cape.

From Cape Beaufort, the coast trends in a SE direction for 34 miles to Point D'Entrecasteaux. The Donnelly River and the Warren River discharge 7 and 17 miles, respectively, SE of the cape. The mouth of both rivers is closed, except during winter and after heavy freshets.

Silver Mount, 136m high, is located about midway between the Donnelly River and the Warren River, 1.5 miles inland. The coast, a short distant SE of the Warren River, is composed of dark bushy-topped sand hills, culminating in Callcup Hill, 236m high. From the base of the sand hills, swamps extend to the beach.

The **Meerup River**, which extends a few miles inland, percolates through the beach 4 miles SSE of the entrance to the Warren River, forming quicksand which can only be crossed by keeping on the edge of the surf. These quicksands occur at the mouth of most of the rivers between Cape Beaufort and Point D'Entrecasteaux.

Courtesy of NatureBase - Dept. of Conservation and Land Management, Gov't of Western Australia

Point D'Entrecasteau as seen from Windy Harbor

The high coastal ridge terminates abruptly, about 9.5 miles SE of the Warren River, in a bare sand-topped hill, 246m high; then the coast is low and rocky for a distance of 2.5 miles to Black Head. Doggerup Creek flows through a bare sand patch of moderate height, 1 mile SE of Black Head. From Doggerup Creek, high rocky sandstone cliffs extend about 0.5 mile beyond Point D'Entrecasteaux, but a small break about 1.5 miles N of the point is low and grassy.

From Cape Beaufort to Point D'Entrecasteaux, the coast is fronted by heavy breakers; those breakers S of the Warren River break from 0.5 to 0.75 mile from shore.

6.4 Point D'Entrecasteaux (34°50'S., 116°00'E.), composed of reddish perpendicular cliffs, 122m high, is one of the most remarkable projections on this part of the coast. Mount Chudalup, a conspicuous granite hill, rises abruptly from a low swamp to a height of 185m, 6 miles NE of the point. This point has been reported to give good radar returns at 23 miles and to be identifiable with charted features at 16 miles. A light is shown from a white square tower situated on Point D'Entrecasteaux.

Flat Island, 8m high, with a number of dry rocks around it, lies about 0.5 mile SW of Point D'Entrecasteaux. South West Reefs, consisting of three reefs 0.5 mile apart, lie 2.75 miles S of the same point. The two N reefs are about 0.15 mile in diameter and are nearly awash; the S reef is smaller, with greater depths, and does not break regularly.

Sandy Island, 14m high, lies 2.5 miles SE of Point D'Entrecasteaux; a number of small ledges and submerged rocks extend from it. Several reefs, some of which are awash, lie between the island and the shore, and in heavy weather this locality appears as a mass of breakers.

The coast between Point D'Entrecasteaux and the entrance to the Gardner River, 6 miles E, is fronted by a sandy beach. Low grassy ridges and swamps, with occasional clumps of trees, extend several miles inland behind the beach. Close within the 40m curve, which lies about 5 miles offshore, there are detached rocks, with depths of less than 1.8m.

The Gardner River flows into the sea over a narrow rocky bar; off the bar are several dry ledges and sunken rocks. The river usually flows with great strength, except in very dry seasons, when it may be forded at its mouth.

Between the Gardner River and West Cliff Point, 9 miles ESE, is a small projection fronted by rocks; a conspicuous sand patch is located 1 mile NNW of West Cliff Point.

6.5 West Cliff Point (34°54'S., 116°17'E.), 43m high, is the W extremity of high precipitous cliffs which form the coast to Broke Inlet, 5 miles ESE, and continue to Cliffy Head, 7 miles farther SE. The entrance of Broke Inlet (Brookes Inlet) is generally closed by a broad bar of sand. A rock, on which the sea breaks at times, lies 1 mile WSW of West Cliff Point.

The hills SE of Broke Inlet rise gradually to an elevation of 248m about 2 miles NW of Cliffy Head. The SW extremity of Cliffy Head terminates in a narrow cliff, 115m high.

Cow and Calf Rocks (35°01'S., 116°13'E.) are two rocks located about 8 miles offshore SSW of West Cliff Point. The W rock, 33m high, has a jagged top whitened by guano. The smaller rock, 12m high, is of dark appearance and has a flattened top. These rocks are steep-to and soundings give no indication of their proximity, but they do afford good radar targets.

Broke Reefs (Brookes Reefs) lie 2 miles SW of the entrance to Broke Inlet; the sea breaks constantly on the shallowest part, which lies 1.75 miles WSW of the entrance. Breakers also lie 4 miles SE of the inlet. The extremity of Point Nuyts, in range with the S edge of Chatham Island, leads S of the reef and breakers and N of Cow and Calf Rocks.

6.6 Chatham Island (35°02'S., 116°30'E.), 0.5 mile SSE of Cliffy Head, appears brown and bald and has a few scrubby bushes near its 186m summit. The S end of the island rises perpendicularly from the sea and slopes steeply N; when seen from the E or W, it has a wedge-shaped appearance. A rocky islet, 27m high, lies 0.15 mile W of Chatham Island and a rock, awash, lies 1 mile farther W. A shoal, with a depth of 24m, lies 8 miles SW of Chatham Island.

The coast between Cliffy Head and Long Point, a narrow cliffy projection, 43m high, 4.25 miles ESE, forms a bight which has a conspicuous sand patch at its head. A high cliff extends from the sand patch ESE to Long Point; a conspicuous round green hill rises abruptly from a gully on its E side, 1 mile E of Long Point. From the gully the high cliffs continue to a position about 1 mile E of Point Nuyts.

Point Nuyts (35°04'S., 116°38'E.), projecting SSW from the coast in a position about 3 miles ESE of Long Point, is 144m high and rises to an elevation of 197m close within the point.

Mount Hopkins, a remarkable mass of granite, is located on a ridge 204m high, which rises abruptly from the coast 2 miles ENE of Point Nuyts. About 1.75 miles farther SE, there is a narrow sandy beach backed by a steep sand cliff which has a dark cliffy head at its S end. Rocky Head, about 24m high, lies 1.5 miles E of the dark head.

Mount Frankland (Caldyanup Peak), Mount Mitchell (Rugged Peak), and Granite Peak (Sugar Loaf Peak), three prominent peaks, each between 308 and 411m high, are located between 13 and 19 miles N of Rocky Head.

6.7 Goose Islet (35°04'S., 116°44'E.), 38m high, lies 2 miles S of Rocky Head. Rocks, on which the sea generally breaks, lie 0.2 mile E and W of the islet and a rocky ledge, 1.2m high, on which the sea constantly breaks, lies 0.75 mile WSW of the islet.

Black Rock, 21m high, and Saddle Island, 45m high, lie 3.75 miles WNW and 0.5 mile N, respectively, from Goose Islet. Other dangers, which may best be seen on the chart, are located between Point Nuyts and Rocky Head.

Anchorage, sheltered from NW gales, can be obtained with local knowledge off Rocky Head.

Nornalup Inlet, located on the W side of the bay close E of Rocky Head, has an entrance about 0.1 mile wide between the heads. The fairway of the entrance is shallow, but during the rush of water after heavy rains, depths may reach 3.6m. Heavy swells constantly roll into the bay making it difficult for even boats to enter. The Frankland River and the Walpole River flow into the inlet.

Sand hills, 45 to 60m high, extend 3 miles E from Nornalup Inlet, then rise to a rocky bluff 98m high, about 1 mile farther SE. A rocky ledge extends 0.2 mile seaward from the bluff.

A rock, which breaks in a heavy swell, lies about 0.75 mile offshore in a position 2.5 miles E of Rocky Head.

A small green headland, 45m high, projects from the coast 5 miles ESE of Rocky Head; the land within the headland rises abruptly to a height of 137m. A stream flows through a high sand patch into a bight on the W side of the green headland.

Rame Head (35°03'S., 116°52'E.), 125m high, lies 0.75 mile E of the small green headland; Point Irwin lies 3 miles farther E. The coastal waters from the small green headland to Point Irwin are foul, with above and below-water rocks extending up to 1 mile offshore SE and SW of Rame Head.

6.8 Point Irwin (35°04'S., 116°55'E.), 52m high, is the SW extremity of Foul Bay. A prominent green peak rises abruptly to an elevation of 52m, about 0.75 mile NW of the E entrance point of Foul Bay. The bay, about 5 miles in width between the entrance points, is encumbered with reefs and submerged rocks, and in bad weather, the entire bay is a mass of breakers.

Irwin Inlet opens into the head of Foul Bay. The entrance of the inlet is seldom closed, but it is too shallow for a boat to enter except after a heavy freshet. There are several villages on the N side of the inlet.

The coast from Foul Bay trends E for 2 miles to a dark headland, 49m high, which has several rocks off its SE extremity.

Boat Harbor lies to the E of the dark headland described above and is safe for boats in moderate weather; landing might be made on a small sandy beach at the head of the harbor. Rocks extend nearly 0.5 mile SE from the N entrance point of Boat Harbor.

From the swampy flats close E of Boat Harbor, the land rises gradually to Hillier Point, 3 miles farther E. An island, 37m high, lies 0.1 mile offshore, 1 mile E of Boat Harbor.

Point Hillier (35°04'S., 117°09'E.) is a narrow projection, 134m high, with a cliffy face and a flat top, from which the land rises abruptly to an elevation of 155m. There are times when landing can be made inside the point. A depth of 23m lies 3.5 miles SSW of Point Hillier.

Stanley Islet, whose 49m summit is covered with coarse grass, is located 0.1 mile S of Point Hillier. Foul ground, which breaks in bad weather, lies about 0.75 mile ESE of Stanley Islet.

William Bay lies between Hillier Point and Edward Point about 5 miles ENE. Parry Inlet, whose entrance is generally closed, discharges into the NW part of the bay and on the NE shore of the bay there is a conspicuous sand patch.

6.9 Wilson Head (35°03'S., 117°20'E.), located 4 miles E of Edward Point, is a broad, cliffy projection, 122m high. Two small streams flow into the head of the bay that lies between Edward Point and Wilson Head.

Bennett Range is an irregular and broken range that extends N from Wilson Head. Mount Shadforth, the S peak, 319m high, is located 3 miles N of Wilson Head and Mount Lindesay, 459m high and prominent from seaward, lies 10 miles farther N. A ridge extends some miles E from Mount Lindesay.

Ratcliffe Bay is located close NE of Wilson Head. A heavy swell usually sets into the bay.

Wilson Inlet opens into Ratcliffe Bay, 1 mile N of Wilson Head; its 0.5 mile wide entrance is generally blocked by sand. A number of streams discharge into the inlet.

Two sand drifts are located a short distance E of Wilson Inlet; the coast then rises steeply to an elevation of about 155m and presents a cliff front that continues to Knapp Head, 7 miles ESE. A heavy surf always breaks on this coast.

A submerged rock lies 0.35 mile offshore, 1.5 miles NW of Knapp Head.

Knapp Head (35°05'S., 117°29'E.), 122m high, is conspicuous and has grassy ridges rising to 183m high, 0.75

mile inland. The head has been reported to give good radar returns up to 17 miles.

West Cape Howe, 6.5 miles SE of Knapp Head, is the W of three bluff headlands, each 91m high, located at the S end of a promontory. Torbay Head, the farthest E of the three headlands, has a round scrubby top.

The coast trends N from Torbay Head to Forsyth Bluff, a distance of about 3 miles, then in a general NNE direction 3 miles, to the entrance of Torbay Inlet.

To the E of Torbay Inlet, for about 1.25 miles, the land rises to a height of 143m; then the coast trends 8.5 miles SE to Sharp Point.

Torbay Bay lies between Torbay Head and the coast N of Stony Island, and includes Port Harding, Port Hughes, and Torbay Inlet. There are several islands in the bay which may best be seen on the chart.

Anchorage has been obtained, in 32m, about 0.6 mile NW of a rocky bluff, 0.75 mile N of Torbay Head. Shelter for vessels with local knowledge may be found in Port Harding, close N of Forsyth Bluff and in Port Hughes, 1 mile ESE of Torbay Inlet.

6.10 Sharp Point (35°07'S., 117°52'E.) rises to a height of 165m; the cliffs at the point and for 0.5 mile E are precipitous. Grove Hill, 212m high, stands 0.5 mile N of Sharp Point.

Cave Point (35°08'S., 117°54'E.), 2 miles ESE of Sharp Point, is faced with low, dark cliffs. A black rock, 15m high, lies close S of Black Head, which is located 1 mile E of Cave Point.

Peak Head, 150m high, is a bluff, rocky projection 1.25 miles ESE of Black Head. Stony Hill, a prominent mass of granite boulders 224m high, rise abruptly 1 mile within Peak Head. A small dry rock lies close off Peak Head.

Between Peak Head and Black Head, a bight is formed, which has a narrow rocky cove in its N part. Landing may also be made in Newles Inlet, 0.25 mile NW, which provides good shelter for small craft in all but S winds.

An intermittent stream of water flows out of a precipitous ravine on the N side of a bluff, 1.5 miles NE of Peak Head. A little farther N is a dark, round, granite hill, 140m high. Isthmus Bay is formed between the bluff and Bald Head, 2.5 miles E.

Bald Head (35°06'S., 118°01'E.) is the E extremity of the Flinders Peninsula, which forms the S side of King George Sound. The head, 122m high, with a smooth round surface, almost destitute of vegetation, has a white sterile appearance when seen from the E. The Flinders Peninsula reaches a height of 234m, and Limestone Head, on the N side of the peninsula, is 176m high. Northumberland Rock, 4m high, lies 0.1 mile S of Bald Head.

Caution.—Vessels rounding Bald Head should be prepared for heavy rolls. Marine farms are situated along the N shore of the Flinders Peninsula.

Off-lying Islands and Dangers

6.11 Stony Island (35°06'S., 117°47'E.), a dome-shaped granite island, 45m high, with two or three prominent boulders on its summit, lies 7.5 miles ENE of Torbay Head, and appears white with the sun shining on it. It is steep-to and may be approached to a distance of 0.1 mile.

Passage Reefs (35°08'S., 117°49'E.) are three reefs which lie between 1.5 and 3 miles SE of Stony Island. The N reef has a least depth of 12.7m, the SW reef has a least depth of 5.9m, and the SE reef has a least depth of 9.1m. There is deep water around each of the reefs and the sea occasionally breaks on them.

The Green Islands, two in number about 0.1 mile apart, lie about 0.5 mile SSW of Sharp Point. The islands are composed of dark granite and have a low grass covering. A 6m high black ledge lies 0.1 mile W of the W islet.

North Rock, with a least depth of 16m, lies 0.5 mile SW of the Green Islands.

6.12 Eclipse Island (35°11'S., 117°53'E.), 109m high, lies about 3.5 miles SSW of Cave Point. The island is the largest of a group of islets, rocks, and dangers that lie in its immediate vicinity, and which extend from Eclipse Island in a NW direction about 6.25 miles to Stony Island. These dangers may best be seen on the chart. Eclipse Island Light is shown from a white lantern on a round concrete tower.

An area, whose limits are shown on a chart, in which anchorage is prohibited, lies between the N and E sides of Eclipse Island and the coast between Cave Point and Black Head. A shoal, with a least depth of 10m, lies 1.5 miles NE of the NE end of Eclipse Island; another shoal, with a least depth of 25.5m, lies 0.5 mile N of the 10m shoal.

Maude Reef (35°12'S., 117°58'E.), which has a depth of less than 2m, lies 4 miles ESE of Eclipse Island Light; the reef seldom breaks.

Vancouver Rock, 5m high, lies 2.5 miles SW of Bald Head. The swell, which usually rolls in from the S and W, breaks violently over this steep-to rock.

At night, vessels making for King George Sound should maintain depths of 82m until a bearing of Breaksea Island Light (see paragraph 6.16) indicates that they have passed Maude Reef.

Caution.—Near Bald Head and Limestone Head, gusts of wind of great strength sometime occur when the general direction of wind at sea is between S and W.

King George Sound

6.13 King George Sound (35°03'S., 117°58'E.) is entered between Bald Head and Herald Point, about 5 miles NNE. The sound is the safest and most convenient port along this coast of Australia. There is good anchorage in the sound, and on its W side is Princess Royal Harbor, which is landlocked, and available to ocean-going vessels. The SW part of the sound is known as Frenchman Bay and the NW part is known as Middleton Bay; Oyster Harbor lies N of Middleton Bay. The port of Albany lies on the N shore of Princess Royal Harbor.

The SW shore of King George Sound trends in a NW direction from the Flinders Peninsula to the Vancouver Peninsula, about 3.5 miles distant. The summit of the Flinders Peninsula is 234m high, while the hilly land of the Vancouver Peninsula rises to a height of 82m in its center. Possession Point is the NE extremity of the Vancouver Peninsula.

Caution.—Marine farms lie on the northern and southern coasts of Mistaken Island and between Limestone Head and Waterbay Point; may be floating or fixed structures and their

associated moorings should be avoided. The farms are generally marked by buoys or beacons, which may be lit. Their charted positions are approximate.

6.14 Frenchman Bay (35°05'S., 117°57'E.) lies between Flat Rock on the S and Mistaken Island to the North. Flat Rock, 2m high, is located 0.2 mile offshore, 1.75 miles W of Limestone Head. Mistaken Island, 44m high, is located 2 miles NNW of Flat Rock. There are a number of above-water rocks between it and shore.

Seal Island, 32m high, is located 1.5 miles NW of Limestone Head and is steep-to, but has a rocky spit extending about 0.1 mile from its W side; the island lies 1.25 miles E of Frenchman Bay. An 18m patch lies about 0.65 mile NW of the island.

Frenchman Bay provides convenient anchorage over sand and weeds, in a depth of 16m, about 0.35 mile offshore, with Seal Island and the center of Michaelmas Island in line and Flat Rock bearing 131°. Good anchorage can also be found, in all but very strong W or N winds, between Seal Island and the first sandy beach W of Limestone Head, with Limestone Head bearing 073°. A partly submerged pipeline, which is a hazard to navigation, extends about 0.3 mile NNW from a disused whaling station, 0.25 mile SSW of Flat Rock. A dangerous wreck lies 650m SW of Seal Island.

6.15 Herald Point (35°01'S., 118°02'E.), on the N shore of King George Sound, is covered with grass; the land close NW of the point rises to a height of 69m. The coast is backed by a grassy ridge, which rises to Mount Taylor, at a height of 206m, and then slopes gradually to Ledge Point, 1.25 miles W of Herald Point. The beach between Herald Point and Ledge Point is fronted by sunken rocks lying up to 0.1 mile offshore.

The coast between Ledge Point and Cheyne Head, about 1.75 miles WNW, recedes and forms a sandy cove where small vessels, with local knowledge, can obtain anchorage sheltered by all but SW winds.

From Cheyne Head, the coast trends NW 1.5 miles to the entrance to Oyster Harbor; the land behind the coast rises to a height of 156m and is densely wooded.

Herald Rocks (35°02'S., 118°02'E.), with least depths of 4m, lie between 0.3 and 0.5 mile S of Herald Point. Middle Rock, with a least depth of 8.3m, lies 0.25 mile S of the S extremity of Herald Rocks; Mount Pleasant Rock, with a least depth of 5.1m, lies about 0.25 mile farther SSW.

Gull Rock, 10m high, is located 0.35 mile WSW of Ledge Point; there is a small dry rock lying close W. There are depths from 5.3 to 9.1m in the channel between Gull Rock and Ledge Point.

Cheyne Ledge, farther W along the coast about 1 mile WNW of Cheyne Head, is a small rocky ledge, awash at high water, located about 0.1 mile offshore. The entrance to Oyster Harbor is obstructed by a bar, with a depth of 3m, in the fairway. The tidal currents run with considerable strength in the entrance and no vessel should attempt to enter it without local knowledge.

The coast between the entrance to Oyster Harbor and Wooding Point, 2 miles SW, is low and forms Middleton Bay. Ellen Cove, near the S end of Middleton Bay, has a jetty, with depths of 1 to 1.4m alongside, which can be used by boats.

Wooding Point (35°02'S., 117°55'E.) is the E extremity and King Point is the SE extremity of the headland that forms the N side of Princess Royal Harbor. King Point Light is shown from a white framework tower.

A spoil ground lies 0.25 mile N of Wooding Point and Whale Head Rock lies close offshore, 0.15 mile N of King Point.

6.16 Belches Foul Ground (35°06'S., 118°03'E.) lies 1.5 miles ENE of Bald Head; it consists of a number of rocky patches. East Shoal, with depths of 11.3m, and West Shoal, with depths of 16.8m, are the shallowest. During S gales, the sea breaks heavily on East Shoal and the whole area of Belches Foul Ground is covered with a dangerous and confused sea.

Breaksea Island (35°04'S., 118°03'E.), 3 miles NE of Bald Head, is a rugged mass of rock 103m high, with an islet 20m high, located off its E end. A light is shown from a round stone tower on the summit of the Breaksea Island; two ruined dwellings stand at the top of the island E of the light. A detached shoal, with a depth of 16m, lies 0.4 mile ENE of the E end of Breaksea Island. Less water may exist over this shoal.

South Channel lies between Belches Foul Ground and Breaksea Island.

Michaelmas Island (35°03'S., 118°03'E.), 152m high, lies 0.75 mile N of Breaksea Island and is covered with grass and stunted trees.

Middle Channel, which separates Breaksea Island from Michaelmas Island, is deep and clear of dangers.

North Channel lies between Michaelmas Island and Herald Point, on the mainland, about 1 mile N. The channel is encumbered with rocks. A wreck, with a depth of 10m, lies in North Channel, close N of the W end of Michaelmas Island. Vessels with a draft of greater than 3m should not use North Channel without a pilot.

Michaelmas Reef (35°03'S., 118°01'E.), which has a least depth of 6.3m, consists of several rocky patches that lie from 0.6 to 1.1 miles W of Michaelmas Island.

Gio Batta Patch is a detached area of foul ground, with a least depth of 5.5m, lying about 1.75 miles W of Michaelmas Island.

Princess Royal Harbor (35°03'S., 117°53'E.), which is entered through a dredged channel that lies between Possession Point on the S and King Point on the N, is shallow over the greater part of its area, especially on its S and W sides. Princess Royal Harbor is very sheltered from the sea and an excellent place to moor with a well marked channel. A considerable area has been dredged in the NE part to form the port of Albany, which can accommodate large vessels.

Albany (35°02'S., 117°54'E.)

World Port Index No. 54470

6.17 The port of Albany lies within Princess Royal Harbor. The port includes all the waters of King George Sound and Princess Royal Harbor lying W of a line joining the E extremity of Bald Head, Breaksea Island Light, and Herald Point.

Albany is primarily concerned with the import of general merchandise, petroleum products, phosphate, and sulfur. Exports include grain, silica sand, and woodchips.

Albany Port Authority Home Page

http://www.albanyport.com.au

Winds—Weather.—Prevailing winds are from the W in winter and the E in summer.

Tides—Currents.—The tides are often irregular and predominantly diurnal. Springs rise about 0.9m and neaps rise about 0.7m.

Tidal currents are not appreciable in King George Sound, but run with considerable strength in the entrance to Princess Royal Harbor; the flood current sets SW across the entrance and the ebb current sets towards the NE.

Depths—Limitations.—The entrance to Albany is through King George Sound, then via the dredged channel that lies between King Point and Possession Point. The channel is dredged to a depth of 12.2m over a width of 145m. The channel and the turning basin, which is also dredged to a depth of 12.2m, are marked by lighted beacons and indicated by a range. A 230m section of the channel NW of Possession Point has been dredged to a depth of 12.5m.

The Princess Royal Land Backed Wharf fronts the shore from a position about 1 mile W of the entrance. The berths are numbered from the W. The wharf is 608m in length, with a depth alongside Berth No. 1 and Berth No. 2 of 10.4m and 12.2m alongside Berth No. 3. Berth No. 3 handles bulk cargo, mostly grain, in addition to container and ro-ro vessels. Bulk petroleum products are worked at Berth No. 2. Berth No. 6, which handles woodchips, is 216m in length and has a depth of 12.2m alongside.

Vessels up to 67,000 dwt, with a maximum length of 220m, a maximum draft of 11.5m, and a maximum beam of 33m, can be accommodated, subject to the harbormaster's discretion and dependent on the weather and tidal conditions during daylight hours.

Aspect.—The lights that are shown on Breaksea Island and King Point are good landmarks. A directional light, leading NNW from near the pilot boarding position, stands on Emu Point (35°00'S., 117°57'E.). Range lights at the head of Princess Royal Harbor lead through the harbor approach to the SE end of the port of Albany. A memorial illuminated by floodlights is situated near the summit of Mount Clarence, 1.25 miles WNW of King Point; Mount Clarence has a height of 186m. An observation tower, lit at night, stands on Mount Melville, 157m high, about 1.25 miles WNW of Mount Clarence.

Pilotage.—Pilotage for Albany is compulsory for all vessels over 500 gt. The pilot station is situated near Semaphore Point, about 0.5 mile WSW of King Point. Pilots embark about 3 miles ESE of King Point Light.

Regulations.—Albany is a first port of entry. Radio channels guarded are VHF channels 6, 12, and 16, but there is limited Port Radio Service.

Vessels should send an ETA 48 hours in advance and then 24 hours in advance if ETA varies more than 2 hours.

Anchorage.—Good holding ground lies 1.5 miles E of Possession Point. Seven designated anchor berths, with 560m radius swinging circles, have been established approximately 1 mile E of Wooding Point and Possession Point. They are lettered A through G and can best be seen on the chart. Anchoring is prohibited in the charted area, about 1 mile E of King Point, having a radius of 0.5 mile.

Reproduced with permission of the Albany Port Authority
Albany from WNW

Courtesy of Albany Port Authority
Princess Royal Land Backed Wharf

Directions.—Vessels approaching from the W wishing to use South Channel should steer to pass about 2.75 miles E of Bald Head, until South Channel can be entered, when King Point Light bears 292°. King Point Light is sometimes difficult to make out, but a group of boulders on rising ground behind the light can be used as a reference. Continue on course 292° for the pilot boarding position.

Vessels approaching from the E wishing to use South Channel should steer for Seal Island on a course of 270°, and then change course to 292° when King Point Light is on that bearing, continuing on to the pilot boarding position.

Middle Channel, although seldom used, can be used by vessels approaching from the E. By day, keep the S extremity

of Rock Dunder (35°02'S., 118°10'E.) astern bearing 077°, steering a course of 257° until King Point Light bears 292°, when course is altered to 292°, continuing on to the pilot boarding position. At night, alter course S after passing the W end of Breaksea Island until King Point Light bears more than 290°, when the vessel will be S of Gio Batta Patch.

Caution.—Several marine farms have been established in the waters adjacent to Albany and can best be seen on the chart.

King George Sound to Esperance

6.18 Cape Vancouver (35°02'S., 118°11'E.) is the S extremity of an islet, 51m high, that lies 7.5 miles E of Herald Point. The coast recedes about 2.25 miles between Herald Point and Cape Vancouver and is backed by a series of hills, of which the most conspicuous are Reservoir Hill, 165m high, 6 miles NNW of Cape Vancouver, and Mount Gardner, 399m high. Mount Gardner is a peaked mass of granite partially covered with grass and poisonous scrub.

Stirling Range lies about 40 miles N of Cape Vancouver and has several conspicuous peaks. The most conspicuous one is Toolbrunup (Castle Peak), 1,018m high, and is located near the center of the range. Bluff Knoll and Ellen Peak, both higher than Toolbrunup, lie near the E end of the range.

False Island and Inner Islet lie close off the coast 1 and 2 miles, respectively, NW of Cape Vancouver. Foul ground lies between the two islands and may best be seen on the chart.

Rock Dunder (35°02'S., 118°10'E.), a long, narrow rock 60m high, lies 1.25 miles W of Cape Vancouver. Close E of the rock is a small rock above water; the rest of Rock Dunder is steep-to.

The coast between Cape Vancouver and South Point, about 3.5 miles N, is steep and rocky. Coffin Island (Caffin Island), 45m high, lies 0.1 mile offshore, 2 miles NE of Cape Vancouver. A number of rocks lie up to 0.35 mile S of the island; the outer one is 2.5m high.

Two Peoples Bay, which has not been properly surveyed, lies between South Point and North Point, 2 miles NNE. A ledge of rock extends about 0.1 mile N from South Point and a ledge, on which the sea generally breaks, lies about 0.3 mile NE of this ledge.

6.19 North Point (34°57'S., 118°13'E.) is a rough, stony islet, 27m high, with little vegetation on its top; it is connected to the mainland by a ledge of rocks. Immediately behind the point, the land rises steeply to a height of 195m; a remarkable square granite boulder is located on the summit.

The coast from North Point to a rocky projection about 2.25 miles NE is a long rock-fringed sandy beach, backed by a ridge of bush-topped sand hillocks. The coast between the rocky projection and Mermaid Point, about 7.5 miles E, is steep and has several rocky indentations.

Mount Manypeaks rises to an elevation of 565m, 4 miles NE of North Point; it falls gradually toward the Waychinicup River, 3.5 miles E.

The Waychinicup River flows into the sea 4 miles W of Mermaid Point. Excellent shelter for small craft with local knowledge can be found within the second bend of the river.

The coastal ridge in the vicinity of Mermaid Point rises to an elevation of 150 to 195m, surmounted by huge granite boulders, and terminates 2 miles NE.

The **Twin Islets**, 2 miles SSW of **Mermaid Point**, are each 26m high. There are submerged rocks between the islets; a shallow patch extends 0.25 mile N from the N islet. The sea generally breaks on a rock approximately 1 mile W of Mermaid Point.

Bald Island (34°55'S., 118°27'E.), 311m high, is separated from the mainland by a channel 0.75 mile wide. Submerged rocks extend 0.1 mile from its NW side. The sea breaks constantly on a detached ledge, 0.6m high, that lies 0.25 mile S of the island.

Bird Rock, 3.6m high, is located 0.5 mile NE of Bald Island. A small rock lies close W and a similar rock lies close S of Bird Rock.

The coast between Bald Island and Butty Head, about 173 miles ENE, has not been closely surveyed and special caution is necessary when navigating in those areas where no sounding are charted.

6.20 Lookout Point (34°53'S., 118°26'E.) lies about 2 miles NE of Mermaid Point. Anchorage, in a depth of 12.8m, sand, may be obtained off a sandy beach about 1.25 miles WNW of Lookout Point, with Mount Manypeaks bearing 260° and Lookout Point in line with the E side of Bald Island, bearing 123°.

The coast from the above anchorage to a point about 10 miles NNE is one continuous sand beach. Warriup Hill lies about 2.5 miles N of the N end of the sandy beach. Warriup Hill is a prominent scrubby mount, 311m high. Green Ridge, from 245 to 309m high, extends W from a position N of Warriup Hill.

Haul-off Rock (34°42'S., 118°39'E.), a prominent granite rock, 96m high, lies 1 mile offshore, 8 miles E of Warriup Hill. A ledge of rocks extends off its SW end and a detached ledge lies 0.5 mile SW of the highest part of the rock.

Two small rocks lie close to Ledge Point, 4 miles NE of Haul-off Rock.

Cape Riche, 4 miles farther NE, is a cliffy projection of moderate elevation, with a level appearance.

Cheyne Islet, 34m high, lies 1 mile NW of Cape Riche. Large vessels can anchor midway between the islet and the cape. Smaller vessels can anchor W of the islet and vessels of not more than 3m draft can anchor SW of the islet.

A dangerous reef, reported to have a least depth of 5.5m and a charted depth of 8.5m, is steep-to and lies 4 miles SE of Cape Riche. As the sea has seldom been seen to break on this reef, it is considered to be of small extent.

The coast between Cape Riche and Cape Knob, 23 miles E, forms a large bay, which may be identified by the land on its W side being cliffy and that on the E side consisting of almost bare sand hills.

6.21 Groper Point (34°30'S., 118°54'E.), 58m high, is located 9 miles NE of Cape Riche. Close NW of the point, the land rises to form Mount Groper, which has a height of 154m.

Smooth Rocks, located about 11 miles E of Groper Point, consist of three bare rocks. The S rock, the largest of the three,

is 51m high. Roe Rock, 3.6m high, lies about 2 miles ESE of Smooth Rocks.

Cape Knob (34°32'S., 119°14'E.) is a rugged stony promontory which rises to a height of 220m, in a position about 1.5 miles NNE.

Good anchorage can be found, in a depth of 13m, off a sandy beach close NW of Cape Knob; it has been reported anchorage could be obtained W of the cape.

Dillon Bay is the sandy bight between Cape Knob and Point Henry, about 5.5 miles ENE. Breakers and indications of shoals have been observed in the middle of the bay and it should not be entered without local knowledge.

Black Point (34°27'S., 119°25'E.) is the NE extremity of a small promontory which extends E from the coast 1.75 miles NE of Point Henry.

Bremer Bay is located between Black Point and the W extremity of Point Hood, about 4.5 miles NE. Glass Islet lies 0.5 mile offshore, on the W side of the bay, 2.5 miles N of Black Point. It is reported that Bremer Bay appears free from dangers and that anchorage, sheltered from all winds, could be found in it.

6.22 Hood Point (34°22'S., 119°33'E.), 112m high, is the SE extremity of a cliffy headland that projects about 4 miles in a SE direction from the general trend of the coast. When seen at a distance from seaward, the headland appears to be an island, as the land connecting it to the mainland is low and sandy. A conspicuous building stands on the N side of Hood Point.

The **Doubtful Islands**, the highest of which is 75m, extend 2.25 miles E from Hood Point. Between the two E and two W islands, there is a channel 1 mile in width that has depths of 37 to 44m and which shoals to 22m, close around the N side of the two inner islands.

Seal Rock, 3m high, and a sunken rock close N of it, lie 1 mile NW of the two W islands of the Doubtful Islands.

Doubtful Island Bay is formed within the Doubtful Islands. The bay affords shelter from winds between S and SW.

There are depths of 13m, about 0.1 mile offshore, 1 mile NW of Hood Point. A submerged rock lies near the shore of the bay, 4 miles NW of Seal Rock.

The land on the W and NW side of the bay is sandy and rocky; several barren peaked hills rise to considerable heights a short distance inland. The mouths of Gordon Inlet and the Boondadup River are located about 6.5 and 10 miles, respectively, N of Hood Point. West Mount Barren rises to a height of 372m, in a position about 12 miles NNW of the same point.

Ann Point (34°10'S., 119°34'E.) is located about 12.5 miles N of Point Hood; the St. Mary River mouth is close N of Ann Point and the Fitzgerald River flows into the sea in a position close N of Point Charles, which is located about 4.5 miles NE of Ann Point.

Middle Mount Barren, 457m high, is located about 6 miles NE of Point Charles. From Middle Mount Barren, the high rocky coast trends NE for about 19 miles to East Mount Barren, which rises to a height of 299m about 0.5 mile inland.

The Whoogarup Range rises to an elevation of 392m, 13 miles NE of Point Charles.

Red Islet, 43m high, lies near the coast 5 miles ENE of Middle Mount Barren; submerged rocks extend nearly 1 mile SW from the islet. The Hammersley River flows into the sea in a position about 7 miles NE of Red Islet.

Mary Ann Point (33°57'S., 120°08'E.) lies 6 miles ESE of East Mount Barren; the intervening coast is low, sandy, and is broken in its W part by the entrance to Culham Inlet. The coast is fronted, in its E part, by foul ground and reefs which extend a considerable distance offshore.

6.23 Mary Ann Haven (Hopetoun) (33°57'S., 120°07'E.) lies within the reefs which extend about 1 mile off Mary Ann Point. The haven is exposed to all except offshore winds, but during SW gales, when the seas break heavily on the outer reefs, it is quite smooth within. A light is shown from the breakwater at Mary Ann Haven.

Anchorage may be obtained inside the reefs, in a depth of 4.9m, good holding ground, and outside the entrance, in a depth of 7m, with No. 1 Beacon and No. 2 Beacon in line.

A directional light leads E of all dangers in the approach to the haven. No. 1 Beacon and No. 2 Beacon, on the W side of the haven, in line bearing 275°, lead through the entrance and to the inner anchorage. Both beacons were reported (1989) to be in disrepair. No. 4 Beacon marks the shoal on the S side of the entrance.

Caution.—Although this coast has not been closely surveyed, there are dangers known to exist between East Mount Barren and Powell Point, 20 miles E of Mary Ann Point. Soundings give no indication of the proximity of the dangers, and many of them, several meters below the surface, are only occasionally discernible in rough weather.

A small sunken rock, on which the sea seldom breaks, lies about 9 miles SSE of East Mount Barren; a similar rock lies about 3 miles farther E. A shoal, with patches over an area of 1.5 miles in a N to S direction, is located about 9 miles SE of Mary Ann Point; the sea breaks heavily on this shoal.

6.24 West Islet (34°05'S., 120°28'E.) is a low sandy islet, with a smooth and sterile aspect, 19 miles ESE of Mary Ann Point. Black Rock lies 1.5 miles WSW and a reef, depth unknown, lies 1 mile NNE, respectively, of West Islet. Breakers exist 2 miles N and 2.5 miles NW of West Islet. Breakers were reported to extend from the coast nearly out to the islet and it is doubtful whether there is a safe passage between it and the coast.

6.25 Powell Point (33°56'S., 120°33'E.), 20 miles E of Mary Ann Point, is the SE extremity of the promontory that forms the S side of Bedford Harbor (Starvation Boat Harbor). North Powell Point is the NE extremity of the promontory and Maintop Hill, 36m high, the highest point of the promontory, lies 0.5 mile W of North Powell Point.

Bedford Harbor affords good shelter during SW winds in an anchorage 0.35 mile N of North Powell Point, in a depth of 7.6m, but there is a 5.2m patch about 0.1 mile N of this anchorage. **Inside Rock**, with a least depth of 3.6m, lies 0.25 mile NNE of North Powell Point; a rocky shoal, with a least depth of 3m, and which generally breaks, lies 0.5 mile NE of the same point.

Submerged reefs extend 5 or 6 miles E from a position 1 mile NE of North Powell Point; the sea breaks over them in places along their entire length in any but the finest weather.

Shoal Cape (33°53'S., 121°07'E.), located about 28 miles E of Powell Point, is composed of sand hills that resemble white cliffs. The Oldfield River discharges into the sea in a position about 9 miles E of North Powell Point; the Margaret River discharges into the sea about 11 miles farther E. The Young River and the Lort River discharge into Stokes Inlet, which is located about 3 miles NW of the cape. An islet, surrounded by foul ground and breakers, lies close off the SE side of Shoal Cape. Depths of 21.9m and 10.9m lie 5.5 and 7 miles, respectively, S of the mouth of the Oldfield River.

6.26 The **Rocky Islets** (34°04'S., 120°54'E.), two small islets about 54m high, lie 17 miles SW of Shoal Cape. The islets, which are joined at their S ends by a narrow, rocky, and boulder-strewn beach, are surrounded by breakers which appear to extend farthest from the SE side. A rock, which breaks, lies about 1.25 miles E of the islets; a 1.8m patch, which breaks, lies about 3.25 miles SW of the islets. The depths in the area make it appear probable that there are other sunken rocks in the vicinity.

The two islets, and the beach which connects them, form a circular basin in which anchorage may be found by vessels up to 36.6m in length, in a depth of about 18m. The entrance is from N and is fairly steep-to on both sides. Good anchorage is afforded in E winds, but in W winds it is hazardous.

Fanny Cove (33°52'S., 121°07'E.) is a small rock and reef-encumbered cove that lies close NE of Shoal Cape. No shelter is available in the cove.

Barker Inlet lies 10 miles ENE of Shoal Cape. From the inlet, grassy hills extend about 11 miles E, and are backed by sandy, undulating hills; Butty Head lies 7 miles farther SE.

There is a heavy surf all along the coast between Shoal Cape and Butty Head, 28 miles E. Red Island lies about 11.5 miles E of Shoal Cape and SE of Barker Inlet. Mariners are advised to keep at least 5 miles S of the latitude of Red Island, due to the existence of unexamined shoals.

Butty Head (33°54'S., 121°39'E.) is a dark headland covered with stunted scrub that rises from its seaward extremity to a conspicuous conical hill. The shore in the vicinity of the head is very rocky. Bayliss Rock, 2.1m high, lies about 0.7 mile W of Butty Head. The sea always breaks heavily on this rock.

Butty Harbor, 2 miles NE of Butty Head, is only suitable for small coasting vessels; there is good landing at the SW corner of the cove.

Between Butty Head and the rocky point abreast Observatory Island, 6.5 miles SE, the coast is composed of sand and limestone cliffs backed by conspicuous white sand hills. The rocky point attains a height of 92m. From the rocky point, the coast trends ENE for 5.75 miles to Dempster Head and is divided into three bays by two rugged rocky projections, which have sandy beaches on either side of them.

Approaches to Esperance

6.27 **Esperance Bay** (33°54'S., 121°58'E.) is contained between the point N of Observatory Island and Cape Le Grand, 17 miles ESE. The town and port of Esperance are situated on the NW shore of the bay.

The N and E shores of Esperance Bay, between the town and the headland which rises to Mount Le Grand, about 13 miles SE, consists of a long stretch of sand broken by Bandy Creek and by Wylie Head, 4.75 miles ENE of Esperance. There is good landing in Wylie Bay, a small bay close N of Wylie Head, but elsewhere there is a constant heavy surf.

There is a small craft harbor, protected by breakwaters, at Bandy Creek.

Cape Le Grand (34°01'S., 122°07'E.), 154m high, the SE extremity of Esperance Bay, rises to Mount Le Grand, 345m high, 1.75 miles NE.

Mount Merivale rises to a height of 197m, 6.5 miles E of Wylie Head, and is conspicuous from seaward.

Low Rock, 8m high, is located in the N part of Esperance Bay, about 1.25 miles SSW of Wylie Head. Lion Island, 52m high, is located 1.5 miles offshore, 3 miles SE of Wylie Head. Other rocks, 1 to 6m high, lie between Lion Island and the shore.

Woody Island (33°58'S., 122°01'E.), 127m high, is the largest island in the SE part of Esperance Bay. Time Rock, Thistle Rock, and Murray Rock are among the named rocks located SE of Woody Island. The positions of these and of adjacent unnamed islets and dangers may best be seen on the chart.

The two channels in the W approach to Esperance Bay are known as West Channel and Causeway Channel.

6.28 **West Channel** (33°57'S., 121°42'E.) lies between Butty Head on the N and West Group, which consists of three principal islands and a number of islets, rocks, and dangers, lying from 8 miles SSW to 6.5 miles SSE of this headland. The channel leads in an E direction for about 15 miles and is joined by Causeway Channel in the entrance of Esperance Bay. General depths of 37m and over are found in the fairway of West Channel.

Figure of Eight Island (34°02'S., 121°36'E.), at the SW end of West Group, has a height of 112m; it is rocky and covered, in places, with coarse grass and small scrub. A rocky islet, 30m high, lies off its S extremity.

A light is situated on the summit of Figure of Eight Island and is shown from a lantern on a concrete base; a white hut stands nearby.

Caution.—A 6.5m shoal lies 0.75 mile SW of the light; a 2.2m patch, with a below-water rock close NE of it, lies about 1 mile SE of the light.

6.29 **Capps Island** (33°59'S., 121°41'E.), 3.75 miles NE of Figure of Eight Island, is the N danger of West Group. Fury Rock, awash, on which the sea breaks heavily, lies 1.25 miles SE of Capps Island and is the E danger of this group. There are a number of rocks, islands, and submerged patches between Figure of Eight Island and Fury Rock, which may best be seen on the chart.

Vessels should not attempt to pass through West Group.

Observatory Island (33°56'S., 121°48'E.), on the N side of West Channel, is very rocky with stunted vegetation on its rugged, 78m high, summit. Foul ground extends 0.5 mile SW from the island, and a rock, on which the sea occasionally breaks, lies 0.1 mile off its E point. A 2.2m shoal lies in the narrow channel between Observatory Island and the coast.

Gig Rocks, 5m high, lie 1 mile W of Observatory Island; foul ground extends 0.25 mile WSW of them.

Sunday Patch, 1.25 miles E of Observatory Island, is a rocky patch with a least known depth of 8.6m. The patch breaks in heavy weather.

Charley Island, located about 3.25 miles E of Observatory Island, is rocky and sparsely covered with vegetation. It rises to a fairly well-defined summit, 106m high. Two rocks are located on a ledge that extends about 0.4 mile SE from the island. The outermost of the two rocks is 9m high.

Cull Island (33°55'S., 121°54'E.) lies 0.75 mile E of Charley Island. There are some stunted trees on the flat summit, which is 94m high. The island can be approached with safety to a distance of 0.25 mile on its E and S sides.

A light is situated on the summit of Cull Island and is shown from a white hut, surmounted by a lantern.

There are rocks and islets N of Observatory Island and the islands E, previously described, which do not affect the safety of vessels in West Channel; these rocks and islets may be seen on the chart.

6.30 Causeway Channel (34°00'S., 121°50'E.), deep and free from dangers, lies between West Group, Sunk Rocks, and Douglass Patch on the N, and The Causeway on the S.

Sunk Rocks, two rocks with depths of 5.5m, lie 4.5 miles SSW of Observatory Island. They are steep-to and will break heavily, at intervals, with moderate S winds and swells.

Douglass Patch, with a least depth of 12.8m, lies 3 miles SSE of Observatory Island; the patch breaks in heavy weather. A 22m bank lies 1 mile W of the patch.

The Causeway, which forms the S side of Causeway Channel, consists of rocks, islands, and sunken reefs extending from Giant Rocks to Long Island, which lies about 16 miles to the NE.

Giant Rocks (34°11'S., 121°40'E.) are two rocks lying in a position 8.5 miles SSE of the Figure of Eight Islands. The W rock has a height of 13m and the E rock has a height of 9m. These rocks should be given a wide berth when a vessel is approaching Causeway Channel from the S.

A reef, on which the sea breaks heavily, lies 3.75 miles NE of the E Giant Rocks, and another reef lies 1.75 miles farther ENE.

Smith Rock, 6m high, and Hendy Isle, 16m high, are located about 12 and 13 miles, respectively, NE of Giant Rocks and are surrounded by foul ground. A sunken reef lies 0.4 mile NW of Smith Rock and a rock, 6m high, with foul ground extending 0.2 mile SW from it, is located 0.85 mile NE of Smith Rock.

Long Island, 103m high, lies 3.25 miles E of Hendy Island. Long Island and the other reefs and islands of The Causeway, not previously described, are of no danger to vessels in transit of Causeway Channel.

Coates Reef (33°59'S., 121°58'E.), nearly awash and with the sea nearly always breaking on it, lies on the E side of Causeway Channel, and is the SW danger of a group of islands, rocks, and reefs that are located in the entrance of Esperance Bay. Coates Reef lies 4.5 miles SSE of Cull Island.

Magistrate Rocks, the largest being 14m high, form a conspicuous group rising from a small bank with depths of less than 37m, and are located 3 miles E of Cull Island. The SW rocks are awash, and the sea always breaks heavily on them.

Limpet Rock, 24m high, is located in Esperance Bay 3.75 miles N of Cull Island. There is deep water within 0.1 mile of the rock. A spoil ground lies about 1 mile WSW of Limpet Rock.

Esperance

Directions.—Vessels approaching Esperance Bay from the E are recommended to pass well clear S of **Salisbury Island** (34°22'S., 123°33'E.), and S of **Termination Island** (34°28'S., 122°00'E.); this will lead S of the Archipelago of the Recherche. When the vessel has reached a position slightly W of the meridian of Figure of Eight Island, course should then be

set N toward that island, then as directed on the illustration for Causeway Channel. These directions will insure passing W of Giant Rocks.

Vessels approaching from the S should pass S of Termination Island, then proceed as directed above.

Esperance (33°52'S., 121°54'E.)

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6.31 **Esperance**, an artificial harbor situated on the NW side of Esperance Bay close N of Dempster Head, is protected by a long breakwater on the SE and by land on the W side.

Esperance Port Authority Home Page
http://www.esperanceport.com.au

Tides—Currents.—The port has a tidal range of 0.7 to 1m.

Depths—Limitations.—An area maintained to a depth of 14.5m lies in the harbor and swing basin and is approached through a channel with a depth of 19m, which extends about 0.2 mile ENE. Inner Harbor Berth No. 1 and Inner Harbor Berth No. 2, which are 244m and 213m in length, respectively, and having a depth of 14.5m alongside, lie on the SW side of the maintained area. Movements at Berth No. 1 are restricted to daylight hours only. Berth No. 3 lies along the NW side of the breakwater, is 230m in length, and has a depth of 19m alongside. Vessels berth starboard side alongside Berth No. 3.

A tanker jetty exists 1.5 miles N of Dempster Head. A light is shown from its head.

Aspect.—A breakwater, 4m high, extends NNE, then ENE, from the NE side of **Demster Head** (33°53'S., 121°54'E.). Lights are shown from a white round tower at the angle of the breakwater and also at the breakwater head about 0.1 mile ENE of the angle. A conspicuous tower, 150m in elevation, stands 0.4 mile NW of Demster Head.

The channel leading to the berths is marked by a lighted range.

Pilotage.—Pilotage is compulsory for all commercial vessels larger than 150gt, except for vessels exempted by law, and is available 24 hours. The pilot boarding ground is about 1 mile NE of Cull Island in position 33°54.22’S 121°55.52’E. Ships should signal their estimated time of arrival 48 hours in advance, confirming or amending the ETA 24 hours and 2 hours prior to arrival through Perth. Vessels should contact Esperance Harbor 1 hour before arrival on VHF channel 16. Vessels berth during daylight hours only, but may berth at night or sail at any time subject to the harbormaster’s discretion.

Anchorage.—The recommended anchorage is 1.5 miles NE or ENE of the head of the breakwater, in depths of 14.5 to 27.5m; a heavy swell can be experienced in this anchorage. Anchorage may also be found ESE of the breakwater head, in depths of 7 to 9m, sand and weed; the anchorage is safe with good holding ground, but it is uncomfortable.

Directions.—Vessels approaching Esperance via West Channel should pass 1 mile N of Capps Island, steering 080° to pass 0.5 mile S of the rocks off Charley Island. Causeway Channel is then joined S of Cull Island.

Vessels approaching Esperance via Causeway Channel should steer a mid-channel course through Causeway Channel, observing that Limpet Rock open E of the E extremity of Cull Island leads SE of Sunk Rocks and Douglas Patch. Cull Island should be rounded at a distance of about 1 mile.

Esperance—Contact Information	
Pilots	
VHF	VHF channels 6, 12, and 16
Telephone	618-907-23344
Facsimile	618-907-11312
E-mail	pilots@epsl.com.au
Port Authority	
Call sign	Esperance Harbour
VHF	VHF channels 6, 9, 12, 67, and 16
Telephone	618-907-23333
Facsimile	618-907-11312
E-mail	esppa@epsi.com.au
Web site	http://www.esperanceport.com.au
Harbormaster	
Telephone	618-907-23345
Mobile	61- 417-226268
Facsimile	618-907-11312
E-mail	pilots@epsl.com.au

The Archipelago of the Recherche

6.32 The Archipelago of the Recherche consists of a great number of islands and reefs and extends from Figure of Eight Island (34°02'S., 121°36'E.), the W island of West Group, 7 miles SW of Butty Head, to the N rock of Eastern Group, 123 miles E; it extends up to 40 miles offshore in places.

Vessels, unless proceeding to Esperance Bay, should avoid the archipelago at all times, as a haze is frequently found among the islands, in the neighborhood of the small detached reefs in the SW part of the archipelago, and up to 20 miles from any of the islands.

The islands and dangers of the archipelago are not discussed in detail; only those which lie near a proposed track are described. Vessels without local knowledge should not traverse the area as much of it is inadequately surveyed. Passage should not be attempted at night.

The archipelago is a nature reserve and landing on the islands is restricted.

A local magnetic anomaly has been observed among the islands of the archipelago. In the vicinity of Termination Island, the variation observed when W of the island was 5° greater than that observed when E of it.

Termination Island (34°28'S., 122°00'E.), 114m high, lies 27 miles S of Long Island and is the S island of the archipelago. It is a solid mass of rock of a very light color, with scarcely any

vegetation on it; it is not easily seen from a distance. When viewed from E or W, the summit appears well defined.

Caution.—A depth of 13m lies 7.5 miles W of Termination Island. A bank, with a depth of 18.3m on it, was reported to lie 19 miles S of Termination Island.

6.33 Waterwitch Rocks (34°20'S., 121°41'E.) are two submerged rocks, with depths of 1.2 to 2.4m, that lie close together 12.5 miles NW of Termination Island; the sea breaks over them only occasionally in moderate weather. A shoal, with a depth of 6.5m, lies about 2 miles W of Waterwitch Rocks.

Middle Rock (34°18'S., 121°50'E.), a black smooth-topped rock, 9m high, with dangers lying off it, lies 8.5 miles E of Waterwitch Rock. A submerged reef, on which the sea occasionally breaks, lies about 3.75 miles NNE of Middle Rock. An 8.7m shoal lies about 3.75 miles W of the same rock.

Little Islet, 0.5 mile N of Termination Island, is rocky and 42m high. Brown Reef, about 3 miles NE of Termination Island consists of two islets, each 1m high, around which the sea always breaks.

Twin Rocks (34°22'S., 122°13'E.) are two small red rocks located close together about 13 miles ENE of Termination Islet; the N rock, 28m high, is the higher of the two. The rocks lie on a steep-to reef which extends one mile in all directions. Reefs, which break, lie 9 miles WNW and NW of Twin Rocks.

Caution.—Navigation should not be attempted between Termination Island and The Causeway, or N of a line joining that island and Salisbury Island (see paragraph 6.43), 77 miles E, as there are numerous submerged dangers which only break in heavy weather; other uncharted dangers may exist S of that line.

Cape Le Grand to Mississippi Point

6.34 Inner dangers.—The coast between Cape Le Grand and Mississippi Point, 8.25 miles E, has a bold rugged appearance and is backed by bare rocky slopes that rise to well-defined hills.

Mississippi Hill rises from the coast, 1.25 miles WNW of Mississippi Point, to an elevation of 180m; its summit, on which there is a cairn, is bare and rocky.

The coast between Cape Le Grand and Mississippi Point is indented by five bays which have sandy beaches at their heads.

Lucky Bay, the E bay of the five above-mentioned bays, is located close W of Mississippi Hill.

Anchorage can be obtained during N and E winds in the bay, close under the islands that form the SE side of the bay, in a depth of 22m, coarse sand. With E winds a S swell sets into the bay; with W winds violent squalls sweep down from the hills on the NW side of the bay.

Cliff Island (34°01'S., 122°05'E.), 43m high, lies about 1 mile W of Cape Le Grand; shoal ground extends 0.2 mile off its E end, and a submerged rock lies close off its W end.

Ram Island, 133m high, lies 1.25 miles SE of Cape Le Grand; the island is of rocky formation, with little vegetation. A reef, on which the sea occasionally breaks, lies 0.3 mile S of the island.

New Island, 54m high, lies close offshore, 0.4 mile N of Ram Island.

Mississippi Reefs lie close off Mississippi Point; the inner reef is awash, but the outer reef, 0.3 mile SE of the point, is submerged and the sea only breaks on it at intervals.

Black Rocks (34°03'S., 122°13'E.) are two steep-to rocks, 4m high, located 3 miles ESE of Ram Island.

Rob Island and **Roy Island**, 4.5 miles E of Ram Island, are 56 and 43m high, respectively, and are bare and rocky. A submerged reef, on which stands a 2m high rock, lies 0.5 mile SE of Roy Island. A 2.7m patch lies 0.4 mile WNW of Rob Island.

6.35 Outer dangers.—Cloud Island, 63m high, is located 2 miles SW of Cape Le Grand. A submerged rock, on which the sea usually breaks, lies about 0.3 mile ENE of the island.

Pasco Island, 68m high, lies 1 mile SSE of Cloud Island. Rocks, both above and below-water, extend up to 0.2 mile from its E and SW sides.

Hope Island (34°05'S., 122°10'E.), 2.25 miles SSE of Ram Island, is bare and rocky, with a well-defined summit, 45m high; an islet lies close to its S extremity.

French Reef, awash and on which the sea always breaks, lies 5 miles E of Hope Island.

Escape Rock, a dangerous patch with a depth of 3.6m, lies about 0.75 mile S of French Reef. The patch does not break and it can be made out only in good light.

Mondrain Island (34°08'S., 122°15'E.), 6.75 miles offshore SSW of Mississippi Point, is the second largest island in the Archipelago of the Recherche. The island, 226m high, is prominent from all directions.

Mississippi Point to Hammer Head

6.36 Inner dangers.—The coast between Mississippi Point and Cheyne Point, 12 miles ENE, in general, consists of sandy beaches backed by sandhills 9 to 30m high. For a distance of 2 miles N from Mississippi Point, the coast is rocky, and a rocky promontory, 51m high, projects from the coast 5 miles NE of the point.

Cairn Hill, 128m high, 3 miles WNW of the rocky promontory, is prominent; Yungarup Hill, 7.5 miles ENE of the same promontory, rises to an elevation of 165m.

The **Tory Islands** (34°01'S., 122°19'E.) are a group of four rocky islets with very little vegetation on them, located 1.5 miles SE of Mississippi Point. The N islet, 73m high, is the largest of the group and has deep water close up to its N side, but a submerged reef lies 0.25 mile off the SW islet.

Outtrim Reef, awash and on which the sea always breaks, lies 1.5 miles SE of the Tory Islands.

Mississippi Bay is a small bight which lies about 1 mile N of Mississippi Point. A chain of six islands lies across the entrance of the bay. These islets afford inadequate shelter during E winds, and the bay affords shelter from W winds only.

Other islands and rocks, which may best be seen on the chart, lie in the bight between Mississippi Point and Cheyne Point.

Hammer Head (33°58'S., 122°35'E.), 76m high, is a rocky headland of rounded appearance and is sparsely covered with vegetation. It is steep-to and may be approached to a distance of 0.2 mile.

Cheyne Bay indents the coast between Hammer Head and Cheyne Point, about 3 miles WNW. An islet, 9m high, lies 1

mile NNW of Hammer Head and several smaller islets lie as far as 0.25 mile off the E and W shores of the bay.

Passage Island, 4 miles WSW of Cheyne Point, is 26m high, bare, and rocky. Submerged rocks lie close off its NE and SW ends, otherwise it is steep-to.

, upon which the sea always breaks, lies 1 mile SE of Passage Island.

The **York Islands** (34°00'S., 122°35'E.) are a group of five islands lying 2.5 miles S of Hammer Head. The easternmost, and most prominent, has a dark patch of vegetation on its E face. It is steep-to on all sides, and from the SE appears as a conspicuous peak, 110m high. The other islands of the group are low, dark, and barren.

A reef, with two pinnacles and nearly awash, lies 0.75 mile SSE of the largest island of the York Islands. The reef is steep-to and always breaks.

6.37 Outer dangers.—Stokes Bank (34°05'S., 122°19'E.), with a least depth of 13m over a rocky bottom, lies in a position 4 miles NE of Mondrain Island, which has been previously described in paragraph 6.35.

Finger Island, 45m high, is the N of a group of three islands. It is rocky and round in appearance, with sparse vegetation near its summit.

Draper Island (34°12'S., 122°30'E.), 80m high, bare, and rocky, lies 14.5 miles SSW of Hammer Head. Detached reefs and submerged rocks extend up to 0.5 mile from the island in places; a rock, 7m high, lies on the reef NE of the island, and a rock, 5m high, lies on the reef NW of it; a submerged rock, on which the sea breaks only occasionally, lies 0.5 mile SW of the island.

Spray Reef, nearly awash and steep-to, lies about 1.75 miles ENE of Draper Island. The sea always breaks over the reef.

Hammer Head to Cape Arid

6.38 Inner dangers.—The coast between Hammer Head and Cape Arid, 29 miles E, consists of a succession of sandy beaches and rocky points backed by sandhills. Behind the sand hills the country is open, undulating, and of moderate elevation. The most prominent summit is Howick Hill, a 265m high granite hill located 9 miles inland behind the W part of this stretch of coast.

Alexander Point, 32m high, is located about 13 miles ENE of Hammer Head. Alexander Hill, long and flat-topped, lies 2 miles NE of Alexander Point. The hillsides are covered with thick scrub and the top is bare; the actual summit, 117m high, is marked by a granite cairn.

Tagon Point is the extremity of a rocky promontory, covered with scrub, 7 miles E of Alexander Point

Hawes Hill, 140m high, stands 3.75 miles NNW of Tagon Point.

Cape Arid (34°01'S., 123°10'E.), lies 11 miles SE of Tagon Point; the cape and the coast in its vicinity is bare and rocky, and rises in a succession of granite ridges to the double summit of Mount Arid, 362m high, 3.5 miles NE of the cape.

Mount Belches, 1.25 miles N of Hammer Head, is a dome-shaped rocky hill with smooth, steep slopes, rising to an elevation of 168m. A 3m high cairn stands on the summit and is prominent from all directions.

Duke of Orleans Bay (33°55'S., 122°36'E.), an indentation in the coast NE of Mount Belches, affords good anchorage sheltered from all but E winds, which, especially in summer, raise a short and very choppy sea; the holding ground, sand and weed, is good.

The entrance to Duke of Orleans Bay is encumbered with Nares Island, Table Island, and John Island and by Dodd Rock and Bay Rock.

6.39 Nares Island (33°56'S., 122°36'E.) is 26m high, rugged, and covered with small bushes and some grass; it lies close to the S point of Duke of Orleans Bay. A white-topped rock, 1.5m high, lies close off its NW point.

Anchorage for vessels of not more than 4.9m draft can be taken with the white-topped rock close off the NW point of Nares Island bearing about 125°, distant 0.2 mile.

Belches Reefs, 4.5 miles ENE of Hammer Head, are two submerged reefs lying 0.3 mile apart. The W reef has depths of 2.7 to 3.7m and seldom breaks; the E reef has lesser depths and usually breaks.

Alexander Bay lies NW of Alexander Point. The W end of the bay affords moderate shelter from W winds to vessels with local knowledge and draft not exceeding 3m.

Tagon Bay, close NE of Tagon Point, is sometimes used as an anchorage by coasters, but it is not recommended, as the bottom is uneven and the bay is exposed to the S swell.

Arid Bay is an indentation in the coast immediately N of Cape Arid. Rocks, above-water, and foul ground extend 0.75 mile N of Cape Arid; a 5.5m patch lies 1.25 miles NW of the cape.

The **Barrier Islands** (33°59'S., 123°09'E.) are two islands located 1.5 miles N and 2 miles NNW, respectively, of Cape Arid; there is foul ground and several above-water rocks between the two islands. The islands are 18 and 39m high, with the S island being the higher.

Barrier Anchorage, inside these islands, may afford shelter from NE gales for a small vessel, with local knowledge, in a depth of 9.1m.

Caution is necessary if taking shelter in Barrier Anchorage, as the only approach is between the foul ground that extends N from Cape Arid and S Barrier Island; the summit of Bearing Rock, bearing 278° astern, leads between them and N of the 5.5m patch mentioned above.

Bearing Rock, 5m high, lies 1.5 miles WSW of the N Barrier Island; foul ground extends 0.2 mile S and W from it.

There are numerous rocks, reefs, and islands that lie in the bight between Hammer Head and Cape Arid; their positions may best be seen on the chart.

6.40 Outer dangers.—The **Marts Islands** (34°00'S., 122°39'E.) are a group of islands and rocks located 4 miles SE of Hammer Head. The E part of the group consists of four islets lying close together; the largest has slight vegetation on it. The W part of the group consists of one islet with several rocks, 2 to 4m high, N of it. The islet in the W part of the group is the highest and most prominent of the entire group; its smooth, bare granite sides slope down symmetrically from its 132m summit.

Sulphur Reefs (34°07'S., 122°41'E.) are a group of detached reefs, about 2 miles long, lying in a N-S direction. The N reef,

which seldom breaks, lies about 6 miles SSE of Marts Island; the S reef of the group is awash and always breaks. Vessels should not pass between or within 0.5 mile of these reefs.

Breakers are charted about 1 mile NNW and NW of the N reef of Sulphur Reefs.

Foam Rocks (34°08'S., 122°51'E.), located 8 miles ESE of Sulphur Reefs, consists of four rocks in a cluster; the highest is 8m high, but the sea always washes over them in great masses of foam. A sunken reef, on which the sea breaks at intervals, lies about 0.5 mile ENE of Foam Rocks. A charted obstruction lies 3.5 miles S of Foam Rocks.

Matthew Rock (34°12'S., 123°00'E.), with a depth of 7.3m, lies 8 miles SE of Foam Rocks; it seldom breaks, except with a heavy S swell.

Recherche Rock (34°18'S., 122°55'E.), about 7 miles SW of Matthew Rock, is steep-to, with a depth of 3.7m; the sea breaks on it at intervals.

Cape Arid to Cape Pasley

6.41 Inner dangers.—From Cape Arid, the coast trends ENE for about 8 miles and then ESE to Cape Pasley. An extensive bay, with a sandy shore, which has not been surveyed, is formed within.

Mount Pasley (33°55'S., 123°33'E.), 2 miles NNE of the S extremity of the cape, is 143m high, with a cairn on its summit, and is a prominent feature on this part of the coast.

Arid Island, about 0.75 mile SSE of Cape Arid, is 5m high and bare. A rock, with a depth of 1.8m, lies N of Arid Island. Darling Shoal, a dangerous patch with depths of 5.5m, lies 0.75 mile SSE of Arid Island; the sea breaks on it at times.

An islet, 8m high, lies close offshore 3.5 miles ENE of Cape Arid, and a shoal, which always breaks, lies 6 miles ENE of the same cape.

6.42 Outer dangers.—Middle Island (34°06'S., 123°12'E.), 5 miles SSE of Cape Arid, is separated from the mainland by Arid Strait. The island is densely wooded, except on the slopes near the coast. Flinders Peak, the highest point on the island, is the summit of a conspicuous dome-shaped hill, which rises to a height of 174m at the NW end of the island; the hill is wooded on its E side. Dangerous rocks, on which the sea always breaks heavily, extend nearly 0.5 mile offshore from the S point of the island. North East Point, the NE extremity of the island, is low, with the land sloping up from the point which should not be approached within a distance of 0.2 mile.

Goose Island (34°05'S., 123°11'E.), lying 0.5 mile off the N coast of Middle Island, is rocky, with sandy patches covered with short scrub; the summit, 47m high, is composed of bare granite rocks.

Goose Island Bay, on the N side of Middle Island between North East Point and Goose Island, 1.5 miles W, is sheltered from the swell and from all except N winds. A rock, near the center of Goose Island Bay, is 0.3 high and covered with marine growth. The rock consists of two smooth granite boulders lying close together. The sea breaking over the rock indicates its position.

Blind Rocks, between 0.1 to 0.25 mile N of Sailor Rock, consists of three dangerous granite boulders, with depths of 1.2 to 1.8m, and with depths of 9.1 to 11m close around them. Caution is necessary when navigating in the vicinity of these rocks, as they are small and not easily seen.

A dangerous rock lies in the S part of Goose Island Bay, 0.25 mile S of Sailor Rock, close within the 5m curve.

During W winds, anchorage may be taken off the E side of Goose Island, in a depth of about 12.8m, with Sailor Rock in line with the NE point of Goose Island, bearing 302°, and Flinders Peak bearing about 253°, or further S if necessary.

Miles Island (34°04'S., 123°14'E.), 39m high, is separated from North East Point on Middle Island by a deep clear channel more than 0.5 mile wide. Miles Island is the S island of a group which extends about 4.25 miles NE and includes George Island, Owen Island, Gulch Island, and Stanley Island.

Foul ground skirts all except the E side of Miles Island. A 5.5m patch, over which the sea breaks heavily, lies 0.25 mile E of the SE point of the island.

6.43 Grace Shoal (34°03'S., 124°12'E.), 0.75 mile W of the N end of the chain of islets that extend NNW from Miles Island, has a depth of 3.4m, and breaks heavily at intervals.

Wickham Island (Stanley Island) (34°01'S., 123°17'E.), the NE of the group, is 12m high, and has some vegetation on it. Foul ground fronts the S side of the island and extends 0.5 mile off the SW extremity. A detached sunken reef, on which the sea usually breaks, lies about 0.75 mile SSW of the island.

The other islands of the group that extends NE from Miles Island to Wickham Island are best seen on the chart.

Douglas Island (34°10'S., 123°09'E.), 3 miles SSW of Middle Island, is barren and rocky. The island consists of two hills connected by a low narrow neck; the E summit, 82m high, is slightly higher than the W, which is 79m high, precipitous on its S side, and is conspicuous. There are submerged rocks, on which the sea breaks with any swell, off the E and W sides of the island. Matthew Rock, lying SW of Douglas Island, is described in paragraph 6.40.

Dome Island (34°10'S., 123°21'E.), 7.25 miles SE of Middle Island, is a small dome-shaped island, 90m high. Sunken rocks extend about 0.15 mile from its E and SW sides. A reef, which has a rock 1.2m high, lies about 1 mile NE of the island.

Penguin Rock (34°13'S., 123°15'E.), a dangerous rock with a least depth of 7.3m, and on which the sea seldom breaks, lies 6 miles SE of Douglas Island.

Salisbury Island (34°22'S., 123°33'E.), the SE and largest island of the Archipelago of the Recherche, lies 28 miles SE of Cape Arid. The island, 119m high, is rocky and covered with matted, stunted scrub. The summit, in the middle of the island, is somewhat flat, but with a slight saddle; the hill on the S end of the island, 101m high, is better defined.

Submerged rocks extend 0.25 mile SW of the S point of Salisbury Island; two rocky ledges, awash, with the S one having on it a rock 5m high, are located 0.75 mile off its NW side.

Salisbury Island is an excellent mark for making the archipelago, but vessels should not approach within 0.75 mile of its S end.

Caution.—Heavy breakers have been reported about 6 miles SSE of Salisbury Island.

6.44 Chester Reef (34°27'S., 123°37'E.), an extensive shoal with a least depth of 10m, lies about 5.5 miles SE of the S end of Salisbury Island.

Pollock Reef (34°34'S., 123°34'E.), 11 miles S of Salisbury Island, has depths of less than 2m, and is steep-to. With S or W swells, the sea breaks heavily on it, but during fresh E winds, it is difficult to see, as the break on the reef is very similar to the breaking waves in the vicinity.

6.45 Archipelago of the Recherche to Esperance—Directions from E.—The directions described here are only to be used by vessels with local knowledge.

Vessels making Salisbury Island in the afternoon should not attempt to pass through the archipelago, but should proceed to the anchorage in Goose Island Bay, or to Duke of Orleans Bay and anchor for the night.

From a position 2 miles W of the S extremity of Salisbury Island, the course leads WNW, passing about 2 miles SSW of Penguin Rock and about 2.5 miles SSW of Douglas Island, bearing 090°. Then steer 270°, passing 2 miles S of Foam Rocks and Sulphur Reefs, and 1.25 miles N of Draper Island. From this position, steer NW to pass 1.5 miles NE of Finger Island, to a position about midway between Stokes Bank and Outtrim Reef; then steer W, passing 1 mile N of French Reef and between Black Rocks and Hope Island.

Pass 1 mile S of Ram Island and S of Cliff Island, steering between Gunton Island and Sandy Hook Island; then steer as directed for Causeway Channel, as described in paragraph 6.30.

Vessels desiring to anchor in Goose Island Bay, from a position 2 miles W of the S end of Salisbury Island may steer NNW, passing 1.5 miles SW of Dome Island and midway between North East Point, Middle Island, and Miles Island, then into Goose Island Bay.

From Goose Island Bay to Esperance Bay, round Goose Island at not less then 0.5 mile N; from this position steer SW for a position 4.5 miles W of Douglas Island, then proceed W as described above.

If intending to anchor in Duke of Orleans Bay, follow the track from Salisbury Island described above until the S Sulphur Reef, described as always breaking, bears 016°, then steer 343° for Mount Belches, keeping it ahead on that bearing. After passing between the York Islands and the Marts Islands, steer for the anchorage in Duke of Orleans Bay.

Cape Pasley to Cape Adieu

6.46 From Cape Pasley to Point Malcolm, the coast is generally low and fronted by sand dunes. The sand dunes are about 15m high and covered with scrub, but on a point 6 miles NE of Cape Pasley, a prominent sandhill rises to a height of 25m.

The coast between **Point Malcolm** (33°48'S., 123°42'E.) and Point Dempster, 11 miles NNE, is low and sandy. Submerged dangers lie up to 5.5 miles off the coast between Cape Pasley and Dempster Point.

Mount Ragged, 585m high, is located 31 miles NNW of Cape Pasley. Of the craggy group of hills in this area, Mount Ragged is the most remarkable.

Caution.—That part of the Archipelago of the Recherche which lies NE of Salisbury Island, Dome Island, and Middle Island has not been surveyed. A historic wreck lies in position 33°47’6”S., 123°45’42”E and there is a restricted area around the vicinity of the wreck.

6.47 Round Island (34°05'S., 123°53'E.), located 19 miles SE of Cape Pasley, is a prominent lump of rock; two small rocks, lying 0.5 mile N and WNW, respectively, of the island are also prominent.

Eastern Group (33°47'S., 124°05'E.), located between 15 and 26 miles NNE of Round Island, consists of eight rocky islets, most of them low and barren. However, the S islet, which is the largest, rises at its N end to an elevation of 152m; near its S end there is a sugarloaf hill, 140m high, with the land between being low with little vegetation.

Two small rocky islets lie close off the SW end of the islet described above, and give protection to an indentation on its SW coast; this indentation is reported to afford anchorage, in a depth of about 18.3m, sand, weed, and rock. When approaching the anchorage, steer for the sugarloaf hill on Daw Islet, bearing about 140°, until a small sandy beach at the head of the bay bears 145°, then steer for it on that bearing, anchoring as soon as a depth of 18.3m has been reached.

As this part of the archipelago has not been surveyed, vessels should approach these islets only with extreme caution.

6.48 Israelite Bay (33°37'S., 123°48'E.), an indentation in the coast immediately N of Point Dempster, affords good anchorage, in a depth of 5.5m, inside the reef that extends NE from the point. There are a number of shoals in the bay, but they can be seen from aloft when conditions are favorable.

Vessels approaching the bay from the S should give Point Dempster a berth of 2 miles, and proceed into the bay with the head of the small pier situated at the head of the bay, in range bearing 260°, with a slight rise in the distant background. There is good anchorage about 0.5 mile from the pier, in depths of 7m.

Cormorant Rock lies about 7 miles E of Dempster Point. Six Mile Island lies about 1.25 miles S of Comorant Rock. Dangerous rocks lie about 1.5 miles ESE and 1 mile WSW of Comorant Rock.

The coast NNE of Israelite Bay is low and sandy, without irregularity. It is backed by a steep limestone terrace from 76 to 82m high. The limestone terrace, which originates some distance inland in the vicinity of Israelite Bay and follows the general trend of the coast line, closes the coast gradually and terminates in a bluff, 87m high, 55 miles NE of Dempster Point.

From this bluff to **Point Culver** (32°54'S., 124°42'E.), about 10 miles E and then ENE for about 70 miles, the coast is of cliffy formation. These cliffs are about 76m high, without any remarkable feature by which one part can be distinguished from another; the upper part of them is brown and the lower portion is almost white. Each small projection on the coast has the appearance of a steep cape to a vessel coming along the coast, but, before coming abreast, it is lost in the general uniformity of the coast. The bluff, located 10 miles W of Point Culver, and **Point Dover** (32°21'S., 125°31'E.), about 47 miles ENE of Point Culver, are exceptions to this uniformity, but it is necessary to be near the coast before they can be distinguished.

Small Rock (32°45'S., 124°58'E.), an above-water rock, is located near the coast, 16 miles NE of Point Culver.

No known dangers exist near this coast, and depths of 37 to 51m are found at a distance of 4 to 5 miles off it.

6.49 Twilight Cove (32°17'S., 126°01'E.), 30 miles ENE of Point Dover, indents the coast slightly and affords good landing on a sandy beach. The cliffs commence to recede from the coast in the vicinity of this bight.

A steep limestone terrace, from 75 to 90m high, extends ENE from Twilight Cove and runs parallel with the coast, about 15 miles inland to Eucla, where it gradually approaches the coast again and forms the actual line of the coast E of Eucla.

A tower, 76m high and with an elevation of 166m, stands 11 miles NW of Twilight Cove; a similar tower, with an elevation of 155m, stands 9 miles N of Eyre.

Foul ground extends about 1 mile from the coast, from 1.5 to 6.5 miles ENE of Twilight Cove.

Eyre (32°16'S., 126°17'E.), a settlement 13 miles E of Twilight Cove, may be easily identified by Eyre sand patch, a white sand patch near the coast, and a peaked sand hill, covered with dense scrub, that rises about 4.5 miles inland. Vessels have found adequate shelter at an anchorage off Eyre, in a position SW of the peaked sand hill, during heavy weather from all quarters.

The coast between **Low Sandy Point** (32°18'S., 126°16'E.), 6 miles ESE of Eyre, and **Low Point** (32°01'S., 128°15'E.), about 100 miles E, has a level ridge on which there are some trees and shrubs. The depths off this part of the coast are fairly regular.

The coast between Low Point and **Eucla Roads** (31°45'S., 129°00'E.), 35 miles ENE, is backed by low sand hills; it should not be approached within a distance of 5 miles.

The coast about 1.5 miles W of Eucla is formed by a low sand bank, not more than 5m high and covered with bushes. From here the land rises gradually, and the coast, a short distance E of Eucla, consists of sandhills rising to a height of 15m. The limestone terrace, which closes the coast in this vicinity, passes about 2.5 miles N of Eucla; it is covered with mallee scrub, and has the appearance of a dark brown mass of bushes as far as the eye can see.

Delisser Sands (31°42'S., 128°57'E.) are a bare patch of sands that extend for more than 1 mile, in a NE direction, from a position about 2 miles E of Eucla. Several of these dunes rise to conspicuous peaks, the highest of which is 35m high, located near the center of the area.

Murdeyerrah Sands (31°39'S., 129°07'E.) are the farthest E of the group of named sand patches that lie in the vicinity of Eucla. They are located on the slopes of scrub-covered hills, which rise to a height of 101m, 17 miles E of Eucla. The highest of these dunes is about 37m.

6.50 Eucla (31°43'S., 128°46'E.) is a township situated 0.5 mile inland, about 5 miles W of the boundary between the states of Western Australia and South Australia.

Eucla Roads, the only known anchorage between that off Eyre and Fowler's Bay, a distance of more than 300 miles, affords shelter at all times to vessels, with local knowledge, of not more than 4m draft.

The anchorage is protected by a rocky shoal that lies S and SW of it; the outer edge of this shoal lies about 1.5 miles offshore, and is generally marked by breakers.

A rocky shoal, about 2 miles long, with depths of 4.6 to 5.5m, and on which the sea breaks with a heavy swell, lies parallel with the coast S of Delisser Sands.

Wilson Bluff, a nearly perpendicular cliff 90m high located E of Eucla Sands, makes the best landfall when approaching Eucla Roads, but the approach should be made with great caution. A tower, with an elevation of 78m, stands 25 miles WSW of Eucla; similar towers, each with an elevation of 173m, stand 4 miles NNW and 20 miles NE of Eucla.

The coast for a distance of about 10 miles E of Murdeyerrah Sands continues to be steep and dark; a perpendicular cliff with a white substratum, having no remarkable feature, extends about another 94 miles E to the head of the bight.

A number of towers, between 61 and 76m high, stand at distances from the coast, varying from 1.5 to 8 miles, between Eucla and the head of The Great Australian Bight.

6.51 Twin Rocks (31°30'S., 131°08'E.) are located close inshore off the junction of the cliff and sand, at the head of the bight. Conspicuous bare sand hills extend more than 1 mile inland from the head of the bight, rising to an elevation of 57m. There is a heavy surf here, usually, which breaks about 0.5 mile offshore, in depths of 5.5m, even in good weather. These conditions render landing impracticable, or very hazardous.

The coast between Twin Rocks and Cape Adieu, 60 miles SE, consists of a series of low, dark, rocky points and sandy beaches, fronted by rocks and foul ground, on which the sea breaks at a general distance of about 0.5 mile offshore.

Black Hill (31°33'S., 131°33'E.) is located near the coast 13 miles ESE of Twin Rocks. A peak, 93m high, on the inland ridge, rises 4.5 miles ENE of Black Hill.

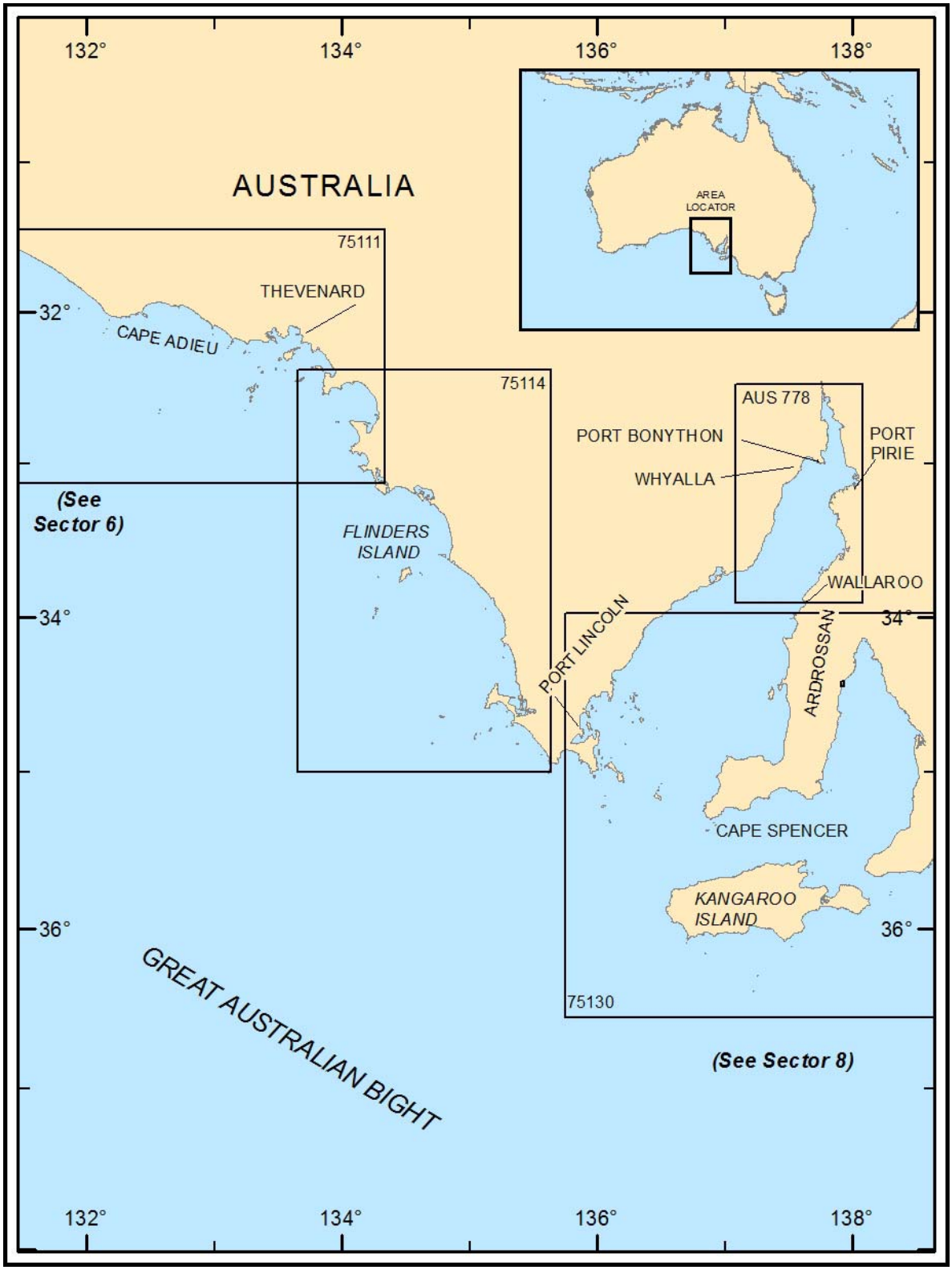
Shoulder Hill (31°40'S., 131°40'E.), 13 miles SE of the peak and on the same ridge, is 99m high.

Three round-topped hills rise to elevations of about 75m, near the coast, about 40 miles ESE of Twin Rocks.

A submerged reef, on which the sea breaks in a heavy swell, lies 2 miles offshore, SSW of the three round-topped hills described above.

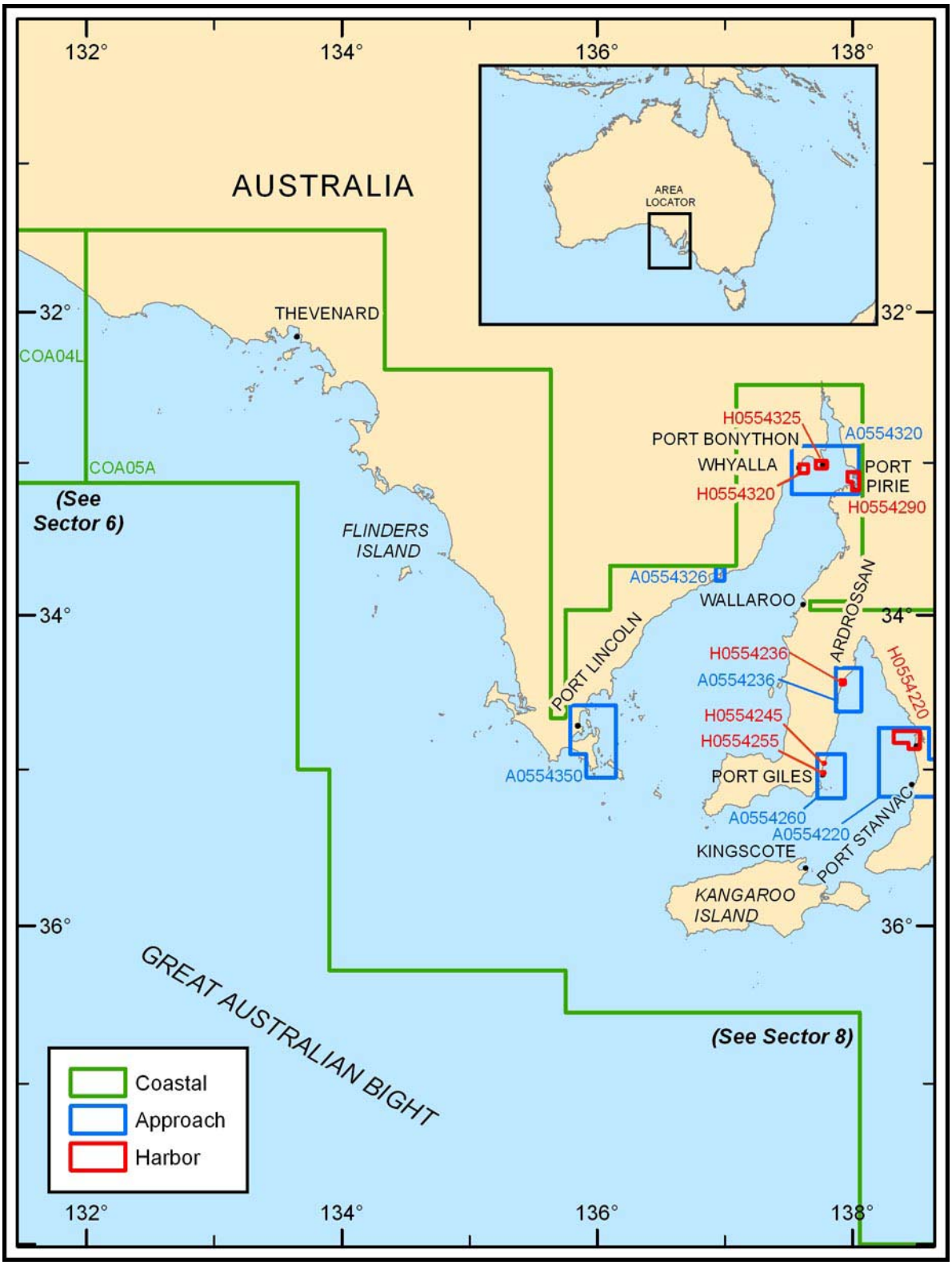
There is a bare sand hill, 73m high, about 9 miles SE of the round-topped hills. A dark, wooded hill, 172m high stands 7 miles NNE of Cape Adieu; it is the highest land on this part of the coast.

Cape Adieu (32°01'S., 132°09'E.) is a dark, cliffy point, 37m high. The cape is bordered by submerged rocks; two detached sunken rocks, which break with a heavy swell, lie about 3 miles W and 2 miles SSW, respectively, of the cape. Other offshore dangers in the vicinity of the cape are described in paragraph 7.2.



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

SECTOR 7 — CHART INFORMATION



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SECTOR 7 — DNC LIBRARY INFORMATION

SECTOR 7

SOUTH COAST OF AUSTRALIA—CAPE ADIEU TO CAPE SPENCER INCLUDING SPENCER GULF

Plan.—This sector describes the S coast of Australia from Cape Adieu to Cape Spencer and includes Spencer Gulf. The descriptive sequence is SE to the entrance of Spencer Gulf and then NNE through this gulf to its head.

General Remarks

7.1 The S coast of Australia between Cape Adieu and Cape Catastrophe, about 266 miles SE, is bordered by moderately-high cliffs and hills and indented by several open bays and inlets. Most of these bays are fairly deep up to within a short distance of the coast, whereas, others are fairly shoal and obstructed by numerous islets, rocks, and reefs. All of these bays are exposed to the heavy SW swell which constantly rolls in, even during SE winds.

The small settlements which lie within these indentations are, in most cases, available only to small vessels of moderate draft. Several commercial ports are available to ocean-going vessels in Spencer Gulf. Sheltered anchorage is provided in the lee of some of the islands for small craft with local knowledge. The entrance of Spencer Gulf lies between Cape Catastrophe and Cape Spencer, about 48 miles to the ESE. The gulf extends about 180 miles in a general NNE direction to Port Augusta at its head. Port Lincoln, Tumby Bay, Franklin Harbor, and Port Whyalla stand along the W side of the gulf. Port Victoria, Tipara Bay, Wallaroo Bay, Port Broughton, Port Pirie, and Germein Bay stand along the E side.

The gulf is navigable over most of its area by deep-draft vessels, but only vessels of moderate draft can reach and berth at Port Augusta.

From the first day of October through the end of May, extensive lobster and giant crab fishing takes place inshore of the 500m isobath off the coast of South Australia. Mariners are cautioned that surface floats associated with the activity may be encountered.

Winds—Weather.—There is a marked winter maximum and a marked summer minimum in the annual course of rainfall along the coast. The annual average ranges from about 210mm at Port Hedland, a sheltered location at the head of Spencer Gulf to the E, to about 970mm at Cape Leeuwin, on the extreme W part of the S coast of Australia. It is dry at Eucla and at other stations along the coast of the Great Australian Bight; rainfall in the area averages about 305mm annually.

The S depression, with its mainly onshore accompanying winds, is responsible for the greatest portion of the rains. The depression and rainfall are most frequent from May to August, with the highest intensities occurring in June and July. In the summer, the depressions occur less than once a month, during which time rainless months are frequent along all but the W part of the S coast.

Tropical depressions extending S also cause rain. An average of two or three of these tropical depressions occur each month during the spring, which is the season of greatest frequency.

Prolonged rain in the summer and transient months does not occur anywhere along the coast. Occasionally, a wet spell of 2 to 4 days duration occurs with a tropical depression as it moves S.

The mean temperature of the air over the area varies little from E to W. The winter averages during June, July, and August along the SW coast, and along the Great Australian Bight, are between 12.2°C and 14.4°C. In the E section of Adelaide and Port August, the winter temperatures 11.1°C to 13.3°C.The summer averages are about 10.6°C than in the winter. The extreme heat reaches over 37.8°C at all the stations, with a high temperature of 50.6°C being recorded at Eucla in January. The winter extremes seldom fall below freezing, with a low temperature of -3.9°C being recorded at Eyre in July. The daily range is usually small, but it varies with the season, usually with a maximum in the summer and a minimum in the winter.

The highest occurrence of thunderstorms is usually associated with the movement of the S depressions across the area. These thunderstorms occasionally are violent, with heavy rain and hail. Convectional thunderstorms, caused by the afternoon heat, also occur at places along the coast, but their incidence is more localized.

Lightning alone is frequently recorded when a tropical depression moves S over the coast. During this situation, night lightning at sea is frequently observed, possibly indicating a more frequent occurrence of thunderstorms at sea than observations indicate.

The cold front thunderstorm in mainly a winter and spring development. The convectional thunderstorm is most frequent in summer.

Fog is comparatively rare on the coast and over the adjacent sea. The highest frequency of fog occurs during the winter months.

Along the coast, patchy drifts of shallow fog or mist frequently occur in low-lying areas during early morning hours. They are due to the combined effects of numerous islets, profuse vegetation, and the saturation of the air. They develop into dense fogs in tropical air chiefly of the pre-warm front type.

Fogs are likely to be dense along the coast when conditions favorable for their formation are preceded by rain. Low patches of clouds moving close to the surface are characteristic of the broken and changing skies observed during the frequent squalls that develop in the prevailing westerlies.

Tides—Currents.—Near Cape Leeuwin and off the S coast of Australia, the current appears to be principally influenced by the prevailing winds. Some vessels have experienced constant N and NE currents, with velocities of 1 to 1.5 knots. Other vessels have been set to the E, but little to the N, as they approached the SW coast of Australia.

From Cape Leeuwin to the Archipelago of the Recherche, the current usually sets in a direction parallel to the coast, being strongest between D'Entrecasteaux Point and King

George Sound, where its rate can sometimes attain a velocity of 1.5 knots.From the archipelago around the Great Australian Bight to Cape Northumberland, it has less strength than farther to the S. When approaching Bass Strait, the current sets E and SE at a rate of 1 to 2.5 knots.

From November to April, the E current loses strength, and after a fresh E wind frequently changes its direction to the NW.

In the offing between Cape Leeuwin and Cape Otway, the currents appear to be influenced mainly by the strong W winds which prevail during 9 months of the year.

Near the Australian coast, with E winds, a current has been found setting W, but this current is probably confined to the vicinity of the coast. To the N of Cape Jaffa, which lies about 220 miles NW of Cape Otway, a current sets E, at a rate of about 1 knot, during W gales; at the same time near Cape Jaffa, the current sets N.

Vessels approaching the vicinity of Cape Otway during strong W winds should be prepared for a S set.

Caution.—Vessels entering the gulf are advised that dangerous currents exist off **Cape Catastrophe** (34°59'S., 136°00'E.) and Waterhouse Point, on the SE end of **Thistle Island** (35°00'S., 136°09'E.), and violent tide rips exist in the vicinity of the islets between Cape Catastrophe and the W side of Thistle Island. Deep-draft vessels should not approach within 5 miles of **South Neptune Island** (35°20'S., 136°07'E.) because bottom irregularity and the lack of detailed surveys.

Offlying Dangers

7.2 D'Entrecasteaux Reef (31°59'S., 131°56'E.), lying between 11 and 12.5 miles W of Cape Adieu, is divided into two parts. The N part, the outline of which is always marked by breakers, is about 2 miles in extent and has several rocks, awash, near its NE extremity. The S part, which only breaks during a heavy swell, lies about 0.5 mile S of the N part. As soundings are not a good guide when approaching the coast in this vicinity, these dangers should be given a wide berth at night.

Nuyts Reefs (32°08'S., 132°09'E.) consist of a number of islets and sunken rocks extending about 9 miles S from Cape Adieu. The highest islet of the group rises to a height of 13m and stands about 7.5 miles S of the cape. This islet is connected to a smaller islet by rocks which uncover. The sea breaks a short distance N of some rocky heads that lie off the N end of these islets; elsewhere they appear steep-to. Three reefs lie about 1.5 miles S of the above highest islet. The center of the NE reef uncovers, but the other two are sunken and do not always break. However, during W gales and heavy swells, the breakers on the two sunken reefs can be seen before the islets are sighted. Two above-water rocks lie close together about 1.5 miles ENE of the above 13m islet. The NE rock is 9.1m high. The N danger of the group is a 6.1m high rock about 5 miles NNE of the 13m islet and about 1.5 miles off the coast. The sunken reef extends almost 1 mile S from it. There are depths of 22 to 51.2m between this reef and the 9.1m rock mentioned above.

Cape Adieu to Denial Bay

7.3 Cape Adieu (32°01'S., 132°09'E.) is described in paragraph 6.51. From Cape Adieu, the coast extends ESE for about 3.5 miles and then E for about 7.5 miles to Cape Nuyts. The coast between these capes consists of low, dark cliffs topped by sand hills in places and fronted by foul ground. The outermost rocks, about 1 mile offshore, break during heavy swells. The W of three hills, all of which are about 120m high, stands 3 miles NW of Cape Nuyts and is densely covered with scrub.

Cape Nuyts (32°02'S., 132°21'E.), 59m high, is a rocky cliff topped by sand hills. A steep-to sunken reef, which seldom breaks, lies about 1 mile SE of the cape. A detached 18.3m high rock stands close E of the NE side of the cape. The small bight between this rock and Scott Point is fronted by rocks which extend about 0.3 mile from the shore.

7.4 Scott Point (32°01'S., 132°23'E.) is 49m high and faced by steep cliffs. The point slopes down to the swamps behind it and appears like an island when seen from the SW or SE.

Scott Bay (32°01'S., 132°24'E.), fouled by rocks, lies close E of Scott Point. An extensive area of bare sand, which rises to a height of 38m, stands N of the bay.

Point Fowler (32°02'S., 132°29'E.), about 4 miles ESE of Scott Point, is a promontory that extends about 3 miles from the coast and forms the S side of Port Eyre. The point is faced by dark cliffs and appears flat-topped when seen from seaward. Sand hills, sparsely covered with vegetation, rise slightly above the cliffs on the SW side. The NE side of the point is lower and slopes gently upward. The SE extremity of the promontory is 48m high. Three rocky banks, with depths of 18.3m and less, lie between 0.5 and 1.5 miles SE of the point. The heavy swells and high rollers that accompany and follow SW gales break on these banks. Nantabi Sand, about 8 miles NE of Point Fowler, is a conspicuous mark on the N shore of Fowlers Bay. A tower stands 2 miles from the coast, 5 miles WNW of Nantabi Sand.

7.5 Port Eyre (32°00'S., 132°27'E.) (World Port Index No. 54430) consists of a bight which lies at the W end of Fowlers Bay, close N of Point Fowler, and provides shelter from all winds within the 10m curve. The high outside seas, which have been raised by SE winds, quickly subside in height when nearing the anchorage. Depths within the bay decrease gradually toward the shore. An extensive area of sandhills, N of Scott Bay, extends to the W shore of Port Eyre. The N end of these sand hills is steep and conspicuous. North of these sand hills, the beach is backed by a low ridge; farther inland the land is low and swampy. A scrub-covered range of hills, 55 to 66m high, stands farther N about 1 to 2 miles inland. A rock, awash, lies about 1 mile NW of Fowler Point and about 0.2 mile offshore. A shoal, with depths of less than 1.8m, extends about 0.5 mile NE from the shore on the SW side of Port Eyre. A jetty, suitable only for fishing boats, extends from the shore in the vicinity of the settlement.

Anchorage can be taken, in depths of 9.1 to 10m, with the E end of Point Fowler bearing 165° and the head of the jetty bearing 284°, or closer in according to draft. The bottom of sand and weed is good holding ground. Because of the increased height of the seas during SE winds, vessels should allow a safety margin of at least 0.9m under the keel at the inner anchorage and 1.8m at the outer anchorage. There are no permanent residents at the settlement.

7.6 From Nantabi Sand, the coast extends E for about 9.5 miles and then curves SE for 14 miles to the inner end of the promontory that forms Sinclair Point. The first 4 miles consists of a sandy beach and then red bluffs for 6 miles, continued by a sandy beach with rocky points for the remaining distance.

Chadinga Hill, 52m high, extends about 2 miles inland as a sand dune along this latter stretch of coast. A dark flat-topped range of hills covered with dense scrub extends from a position about 3.5 miles NNE of Nantabi Sand to a position N of Chadinga Hill. North of Nantabi Sand and **Eyre Bluff** (31°58'S., 132°44'E.), the summits of this range attain heights of about 122m.

Yatala Reef (32°37'S., 132°26'E.), a dangerous detached reef, lies about 36 miles S of Fowler Point in the S approach to Port Eyre and in the W approach to the Nuyts Archipelago. The reef consists of two sunken rocks about 0.2 mile apart. The sea breaks on the N rock, which has a depth of less than 1.8m; the other rock, which breaks occasionally, has a greater depth over it. In 1984, a below-water rock, with 2m or less over it, was reported to lie 0.4 mile N of Yatala Reef. The reef lies near the E side of a bank, with depths of less than 55m, but the depths do not vary sufficiently for soundings to give warning of being too close to it. The reef is visible most days under normal conditions. When a large swell is running, the reef is visible at night at about 0.5 mile and can be picked up on radar at 6 to 8 miles. With little or no swell, the reef cannot be seen at night nor can it be picked up by radar. Vessels should give this reef a wide berth at night and during hazy weather. Eyre Bluff, about 13 miles ENE of Fowler Point, is a steep rocky islet, about 37m high, which is connected to the coast by rocks which uncover. A patch of foul ground, with a depth of 18.3m, lies about 4.25 miles SSW of Eyre Bluff.

7.7 **Sinclair Point** (32°07'S., 132°59'E.), 47m high and topped by a growth of coarse grass, is the outer end of a promontory that extends S for about 2 miles from the coast. A bare limestone cap stands about halfway up the granite slope which forms the S extremity of the point. There are heavy breakers on the rocks off this part of the coast. A rocky patch, with depths of 18.3m, lies about 4 miles WNW of Sinclair Point.

Sinclair Island (32°09'S., 132°59'E.), of granite and 16m high, stands 2.5 miles S of Sinclair Point. A 1.5m high rock, marked by breakers on its E side, lies about midway between the island and the point.

Pudding Rock (32°07'S., 133°00'E.), a bare rock, about 5.8m high, stands 2 miles SE of Sinclair Point. A reef, awash, lies about midway between the rock and the point. Sunken rocks extend about 0.4 mile SW from this reef; a sunken rock lies between this reef and Pudding Rock.

Port Le Hunte (32°06'S., 133°00'E.), close E of Sinclair Point, was formerly a landing place for the surrounding district. The jetty fronting the shore is no longer usable. Vessels anchoring in the vicinity should do so seaward of the 5m curve. The coast between Port Le Hunte and Bell Point, about 10 miles to the SE, is fronted by a long sandy beach backed by sand hills, 24.4 to 36.6m high.

Black Peak (32°06'S., 133°04'E.), 36m high, stands near the coast about 4 miles E of Sinclair Point.

7.8 **Point Bell** (32°12'S., 133°08'E.) extends about 2.5 miles from the coast, about 9.75 miles SE of Sinclair Point. The 54m high summit is grass-covered; the S extremity of the point consists of a smooth low granite formation. Rocks, which uncover, extend about 0.2 mile S from its extremity. A dark rock, 4.6m high, stands 1.25 miles SSW of Point Bell. This rock is surrounded by foul ground which breaks. Foul ground extends more than 1 mile SSW from this rock and its steep-to outer end breaks with a heavy sea and swell. An area of extensive shoals, with depths of 17.4 to 20m, lies centered about 9 miles SSW of Point Bell.

The bight close E of Point Bell provides anchorage, in depths of 3.7 to 5.5m, sandy bottom, in all seasons, for vessels with local knowledge and a draft of about 3m. Anchor bearings may be taken, with the shed near the beach bearing about 284° and the E extremity of Point Bell bearing 183°. A conspicuous bare sand peak, 35m high, stands on the N side of the bight about 2.5 miles NNE of the summit of Bell Point.

Rocky Point (32°12'S., 133°15'E.), low and backed by 30m high grass-covered hills, stands 6.5 miles E of Bell Point. The coast between these points is sandy and backed by barren sand hills. The most conspicuous sand hills stand near Bell Point and about midway between the two points. A rock, awash, lies about 0.75 mile W of Rocky Point and rocks lie within 0.1 mile of the S and E sides of the point.

Flinders Rock (32°13'S., 133°13'E.), a steep-to rock with a depth of 5.5m, lies about 2.5 miles WSW of Rocky Point. The sea occasionally breaks over this rock in a moderate swell.

7.9 The **Purdie Islets** (32°16'S., 133°14'E.) consist of a large granite islet, 25m high, and several above and below-water rocks. A small 3m high rock stands about 0.5 mile S of the islet and sunken rocks extend over 0.25 mile N from the islet. A chain of breaking rocks, 1.5 to 4.6m high, extends about 1.5 miles NE from the islet. An isolated rock, 3.9m high, stands 2.25 miles ENE of the 25m islet. Depths of more than 18.3m are found close to all these dangers, but a depth of 7.5m lies 2.5 miles SE of the 25m islet. The Purdie Islets were reported to be good radar targets at distances of up to 11 miles.

Lounds Island (32°16'S., 133°22'E.) stands 7 miles SE of Rocky Point; the island is 10m high and steep-to.

Lounds Reef (32°14'S., 133°22'E.), which breaks occasionally, lies 2.75 miles N of Lounds Island and about 5.5 miles ESE of Rocky Point.

James Point (32°12'S., 133°25'E.), about 8.5 miles E of Rocky Point, is a small projection which has three dark rises, about 42m high, a short distance NW of it. Two bare sand hills lie close W of these rises; the E hill is 47m high. The intervening coast between the two points consists of rocky points and low cliffs with sandy beaches in between. Rocks extend about 0.25 mile offshore along this stretch of coast. A rock, which breaks, lies about 0.75 mile offshore abreast the W sand hill and about 2.5 miles W of James Point.

Peter Point (32°12'S., 133°29'E.), about 3.25 miles E of James Point, is the E extremity of an irregular peninsula that forms the S side of Tourville Bay, and is also the N point of the entrance of Denial Bay. The point rises gradually to its 34m high summit. Between James Point and Peter Point, the coast is indented by a sandy bay. Cowie Yalkeena, a bare sand hill, 36m high, is the most conspicuous feature of this bay. A rock, with a

depth of 4.6m and on which the sea breaks occasionally, lies about 0.75 mile SW of Peter Point. A shoal, with a depth of 6m, on the N side of Yatala Channel, lies 2.5 miles ESE of the point. Yatala Channel leads from Denial Bay into Murat Bay.

The Nuyts Archipelago

7.10 The **Nuyts Archipelago** (32°15'S., 133°40'E.), comprising a number of islands and rocks, extends about 32 miles SW from that part of the coast SE of Peter Point and between Denial Bay and Smoky Bay. St. Peter Island and St. Francis Island are the largest and only inhabited islands of the archipelago.

The only anchorages among the outer islands lie off the N side of St. Francis Island and off the N side of Franklin Island. The latter anchorage is available only during the summer, when SE winds prevail.

St. Francis Isles (32°34'S., 133°18'E.), consisting of a group of 11 islets, form the outermost and SW portion of the archipelago. St. Francis Island, the largest of this group, lies about 19 miles SSE of Bell Point.

Hart Island (32°39'S., 133°08'E.), the outermost island of the St. Francis Isles, stands 28 miles E of Yatala Reef (32°37'S., 132°26'E.) and about 10.5 miles SW of St. Francis Island. The island consists of a rock, 20m high, and is almost bare. The island is steep-to, except for a sunken rock within 0.1 mile of its SW end and an above-water rock near its NE end. Hart Island is a useful mark for vessels bound for Port Eyre from the SE.

Cannan Reefs (32°39'S., 133°15'E.), about 5.5 miles E of Hart Island, consist of a bare 7.6m high rock about 0.2 mile long, and several rocks awash. A breaking rock lies about 0.2 mile WSW of the 7.6m rock. A rock, awash, lies about 0.3 mile NNE of the E end of the 7.6m rock and another breaking rock lies about 0.75 mile NNE of the same above-water rock. A dangerous rocky patch, with a least depth of 4.9m was reported (1968) to lie about 4.25 miles SSE of this above-water rock. A depth of 29m was reported (1968) to lie 1.5 miles SSW of this rocky patch. A bank, with depths of 16m, lies 10 miles ESE of Cannan Reefs.

7.11 **Fenelon Island** (32°35'S., 133°17'E.), about 3 miles S of St. Francis Island, is very steep and rises to a height of 57m as a single peak. An above-water rock lies 0.2 mile off the N extremity of the island; detached boulders extend about 0.1 mile from the NW and E ends of the island. Elsewhere the island is steep-to.

Masillon Island (32°34'S., 133°17'E.), about 1 mile N of Fenelon Island, has three peaks of almost equal height, the highest rising to an elevation of 76m. The island is steep-to, except for a few rocks close offshore, and is very steep. A bight indents the W side of the island.

Smooth Island (32°30'S., 133°18'E.), almost 1 mile N of the NE extremity of St. Francis Island, is 35m high, smooth, round, and steep-to.

Dog Island (32°29'S., 133°20'E.), 1.5 miles NE of the NE extremity of St. Francis Island, is composed of light-colored cliffs which rise to a 60m high summit on the E side. The N side of the island is sheer, but the S end slopes gently. A few detached boulders lie on the N and E sides of the island, and rocks extend over 0.1 mile from the E and NE extremities of the island, otherwise it is steep-to.

Freeling Island (32°29'S., 133°20'E.), 0.5 mile NE of Dog Island, is dark in appearance and has a rounded summit, 35m high. Two rocks, awash, lie 0.15 mile off its N extremity; elsewhere it is steep-to.

Egg Island (32°28'S., 133°19'E.), the N island of the St. Francis Isles, stands 0.5 mile NE of Smooth Island. The island has a rounded summit, 37m high, which is steep on its E side and slopes on its W side. With the exception of a rock which lies 0.1 mile off the N extremity and on which the sea breaks, the island is steep-to.

West Island (32°31'S., 133°16'E.), about 1 mile WSW of the NW extremity of St. Francis Island, is 27m high and has a number of loose boulders on its W slope. The sea breaks within an area about 0.5 mile N of the island, and there are high rollers, which break occasionally, for a distance of 0.5 mile S of the island. A long, barren, rocky islet, about 7.6m high, stands about midway between West Island and St. Francis Island. The passage on either side of this islet should not be attempted.

7.12 **St. Francis Island** (32°31'S., 133°18'E.) is about 2 miles in extent and almost covered with vegetation. Its rounded summit, 80m high, stands on the E side of the island, and the highest point on the W side rises to a height of 49m. The sea breaks heavily on all except the N side of the island. A 17.7m rock, with a breaker close S of it, lies close off the SE extremity of the island and sunken rocks extend about 0.5 mile S from the S end of the island. With the exception of Petrel Bay, the N and E sides of the island are steep-to and clear of dangers. A light is shown from the summit of the island.

Petrel Bay (32°30'S., 133°16'E.) indents the N side of St. Francis Island close W of the NE extremity, and has a sandy beach. There are depths of 5.5m about 0.1 mile offshore, with depths of 12.8 to 18.3m farther offshore. Vessels with local knowledge can anchor in the bay over a bottom of weed and sand. The anchorage in Petrel Bay is sheltered from all except N and NE winds; however, such winds seldom blow with sufficient force to raise a heavy sea at this distance from the mainland. During W winds, the best anchorage lies in the W part of the bay, in a depth of 16.5m, about 0.5 mile offshore; smaller vessels can anchor farther in. During SE winds, the best anchorage is in the E part of the bay, in a depth of 16.5m, with the W side of the Egg Island bearing 025° and open W of the W side of Smooth Island, and with the NE extremity of the E entrance point of the bay bearing 093°.

The **Lacy Islands** (32°24'S., 133°22'E.), with its largest island lying about 6.5 miles NNE of St. Francis Island, is 45m high and has a steep and apparently inaccessible coast, which is free of dangers. A small round islet lies 2 miles NW of the above island. A rock that uncovers lies about 0.3 mile E of the islet, and a sunken rock lies about 0.1 mile N of this rock. An above-water rock lies about 0.5 mile WSW of the islet. Depths of 23m and 18.2m lie 3 miles WNW and 9 miles W, respectively, of the 45m island.

Evans Island (32°23'S., 133°29'E.), 37m high, stands about 5 miles ENE of the largest of the Lacy Islands. Detached above and below-water rocks extend about 0.25 mile from the NW and SE extremities of the island. A breaking rock lies close off the SW extremity of the island. A depth of 13.8m lies 1.5 miles

ENE of the island. A light is shown from the summit of the island.

7.13 Flinders Reef (32°13'S., 133°12'E.), about 3.5 miles E of Evans Island, consists of two rocks, one drying 1.5m and the other drying 2m, lying about 0.2 mile apart. The swell breaks heavily on this reef, which has deep water about 0.5 mile from it. A shoal, with a depth of 13.7m, lies about 1.5 miles NE of Evans Island.

The **Franklin Islands** (32°28'S., 133°38'E.), which has its two principal islands lying about 16 miles E of St. Francis Island, are joined by a drying sand bar about 0.25 mile long. Both islands are flat-topped; the W island is 48m high, while the E island is almost the same height and has a conspicuous bush on its summit on the N side. A chain of above and below-water rocks, about 1.25 miles long, lies almost parallel to the S coast of the W island at a distance of 0.25 to 0.75 miles offshore. The largest rock of the chain rises to a height of 4.6m. A pyramidal rock, about 15.2m high, stands about 0.4 mile NE of the E island. Rocks which uncover extend almost 0.2 mile N from the 15.2m rock. The channel between this rock and Goalen Rocks, about 2 miles NE, is clear of reported dangers.

Anchorage can be taken, in depths of 11 to 16.5m, sand, off the N side of the W island. However, this anchorage provides shelter from SE winds only. Two dangers which must be avoided in the approach to this anchorage are a sunken rock, about 0.5 mile ENE of the NW island, and foul ground, which breaks occasionally, lying a little more than 0.5 mile WSW of the NW point of the E island.

Directions.—Round the W side of the W island at a distance of about 1 mile, taking care to avoid the W end of the chain of rocks S of the island. When the high water mark on the SW extremity of the E island is in range 123° with the high water mark on the NE end of the W island, proceed on this range until the point between the two sandy beaches on the N side of the W island bears 156°. Alter course to this bearing and anchor almost immediately with the NW point of the W island bearing 244°. A small vessel may anchor farther in with the NW end of the W island bearing 262°.

7.14 Goat Island (32°19'S., 133°31'E.), about 3 miles NNE of Evans Island, is 59m high. Its W side is free of dangers, but a reef, which has a 0.9m high rock on it, lies about 0.75 mile S of the E extremity of the island. Goat Island is joined to St. Peter Island, about 1 mile to the E, by a ridge which has a passage that is almost blocked by uncovering rocks. A dangerous wreck, with a depth of 0.5m and marked close N by a buoy, lies on this reef close N of the E extremity of Goat Island.

Temporary anchorage can be taken about 1 mile N of the E extremity of Goat Island. However, this anchorage, which is sheltered by the ridge mentioned above, has a rocky bottom in places and provides shelter from SE winds only.

St. Peter Island (32°17'S., 133°35'E.), the largest island of the Nuyts Archipelago, stands on the S side of Denial Bay. The S part of the island has two parallel ranges of hills, about 42m high, which are covered with bushes and grass. Mount Younghusband, 44m high, forms a landmark on the NE extremity of the island. This conspicuous hill slopes gradually on its SW side, but on the NE side it falls steeply to a low sand spit that extends about 2 miles ENE from the island. A drying sandbank extends about 2 miles NE from the extremity of the sandspit. A large uncovering sandbank fronts the E side of the island and extends about 4 miles ENE from the E extremity of the island. A line of breaking reefs extends 3 miles ESE from the SE extremity of the island.

Gliddon Reef (32°20'S., 133°34'E.), which uncovers, lies 0.5 mile WSW of the S extremity of St. Peter Island.

Denial Bay to Cape Finnis

7.15 Denial Bay (32°15'S., 133°30'E.), lying N of St. Peters Island and E of Peter Point, indents the coast in a general NE direction for about 10 miles, and is divided into three smaller bays, Tourville Bay, Murat Bay, and Bosanquet Bay, by two projecting headlands.

Tourville Bay (32°10'S., 133°28'E.), the W bay, is entered between Peter Point and Cape Beaufort, about 4 miles NE. The bay is fouled by drying sand banks and has no commercial value. A depth of 6.4m lies about 2.75 miles ESE of Peter Point. Davenport Creek lies on the S side of the bay and is shallow. Vessels with local knowledge and with a draft of less than 3.7m can take sheltered anchorage within the creek at the S end of the first reach.

Murat Bay (32°09'S., 133°37'E.), the central bay and the only one of any commercial importance, is entered between Cape Beaufort and Cape Thevenard, about 4.75 miles ENE. The bay is entered through Yatala Channel. The bay is protected from seaward by St. Peter Island and is obstructed across its entrance by shoals and drying sandbanks. Drying sand flats and reefs extend almost 0.75 mile from the shore in places and there are general depths of less than 5.5m within 1 to 1.5 miles offshore.

Cape Thevenard (32°09'S., 133°39'E.) is a square grass-covered point, 17m high, with a conspicuous clump of bushes on its summit. The point, which is connected to the coast by a low isthmus, projects W about 1.75 miles and forms the SE part of Murat Bay. There are conspicuous silos on the cape.

Bosanquet Bay (32°10'S., 133°40'E.), the E bay of the three, lies between Cape Thevenard and Cape Vivonne about 3.5 miles SE. A conspicuous red cliff, about 18.3m high, stands at the SE end of the beach which lines the shore. Cape Vivonne, a flat grass-covered point about 9.1m high, slopes gradually from the summit of a hill, 34m high, 1 mile E of the cape.

7.16 Port Thevenard (32°08'S., 133°39'E.) (World Port Index No. 54410) consists of that part of Murat Bay which lies N of Cape Beaufort and Cape Thevenard. The principal berth extends W from the latter cape and is approached through Yatala Channel.

Winds—Weather.—The prevailing winds are from the W, although strong S winds up to 35 knots are common during the summer.

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Tides—Currents.—The tidal current in Yatala Channel between the shoal ground at the S end of the bay attains a

velocity of 1.5 to 2 knots at spring; the flood sets NE and the ebb to the SW. In the dredged channel, the currents setting across the channel are weak and in the N part of Murat Bay they are barely perceptible. An E wind may lower the level of the water by 0.3 to 0.6m. The mean spring rise is 1.7m and the mean neap rise is 1m. The tidal current sets across the final leg of the approach channel between Lighted Beacon 16 and Lighted Beacon 28.

Depths—Limitations.—Yatala Channel, the principal entrance, is entered about 2.5 miles S of Cape Beaufort and leads in a NE direction for 3 miles between the foul ground which extends N from St. Peter Island and the foul ground extending SE from Cape Beaufort. The channel then leads E for about 1.25 miles between two drying sandbanks to a position almost 0.5 mile SE of Bird Rock. This rock stands about 3.5 miles ESE of Cape Beaufort. The channel then leads N, passing E of a large drying sand bank, to the deep water area in Murat Bay. The controlling depth is 8.2m in The Cutting, a dredged channel about 78m wide, which lies with its entrance about 0.4 mile E of Bird Rock and extends about 1.5 miles to the N.

Daphne Rock, which uncovers, lies about 0.5 mile SW of Cape Thevenard and is marked by a beacon.

Thevenard Jetty extends about 390m W from Cape Thevenard and has depths of 9.8m along both sides for a distance of 198m from its outer end. The principal commodities handled are gypsum, salt, and grain in bulk, all of which are carried along the jetty to the loading berths by conveyors. Vessels up to 180m long, with a maximum beam of 28m, can be accommodated, although vessels exceeding these limits may be accommodated at the discretion of the port master.

During strong S and NW winds, vessels may have to leave the jetty and anchor in Murat Bay because of the heavy surge alongside. An UKC of at least 0.9m is required for vessels with a draft of 8.2m and over; an UKC of 0.8m is required for all other vessels. These UKC figures are subject to change if abnormal tide or weather conditions prevail. Ceduna Jetty and Denial Jetty, which lie in the inner reaches of Murat Bay, are closed to commercial shipping.

Aspect.—The limits of the channel fairway are marked by lighted beacons and the alignment of the channel reaches are defined by lighted range beacons. A lighted aerobeacon, which stands about 3.5 miles ENE of Cape Thevenard, will be lighted when required.

Pilotage.—Pilotage is compulsory and should be requested at least 2 hours in advance; if the pilot is required outside normal working hours, the request should be made at least 4 hours in advance. The vessel's ETA should be given 24 hours in advance and confirmed 4 hours prior to arrival. The pilot boards about 1 mile SW of Entrance Lighted Beacon from an orange and white launch which is fitted with VHF. Only one pilot is available for night departures.

Anchorage.—Secure anchorage can be taken, in a depth of 7.3m, NW of Cape Thevenard. The mud bottom is good holding ground. Anchorage, for vessels awaiting a pilot for an extended period of time, can be obtained about 4 miles SW of the Entrance Lighted Beacon, in a depth of about 12m. Mariners are cautioned not to approach Entrance Lighted Beacon without a pilot owing to restricted sea room.

Directions.—Pass about 6.5 miles E of St. Francis Island Light and then steer 002° to pass between the Lacy Islands and Evans Island. Approach Yatala Channel in the white sector of Entrance Lighted Beacon; by day, make the approach by keeping the lighted beacon bearing 042°. When Channel Lighted Beacon 2 and Channel Lighted Beacon 4 come in range, alter course to bring them fine on the starboard bow, then pass between Channel Lighted Beacon 2 and Channel Lighted Beacon 1 and steer a mid-channel course between the channel lighted beacons.

Caution.—Mariners are warned of the presence of marine farms in the coastal waters surrounding Cape Thevenard, Smoky Bay, and Denial Bay. Marine farms, which may be floating or fixed structures, and their associated moorings should be avoided. The farms are generally marked by buoys or beacons, which may be lit.

7.17 Decres Bay (32°14'S., 133°44'E.) indents the coast between Cape Vivonne and Cape D'Estree, about 5.75 miles SE, and consists for the most part of two long sandy beaches backed by sand hills. Whittelby Point, low and rocky, separates the two beaches. The coast on the SE side of the bay, up to 2 miles NNW of Cape D'Estree, predominantly consists of cliffs approximately 21.3m high. There are general depths of 7.3 to 9.1m over the greater part of the bay, which may be approached by Waterwitch Channel and Smoky Bay, or from Denial Bay. The channel from Denial Bay has depths of 3.7 to 5.5m and leads between Cape Vivonne and the drying sandbank which extends NE from the sandspit off St. Peter Island. The limits of this channel are marked by beacons.

Cape D'Estree (32°16'S., 133°46'E.), the extremity of a headland which extends 3 miles S from the coast, is faced with light-colored cliffs 30m high. The land close behind it is lower; about 2.5 miles farther inland the land rises to scrub-covered hills. The cape separates Decres Bay from Smoky Bay.

7.18 Smoky Bay (32°18'S., 133°49'E.), which is contained between Cape D'Estree and Eyre Island, about 5.75 miles SSE, is protected from the sea by shoal ground that extends E from St. Peter Island and by Eyre Island and the banks and shoals that surround it.

The bay is about 12 miles long and provides anchorage, in a depth of about 7.3m. The bay is entered through Waterwitch Channel, which can be navigated at all times by vessels having local knowledge and a draft of not more than 5.5m. The coast between Cape D'Estree and the entrance of Laura Bay, about 2.5 miles ENE, consists of broken limestone cliffs.

A rocky islet, 9.1m high, is connected to the coast by a drying sand bank, about 1 mile SE of the entrance of Laura Bay. From Laura Bay, the coast extends SE for about 11.5 miles and curves sharply W and then NNW to Cape Missiessy.

The NE part of this coast consists of rocky points, low cliffs and beaches backed by sand hills. The most conspicuous of these hills stands about 1 mile E of Laura Bay and rises to a height of 44m. Saddle Peak, saddle-shaped and 28m high, stands 5.5 miles SE of Laura Bay. Two long round-topped hills stand 3 miles SE of Saddle Peak; the NE hill is 50m high. The coast in the SE part of Smoky Bay is low and backed by swamps in places.

7.19 Cape Missiessy (32°24'S., 133°52'E.) is the NW extremity of a low, sandy point. Swamps lie on the E side of

this point. Smoky Bay Hill, dark and 33m high, stands 2.5 miles S of the cape.

Eyre Island (32°23'S., 133°50'E.), which lies on the SW side of Smoky Bay, stands close NW of Cape Missiessy and is separated from it by a narrow shallow channel. A drying bank surrounds the island and extends about 3.25 miles WSW from its NW end. A small bare islet stands on the S side of this extension.

Goalen Rocks (32°24'S., 133°43'E.), consisting of two rocks, one above-water and the other awash, lie about 4.25 miles SW of the NW extremity of Eyre Island. The intervening area is foul. A series of breaking reefs lies parallel to the coast of Eyre Island and extends from Goalen Rocks to the mainland about 2 miles SW of Smoky Bay Hill. The passage between Goalen Rocks and the 10m rock ENE of Franklin Island has depths of 14.6 to 27.4m and is clear of dangers.

Waterwitch Channel (32°20'S., 133°43'E.) leads into Smoky Bay, between the foul ground extending about 8 miles E from St. Peter Island and the shoal area extending N and NW from Eyre Island. The least depth in the fairway is a 5.5m patch near the E end of the channel, about 2.5 miles S of Cape D'Estree. A drying sand bank lies on the N side of this channel, about 1.5 miles SW of Cape D'Estree. Shoal water, with depths of 1.8m and less, lies on the S side of the channel about 3 miles S of Cape D'Estree. Mount Younghusband and Cape D'Estree are useful marks when navigating this channel. The N side of the channel is marked by a beacon about 7 miles E of the SE end of St. Peter Island.

The tidal currents in the outer part of Waterwitch Channel set in a NE and SW direction at a rate of 1 knot at springs. In the narrowest part of the channel, these currents set in an E and W direction at a rate of 2 knots at springs. The currents within the bay are negligible.

Anchorage can be taken, in a depth of 7.3m, with Cape D'Estree bearing 293° and the 44m hill E of Laura Bay bearing 034°. Small vessels can anchor anywhere within the bay according to draft and the direction of the wind. During strong W winds, the best sheltered anchorage lies in the W part of Decres Bay. Smoky Bay Jetty, which lies in the S part of the bay, has shallow depths and is closed to commercial shipping. The coast between Smoky Bay and Brown Point, about 6 miles S, consists of rocky points and sandy beaches backed by sand hills.

Mount Mary (32°31'S., 133°51'E.), the highest of these sand hills, rises to a height of 45m, about 2 miles NNE of Brown Point. Detached submerged rocks extend some distance off this part of the coast, and it should not be approached nearer than 2 miles.

7.20 Streaky Bay (32°35'S., 134°04'E.), entered between Brown Point and Cape Bauer, about 15 miles to the SE, recedes about 15 miles to the NE. This bay contains, in its NE part, the only secure anchorage in all weather for large vessels along the S coast of Australia between King George Sound and Port Lincoln. This anchorage is approached through Warburton Channel, which has a least fairway depth of 8.5m.

Brown Point (32°33'S., 133°51'E.), the N entrance point of Streaky Bay, is 35m high, red in color, and covered with coarse grass. Its E side is steep, whereas the W side has a gentle slope. A detached sunken rock lies about 0.5 mile S of the point.

The E part of the bay, S of Warburton Channel, is fronted by an extensive shoal area intersected by two channels which lead to deeper water between the shoals and the mainland. Dashwood Channel, with a least depth of 5m, leads through the middle of this shoal area and divides it into North Bank to the N and South Sand to the S. South Channel, with a depth of 3.4m, leads through the shoal area lying to the S of South Sand and the shoal area that fronts the N side of the Gibson Peninsula.

Cape Bauer is the NW extremity of this peninsula. With the exception of the dangers to be described, there are general depths of 18.3m between the entrance points shoaling gradually to the shoal areas mentioned above. Blanche Port and Streaky Bay Township are situated in the S part of the bay; Carawa Jetty lies on the NE side of the bay. A 9.1m rocky patch, on which the sea breaks during a heavy swell, lies about 4.5 miles SE of Brown Point. Another patch, which breaks during a heavy swell, lies about 4 miles E of the 9.1m patch. The least known depth over this patch is 14.6m, but lesser depths may exist.

Dashwood Rock (32°38'S., 134°04'E.), about 6 miles N of Cape Bauer, is a dangerous pinnacle rock with a depth of 2.7m and with depths of more than 9.1m about 0.2 mile from it. The sea only breaks occasionally on this danger, even with a heavy swell.

Mount Westall (32°54'S., 134°08'E.), bearing less than 172° and open W of Cape Bauer, leads W of Dashwood Rock.

Olive Island (32°44'S., 133°58'E.), a flat-topped rock 30m high, stands 4.5 miles W of Cape Bauer. Numerous rocks and other dangers extend about 1.75 miles NE from the island, and a small head of rock, about 3m high, stands near the NE extremity of this foul ground. Rocks and other dangers, which can usually be located by the heavy breakers over them, extend about 1 mile SSW and W from the island.

7.21 Streaky Bay—North side.—Collinson Point (32°33'S., 133°53'E.), 2 miles E of Brown Point, is low and sandy. A sunken reef, which breaks only during a heavy swell, extends about 1 mile S from the point, and a detached rocky patch, with a depth of 5.5m, lies about 1.5 miles E of the point. In bad weather, heavy rollers are formed between Brown Point and Collinson Point.

Gascoigne Bay (32°31'S., 133°56'E.) indents the coast between Collinson Point and De Mole Point, about 5.5 miles ENE. The low, sandy shores are fronted by rocks, except at the N part. A sand hill, 24m high, stands near the shore, about 3 miles W of De Mole Point.

Good anchorage can be taken in the NW part of the bay by small vessels with local knowledge, in a depth of 4m, sand and weed, with Collinson Point bearing 218° and De Mole Point bearing 090°. Two sunken rocks, on which the sea usually breaks, lie S and ESE of the anchorage, about 3.25 and 2.5 miles, respectively, W of De Mole Point. The 24m sand hill, bearing 009°, leads between them to the anchorage.

De Mole Point (32°31'S., 133°59'E.), 31m high, is dark and wooded. A rock, which uncovers, lies about 0.75 mile S of the point. Between De Mole Point and Lindsay Point, about 5 miles ENE, the coast is indented by a shallow bay. A conspicuous 20m high hillock stands close to the beach near the head of this bay.

Lindsay Point (32°29'S., 134°05'E.), 3.7m high, is round and sandy. Shoal water, with depths of less than 5.5m, extending almost 3.25 miles S from the point, forms the N side of Warburton Channel. The mouth of the Acraman Creek stands on the NE side of Lindsay Point. A drying bar obstructs the entrance of this creek. A sand hill, conspicuous from the anchorage E of Lindsay Point, rises to a height of 15.5m about 1 mile NW of the creek entrance.

7.22 Streaky Bay—East side.—From the entrance of Acraman Creek, the coast extends about 2 miles E and then 5.25 miles SE to Carawa Jetty.

North Bank (32°33'S., 134°10'E.), a shoal area which dries in places, extends almost 6.5 miles offshore, about 1.25 miles S of Carawa Jetty, and lies between Warburton Channel to the N, and Dashwood Channel to the S. A long and narrow drying sandbank extends 2 miles W from the NE extremity of the bank and detached dry patches extend S from its W end to the N side of Dashwood Channel. The NE extremity of this bank has been reported to be extending NE.

Warburton Channel (32°33'S., 134°06'E.) leads in a NE direction between the shoal area to the S of Lindsay Point and the NW edge of North Bank. A least depth of 8.5m can be carried to the anchorage off Carawa Jetty, and also to the anchorage in the NE part of the bay. Tidal currents in the channel attain a rate of 1 knot at springs.

South Sand (32°39'S., 134°13'E.), a drying sandbank, extends about 4.75 miles W from a position about 1.5 miles W of Perlubie Hill. A shoal bank extends NW, W, and SW from the W end of South Sand, and lies between Dashwood Channel to the N and South Channel to the S. Depths of 10m are available in the fairway of the channel between the E extremity of South Sand and the coast.

Dashwood Channel (32°36'S., 134°08'E.), with a least depth of 5.5m in the fairway, leads in an E direction between North Bank and the shoal between the S side of North Bank and the bank extending W from South Sand. Tidal currents in the channel attain a rate of 1.5 knots at springs.

South Channel (32°40'S., 134°08'E.), with a depth of 3.4m in the fairway, leads in an E direction between the shoal water that extends SW from South Sand and the shoal area that fronts the N side of the Gibson Peninsula. Tidal currents in the channel run at less than 1 knot at springs.

Anchorage can be taken by large vessels, in depths of 5.5 to 12.8m, W of Carawa Jetty, or, in a depth of 9.8m, sand and weed, with Lindsay Point bearing 272°, distant 1.75 miles and the summit of the prominent sandhill inside Acraman Creek bearing 309°. Small vessels can anchor between this position and the entrance of Acraman Creek according to draft. Good shelter with fairly smooth water is provided in all weather.

Vessels that can pass through Dashwood Channel can anchor anywhere between North Bank and South Sand and the shore, or between the shoal water that extends N from the Gibson Peninsula and the S side of South Sand. West winds raise a short uncomfortable sea near the E shore in this part of the bay, and considerable strain on the cable is experienced. Under these conditions the best sheltered anchorage lies SE of the middle of North Bank and as near as possible to its edge; however, Blanche Port is to be preferred.

Perlubie Hill (32°38'S., 134°16'E.), about 8.25 miles SSE of Carawa Jetty, is a conspicuous bare sand patch, 21.6m high. The intervening coast is low and has some sand hills standing near the beach. A range of rounded hills, 37m to 46m high and scrub-covered, parallels the coast about 1 to 2 miles inland. The coast between Perlubie Hill and the entrance of Blanche Port, about 7 miles to the SSW, continues low with some sand hills in places.

Eba Island (32°41'S., 134°16'E.), 28m high and grass-covered, is connected to the coast about 2.5 miles S of Perlubie Hill by a drying sand bank. A sandy cliff on the N side of the island is topped by sand hills. A rocky islet, 9.1m high, stands 1 mile S of the E end of Eba Island; a rock that uncovers lies close SW of this islet.

7.23 Streaky Bay—South side.—Cape Bauer (32°44'S., 134°04'E.) is the S point of the entrance of Streaky Bay. Sand hills surmount the cliffy extremity of the cape; the coast up to 2 miles E of the cape is cliffy. Its 90m summit, about 1 mile inland and covered with scrub, is the NW extremity of a range of scrub-covered hills of about the same height that extends several miles SE. Detached rocks lie between 0.25 and 0.75 mile N of the cape. A light is shown from Cape Bauer. From the end of the cliffs, about 2 miles E of Cape Bauer, the sandy coast extends about 6 miles E to Point Gibson, the NE extremity of the Gibson Peninsula.

Point Gibson (32°45'S., 134°13'E.), the W entrance point of Blanche Port, is very low and sandy. A shallow inlet extends W for 3 miles from the S side of Point Gibson. A drying sandspit extends 1 mile E from Point Gibson and is steep-to on its outer end. A light is shown at the outer end of the spit and a lighted beacon stands about 4 miles NW of the point.

Blanche Port (32°47'S., 134°13'E.), entered between Point Gibson Light and the coast about 1 mile to the SE, occupies the extreme S part of Streaky Bay. The port is almost enclosed by the Gibson Peninsula and provides anchorage, with excellent holding ground, for vessels with a draft of 5.8m or less. The shore is lined with sandy beaches and cliffy banks, some of which are red. One Tree Hill, SE of the port, a church in Streaky Bay Township, and a house on the W shore of the port are good landmarks. Streaky Bay township stands at the S end of Blanche Port.

Perforated Rocks (32°45'S., 134°14'E.), two limestone rocks, each 1.5m high with numerous holes in them, stand about 1 mile SSE of Point Gibson Light.

Fairway Rock (32°45'S., 134°13'E.), about 0.6 mile W of Perforated Rocks, consists of a rocky patch about 0.4 mile in length, with a depth of 0.4m.

Oyster Spit (32°46'S., 134°13'E.) dries for a distance of about 0.5 mile W of Crawford Landing, which is the next point S of Perforated Rocks.

Sponge Rocks (32°47'S., 134°12'E.), with depths of about 2m, lie about 1.25 miles W and SW of Crawford Landing.

Anchorage can be taken off Blanche Port, in a depth of 5m, mud, with the church in Streaky Bay township bearing 176° and the point at Crawford Landing bearing 082°. Small vessels anchor nearer the township. A good berth, in a depth of 3m, mud, lies about 0.3 mile from the jetty with the church bearing 177°.

The mean range of the tide in Streaky Bay is 1m. The tidal currents in Streaky Bay generally set directly through the channels, but are very weak in the open parts of the bay. At springs, they attain a velocity of 1 knot in Warburton Channel, 1.5 knots in Dashwood Channel, less than 1 knot in South Channel, 1.5 knots in the channel between South Sand and Perlubie, and 2.5 knots in the entrance of Blanche Port. Within the port, the currents are slight.

Streaky Bay Township (32°48'S., 134°12'E.) is situated at the S end of Blanche Port and is fronted by a wooden pier which extends from the shore N of the town. Streaky Bay is now only used as a fishing port.

7.24 Directions—Warburton Channel.—To pass through Warburton Channel, steer for a position about 3 miles S of De Mole Point, taking care to avoid the previously-described dangers. From this position, steer to bring Carawa Jetty to bear 081°, and steer for it on that bearing. Having passed the NW elbow of North Bank, which is marked by a beacon, steer an ENE course until Carawa Jetty bears 089°; it should be steered for on this bearing, which leads to the anchorage or alongside. If intending to anchor at the N end of Streaky Bay, proceed as directed above and do not alter course for the N anchorage until near the anchorage off the jetty.

Dashwood Channel.—To enter by Dashwood Channel, steer for the entrance, avoiding the previously-described dangers SE of Brown Point and Dashwood Rock.

Approach Dashwood Channel with Perlubie Hill bearing 106° until the red beacon at the SW end of North Bank bears 344°, distant about 1.75 miles, then steer to cross the bar in the best charted water.

If proceeding to Blanche Port and having crossed Dashwood Channel Bar, steer to bring Perlubie Hill to bear 113° and steer for it on that bearing; when the W end of Eba Island bears 177° steer for it, passing between the E end of South Sand and Perlubie Hill. When Perlubie Hill bears 060°, alter course to pass not less 0.6 mile W of Eba Island and about midway between that island and the 6.7m shoal lying 1.75 miles W of it; then steer for Perforated Rocks at the entrance of Blanche Port.

Give Perforated Rocks a berth of about 0.3 mile and steer to pass between them and Fairway Rock, which is marked by a beacon. When Streaky Bay Church bears 200°, steer for it on that bearing, until Perforated Rocks bear 048°, then steer to keep them astern on that bearing until the church bears 177°; steer for the church on that bearing and anchor according to draft.

The least depth obtained when following these directions is 4.9m.

South Channel.—To enter by South Channel, cross the bar with Eba Island bearing 093°, and having passed N of the lighted beacon marking the S side of the channel, steer ESE until Perforated Rocks bear 171°, then steer for them on that bearing until the directions given above can be followed.

7.25 Corvisart Bay (32°49'S., 134°05'E.) indents the coast between Cape Bauer and Westall Point, about 11 miles to the S. The shore of the bay consists of sand and rocks, with sand hills behind and the hills of the Gibson Peninsula farther inland. Dreadnaughts Reef, with a depth of 7.3m over its outer end and on which the sea occasionally breaks, extends more than 1 mile N from a position about 2 miles NE of Westall Point. With the exception of this reef, there are considerable depths near the shore of Corvisart Bay; however, this bay is exposed to SW winds, and anchorage is not recommended.

Westall Point (32°55'S., 134°03'E.) is a narrow projection which extends W about 0.75 mile from a headland forming the S side of Corvisart Bay. The coast near the point is generally steep and reddish in appearance. Mount Westall, which rises to a height of 96m, stands about 1.75 miles NE of the point and has a conspicuous and even-shaped summit. A reef, on which the sea breaks heavily, extends about 1 mile SW from a position about 1.75 miles SE of Westall Point. A small foul bight indenting the shore about 3 miles SE of Westall Point is bordered by sand hills, about 36 to 40m high.

Sceale Bay (32°58'S., 134°10'E.) is entered about 6 miles SE of Westall Point and provides anchorage to small vessels with local knowledge at both ends during SE winds; however, it is not safe during W gales except in its NW part.

Yanerby Hill (32°55'S., 134°11'E.) rises to a height of 46m at the N end of a large patch of bare sand on the N shore of the bay and is conspicuous. A rocky patch, with a least depth of 8.2m and on which the sea breaks at times, lies about 1.25 miles E of a rocky point on the N side of Sceale Bay; otherwise, the bay is free of dangers.

Anchorage can be taken in the N part of the bay, in a depth of 5.5m, with Mount Westall, seen over the sand hills in the bight W of Sceale Bay, bearing 307° and the near point 206°. Note that when approaching this anchorage, Yanerby Hill bearing 034° leads W of the 8.2m patch and when the N point of the entrance bears 275° this patch will have been passed.

The S anchorage lies at the junction of the long sandy beach and the rocky coast of Cape Blanche on a bearing 172°. Anchorage can be taken according to draft.

Sceale Bay Jetty extends offshore at the S end of the bay, but can no longer be used by commercial shipping.

Cape Blanche (33°02'S., 134°07'E.) is the outer extremity of a headland that extends about 3.5 miles W from the coast and forms the S side of Sceale Bay. The outer end of the cape is bold and cliffy and topped by sand which is nearly of the same height as the summit for a distance of 2 miles SE.

From the sea, the point slopes inland to a low grassy plain which forms an isthmus. Rocks and breakers extend almost 1 mile W and N from the cape. Slade Point, the S extremity of the above headland, stands 3 miles SE of Cape Blanche. A heavily-breaking reef extends 0.6 mile S from Slade Point. An 18.3m patch lies about 7 miles WSW of Cape Blanche. A depth of 35m lies 12.5 miles WSW of Cape Blanche.

Searcy Bay (33°05'S., 134°12'E.) indents the coast between Slade Point and Point Labatt, about 7 miles SSE. The shores of the bay are sandy and backed by sand hills, 37 to 61m high. Point Labatt is fringed by foul ground which extends up to 1 mile offshore in all directions.

7.26 Cape Radstock (33°12'S., 134°19'E.), about 5 miles SE of Point Labatt, is the N entrance point of Anxious Bay. At Point Labatt the cliffs begin and extend uninterruptedly to the cape. At the cape, which is steep and bold, the cliffs rise to a height of 135m, but on either side of the cape the cliffs decrease in height. The cape has been reported to be a good radar target at distances up to 23 miles.

Sunken rocks, marked by heavy breakers, extend almost 2 miles offshore at the N end of the cliffs between Point Labatt and Cape Radstock. A reef, which breaks occasionally, extends about 0.75 mile S from the cape. A rocky patch, about 100m in extent and with a depth of 3.7m, was reported to lie about 2.25 miles SE of the cape. Detached banks, with depths of 55 and 37m, lie 23 and 26.5 miles, respectively, W of Cape Radstock.

7.27 Anxious Bay (33°24'S., 134°34'E.), entered between Cape Radstock and Cape Finnis, about 35 miles SE, extends about 10 miles NE and is fully exposed to the prevailing SW swell.

Venus Bay, about 16 miles E of Cape Radstock, is the only place of commercial importance.

Baird Bay is an indentation close NE of Cape Radstock.

Mount Hall (33°04'S., 134°28'E.), about 11 miles NE of Cape Radstock, is the 195m summit of a flat-topped, sandy, and scrub-covered range that extends some distance inland. **Calca Bluff**, 106m high, stands 8 miles N of Cape Radstock. The bluff slopes steeply and marks the W end of the above range.

Mount Camel (33°17'S., 134°45'E.) stands 5 miles SE of the entrance of Venus Bay and close to the coast. This peak is 79m high and shows above the sand hills on both sides of it. Talia Hill, 4 miles inland, about 8 miles SE of Mount Camel, is a round isolated hill that attains a height of 122m. Bramfield Hill, somewhat similar to Talia Hill but higher, stands 7.5 miles ENE of Cape Finnis.

Baird Bay (Beard Bay) (33°07'S., 134°19'E.) is a shallow inlet extending about 10 miles inland in a NW direction. The bay entrance, 1.5 miles E of Cape Radstock, is fouled by Jones Island and numerous other rocks, which generally break the sea surface. A least depth of 3m can be carried over this bar by those possessing local knowledge.

The coast extends ENE for 5 miles from the entrance of Baird Bay and consists of rock and sand backed by sand hills about 30m high. Rocks and breakers extend about 1 mile offshore along this stretch of coast. The coast then extends SE for 10 miles to Weyland Point and is fronted by a continuous line of cliffs.

7.28 Weyland Point (33°15'S., 134°38'E.), a conspicuous cliffy point, 89m high, stands close SW of the entrance of Venus Bay. The point rises to a height of 96m close N and slopes inland toward Venus Bay.

Howard Rock (33°15'S., 134°37'E.) is a dangerous rock that lies 0.25 mile SE of Weyland Point. During bad weather, the sea breaks heavily over this rock, but at high water with a smooth sea it may not show.

Venus Bay (33°14'S., 134°39'E.) is an almost completely landlocked lagoon that is available to vessels with local knowledge having a draft of not more than 3.7m.

Anchorage is available, but the space is limited. Only fishing vessels frequent the bay and the port accommodations.

The bay is fouled over most of its area by sand banks and shoals; the only entrance to the bay lies about 1.75 miles NE of Weyland Point. The outer and most exposed part of the entrance bar has a least depth of 6.4m and usually breaks, except with a flood current and in moderate weather. During bad weather with an ebb current, the bar is a mass of breakers. In the inner and narrowest part of the entrance, there is a least depth of 4m, which is usually marked by smooth water.

The town of Parkin stands on the S side of the bay, about 1 mile E of the entrance. Port Kenny stands on the N side of the bay 3.5 miles N of Parkin.

Germein Island (33°13'S., 134°40'E.) lies on the N side of the channel leading to Port Kenny, about 0.75 mile NE of the N point of the entrance. The island is low and swampy and marked by mangroves on all except its S side, which is marked by a sand ridge, 12.2m high. Within the bay, the currents set in the direction of the channels at a rate of 3 to 4 knots. Two white range beacons, with triangular topmarks, stand on the W side of the entrance. These beacons, in range 027°, lead through the outer part of the bar. Two beacons, in range 069.5°, lead through the deepest water on the inner part of the bar and between the entrance points. The channel to Port Kenny is marked by beacons.

7.29 Port Kenny (33°14'S., 134°41'E.) and Parkin are the distribution centers for the surrounding area. A jetty is situated 0.5 mile E of the entrance, with a depth of 4m at its outer end, which is 37m long; there is a small crane on the jetty. Another jetty, 32m in length, with depths alongside of 1.5m, is situated at Port Kenny, on the N side of the bay, about 3.5 miles N of Venus Bay.

From the entrance of Venus Bay, the coast extends about 9 miles SE and then 18 miles S to Cape Finnis. This section of coast consists of sandy beach backed by sand hills. Between Weyland Point and Cape Finnis, the coast may be approached at a distance of 1 mile.

Cape Finnis (33°38'S., 134°49'E.), the S entrance point of Anxious Bay, is a rocky headland with a rounded top, 47m high. Sunken rocks, with a depth of less than 1.8m, extend from the N side of the cape to the E island of the Waldegrave Islands, about 1.5 miles to the NW.

The Investigator Group

7.30 The **Investigator Group** (33°44'S., 134°21'E.) consists of a number of islands, rocks, and sunken dangers which extend about 38 miles SW from Cape Finnis. The group consists of the Waldegrave Islands, The Watchers, Flinders Island, Topgallant Isles, the Ward Isles, and the Pearson Islands.

Anchorage, except during strong N and NE winds, can be taken off the NE side of Flinders Island, and for small vessels during S winds, NE of the more E of the Waldegrave Islands.

The **Waldegrave Islands** (33°36'S., 134°47'E.) consist of two islands joined to each other and to Cape Finnis by sunken rocks. The E island, which is the larger of the group, is flat-topped and grassy and rises to a 39m summit near the E end. An above-water rock stands at the N end of a reef that extends 0.1 mile N from the NE extremity of the island.

During S winds, anchorage can be taken by small vessels with local knowledge close off the NE side of the island. The W island, 25m high, has a steep cliff on its S side, from the top of which the land slopes gradually on the N side. An above-water rock stands between the two islands about 0.15 mile W of the E island.

The Watchers (33°36'S., 134°42'E.) are two detached above-water rocks about 1 mile apart. The W rock, 7.3m high,

lies about 3.5 miles W of the W island of the Waldegrave Islands. These rocks are surrounded by sunken rocks for a short distance, but there are moderate depths in the passage between them.

7.31 **Flinders Island** (33°43'S., 134°29'E.), about 15.5 miles WSW of Cape Finnis, is the largest and only inhabited island of the group. The coast consists of cliffs and sandy beaches. The cliff on the E side of the island is 53m high and that on the next point to the W is 62m high. The land slopes N from these remarkable cliffs and three heads show above the top of them when viewed from the E. A steep cliff, 63m high, fronts the N end of the island. The island has several long-topped rises which slope to the S and W and are somewhat higher than the above cliffs; however, the most conspicuous of these hills, about 1 mile NE of the SW extremity of the island, is 66m high. Several small bights indent the E side of the island.

The bight close N of the inner end of the projection that forms the E end of the island is the only one which provides anchorage. The beach in this bight is backed by sand hills. A detached reef, which dries in its central part, lies about 0.5 mile E of the S end of the beach in this bight.

The N and W sides of the island are generally foul, and reefs and rocky patches extend over 1 mile from the coast. The bays on the S coast are foul, but between them and the SW extremity of the island, rocks do not extend more than 0.25 mile offshore. A light is shown from the NE point of the island.

Vessels with local knowledge can anchor in a bight on the NE side of Flinders Island. This anchorage is safe only when W or SW gales occur or in the summer during moderately S or E winds. Large vessels can anchor about 0.5 mile offshore, N of the middle of the beach, in depths of 11 to 14.6m, sand, with the SE extremity of the island bearing 169°, and the point at the N end of the beach bearing 301°.

Small vessels anchor between the above-mentioned detached reef and the shore, in depths of 5.5 to 7.3m, sand, with the SE extremity of the island bearing 161° If the wind blows from the N or NE, vessels should heave up and head for deeper water before the sea has time to break.

Directions.—When approaching this anchorage from the S, steer to pass between Flinders Island and the Topgallant Isles, keeping more than 1 mile off Flinders Island until the N isle of the Topgallant Isles bears 099°. Then alter course to 279° and steer for the anchorage, with Topgallant Isles astern, taking care to avoid the previously-mentioned detached reef.

A large area of foul ground, about 2.5 miles in extent and on which the sea always breaks, lies between 3 and 6 miles W of the N part of Flinders Island. A detached breaking rock lies 2.5 miles NW of the NW end of the island, with a similar rock lying about midway between the SE extremity of the foul area and the island.

7.32 The **Topgallant Isles** (33°43'S., 134°37'E.), about 3.5 miles E of Flinders Island, consist of an islet and a number of bare rocks that extend almost 1 mile SE from it. The islet, 101m high, has a rounded top and a high, steep, cliffy coast. The group takes its name from the rocks that, from various directions, have the appearance of sailing vessels showing their upper sails above the horizon. Sunken rocks extend about 0.5 mile SW from the islet and 0.75 mile E from the rock; elsewhere the Topgallant Isles are steep-to.

The **Ward Islands** (33°45'S., 134°15'E.) consist of two islets, surrounded by sunken rocks, and three detached reefs, on which the sea generally breaks. The larger and NW islet, about 8 miles WNW of the SW end of Flinders Island, is 49m high and flat-topped, with a steep coast. Sunken rocks extend almost 0.5 mile N from it.

A detached reef lies 1 mile WNW of this islet; two similar reefs lie 0.75 and 1.25 miles, respectively, S of the same islet. A depth of 15.5m lies about 15 miles W of the islet. The SE islet, 28m high, is a small rock which lies about 1.5 miles from the NW islet. Sunken rocks surround the islet and extend about 0.1 mile S and N from it. Two shoals, each with a depth of 15m, lie 4 miles NW and 16.5 miles WNW of the Ward Islands.

The **Pearson Islands** (33°57'S., 134°15'E.), the SW and outermost of the Investigator Group, consists of four bold granite formations which lie between 13 and 18 miles SW of Flinders Island. An above-water rock lies W of the N island of the group, and a sunken rock lies between this island and the island S of it. A reef is located close to the SW end of the S island. With the exception of the above dangers, the Pearson Islands are steep-to.

The N island has steep cliffs on its W side which rise in the N part almost to its 238m high peaked summit. When first seen, this part of the island resembles Greenly Island (see paragraph 7.42), about 50 miles to the SE. The E side of the summit consists of a grassy slope that is partly wooded. The N end of the island attains a height of 183m. The S part of the island has two bare, rocky peaks, the S peak rising to a height of 115m. A light is shown from the W side of the island.

The two middle islands of the group are bare rocks; the N rock is 82m high and the S rock is 36m high. The S island of the group is barren and almost split in the middle. The N part of the island is 140m high and the S part is 102m high. Banks, with depths of 32m and 27m lie, respectively, 4.75 miles W and 9 miles W of Pearson Islands Light.

Caution.—Care should be taken when approaching the Pearson Islands at night; the light is obscured from several directions. The Pearson Islands have been reported to be a good radar target at distances up to 22 miles.

Cape Finnis to Coffin Bay

7.33 The coast between Cape Finnis and Wellesley Point, about 2.5 miles SE, is cliffy and backed by hills about 61m high.

Waterloo Bay (33°38'S., 134°52'E.), a semicircular indentation in the coast, is entered between Wellesley Point and Wellington Point, about 0.75 mile SE. The bay is open to the SW, but is partially protected by the reefs which obstruct the entrance.

Bramfield Hill (33°35'S., 134°58'E.), 193m high and conspicuous, stands 6.25 miles NE of Wellesley Hill. When viewed from the SW, the hill appears to slope on either side. The bay provides shelter to vessels with local knowledge and a draft not exceeding 4.6m in all weather except SW gales. A rocky ledge extends across the bay entrance close behind the reefs, the edges of which can usually be seen. The basin within

the ledge has depths of 5.5 to 10.3m and is about 0.25 mile in extent. There is a least depth of 4m leading through the channel in the fairway of the entrance. Vessels with a draft of not more than 3m at all stages of the tide can use this channel.

Caution.—Vessels are advised to use their anchors with care in the area between 235 and 470m SW of the pier. An obstruction, presumed to be an old mooring cable, was reported to lie in this area. Two lighted beacons and two day beacons, in range 031.75°, lead across the bar in the greatest depths.

7.34 Elliston (33°38'S., 134°52'E.), a small town on the E side of the bay, is fronted by a pier, about 412m long, with a depth of 4.9m alongside its outer end. Vessels up to 45m in length, with a draft of up to 3.7m, can be accommodated alongside. The coast between Wellington Point and Drummond Point, about 35 miles SE, consists principally of steep cliffs. The only dangers along this stretch of coast are Tungketta Reef, a breaking reef which extends 1 mile offshore, 14 miles SE of Wellington Point, and some rocks in a sandy bight about 6 to 8 miles farther SE.

Cap Island (33°57'S., 135°07'E.), named for its appearance, is 28m high and steep-to. This small islet lies W of **Mount Misery**, about 4 miles offshore.

Conspicuous hills standing between Waterloo Bay and Drummond Point are Tungketta Hill, 138m high, about 11 miles SE of Waterloo Bay; Mount Misery, 114m high, about midway between Tungketta Hill and Drummond Point; and Kiana Cliff, 115m high, steep, and bold, almost midway between Mount Misery and Drummond Point.

7.35 Drummond Point (34°09'S., 135°14'E.), a prominent cliffy headland that extends from the coast, rises to a hill about 59m high. Mount Hope, a wooded hill 172m high, stands 5 miles E of the point and Mount Drummond, also wooded and 173m high, stands 6 miles SE of the point. Both hills are conspicuous. A small above-water rock, with some breakers in the vicinity, lies close off Drummond Point. The coast between Drummond Point and another point about 2 miles S, and on which there is a hillock, 45m high, is steep-to. A rock, awash, lies 1 mile S of the latter point. From this point, the coast extends about 1 mile NE and forms a bight. Between the head of this bight and the foot of Mount Greenly, about 12 miles SE, the sandy coast rises gradually to some wooded ranges about 3 miles inland. These ranges terminate abruptly about 2 miles S of Mount Greenly.

Rocky Island (34°16'S., 135°15'E.), 15m high, stands 6.5 miles S of Drummond Point and about 3.5 miles offshore. The island has been reported to be a good radar target at distances up to 28 miles.

Krause Rock (34°14'S., 135°05'E.), over which the depth is 14.6m, lies about 8.5 miles WSW of Drummond Point. The sea breaks heavily over this danger during a high swell. Less water than charted has been reported to lie in the vicinity of this rock.

Caution.—An unexamined depth of 12.1m lies 2 miles NE of Krause Point.

7.36 Mount Greenly (34°21'S., 135°22'E.) rises to a height of 305m about 0.5 mile inland. When viewed from the N or S, the mount appears as a sharp peak, but when seen from the W, it has a rather long summit that falls abruptly to the N and slopes gradually in three steps to the S. Rocky cliffs form the top of the hill on the seaward side and around the summit, but between the base of these rocky cliffs and the top of the coastal cliff, the sloping sides are wooded. From the base of Mount Greenly to Frenchman Lookout, 0.5 mile inland abreast the E point of the entrance of Coffin Bay, the coast extends S for 4 miles and is cliffy.

North Block (34°22'S., 135°32'E.), a high peak, stands 9 miles E of Mount Greenly.

Frenchman Lookout rises to three peaks of almost equal height; the summit, which is the central peak, rises to a height of 166m.

7.37 Sir Isaac Point (34°26'S., 135°13'E.), about 8 miles W of Frenchman Lookout, is the W point of the entrance of Coffin Bay and the N extremity of the Coffin Bay Peninsula, which forms the W side of Coffin Bay. The W side of the point is fronted by cliffs, which are topped by partly-vegetated hills rising to a height of 52m. The E side of the point is lower and has a sandy beach at its base. A light is shown from Sir Isaac Point.

The W side of the Coffin Bay Peninsula, between Sir Isaac Point and Whidbey Point, about 11 miles SSW, is rugged and cliffy. Reef Point, about midway between the above points, is the most projecting part of this coast. A depth of 2.7m lies 1.25 miles NNW of Reef Point. A sunken reef, about 1.5 miles in extent and which breaks heavily, lies off Reef Point. The S part of this reef apparently dries. Rocky ground, with depths of 11 to 14.6m, extends 1 mile N from the reef. During W gales the sea breaks over this rocky ground. Mount Greenly kept open N of Sir Isaac Point and bearing more than 063° leads NW of the dangers off Reef Point.

Whidbey Point (34°35'S., 135°06'E.) is fronted by low cliffs and rises to a round hill, 62m high, about 1 mile inland. Breaking reefs extend almost 0.75 mile S from the middle and E parts of the seaward side of Whidbey Point.

Caution.—The W side of the Coffin Bay Peninsula should not be approached within a distance of 2 miles because of the heavy W swell that rolls in.

Coffin Bay

7.38 Coffin Bay (34°30'S., 135°20'E.), about 14 miles long, lies between the mainland S of Frenchman Lookout and the Coffin Bay Peninsula. The bay is divided into two parts by the Horse Peninsula. That part of Coffin Bay to the W and S of this peninsula is Port Douglas; Mount Dutton Bay lies to the E of the peninsula and Kellidie Bay is the SE extension of Coffin Bay. There are considerable depths in parts of the bay, but many are so exposed that anchorage is not advised. Sheltered anchorage can be obtained by small vessels only, either in the lee of Sir Isaac Point, at Port Douglas, or in Mount Dutton Bay.

7.39 Coffin Bay—East side.—The coast from Frenchman Lookout to the Horse Peninsula consists of rugged cliffs backed by wooded hills. South of the peninsula, the coast is bordered by sandy beach for 1.75 miles. Cliff Hill, about 3.25 miles S of Frenchman Lookout, is very similar in appearance to it. The central peak of three is the highest.

Mount Dutton, about 2.3 miles SSE of Cliff Hill, slopes gradually and is well-covered by trees. Its 276m summit curves to the E and S from the highest part on the W side. Marble Range, rising to a height of 411m about 7 miles ESE of Frenchman Lookout, has two remarkable summits, with the S summit being very rocky near the top.

7.40 Coffin Bay—West side.—The coast from Sir Isaac Point extends S for 4 miles and is generally low, with rocky points and sandy beaches. It then extends E for 7 miles to the outer end of Longnose Point. Some conspicuous bare sand hills of moderate height stand close to the beach about 2 miles E of the junction of the S and E trend of the coast. A shoal, with a depth of 1.3m, lies about 3.75 miles SE of Sir Isaac Point; another shoal, with a depth of 1.8m, lies about 0.75 mile farther SSE. Longnose Point is a very narrow, sandy peninsula about 2 miles long and 6.1m high.

Port Douglas (34°32'S., 135°23'E.) is entered over a bar that lies between Longnose Point and a low point on the Horse Peninsula, about 1.5 miles to the E. Local knowledge is essential.

Shoal water and drying sand banks obstruct the entrance of Port Douglas. A drying sand bank fronts the W side of the Horse Peninsula and extends W in places up to 2 miles. A similar bank extends from the peninsula terminating in Longnose Point as far S as 2 miles in places. However, depths of 3.7 to 7.3m are found over a considerable area in the S part of Port Douglas. In the NW part of the port, there is a basin with depths of 4.6 to 9.1m between the W edge of the drying sand bank and the shore.

There is a least depth of 2.4m in the fairway of a narrow intricate channel that leads over the bar and between the drying sand banks to the S part of the bay, and to Mount Dutton Bay and Kellidie Bay.

The Brothers, two small rocky islets, lie in the S part of Port Douglas about 1 mile W of the S extremity of the Horse Peninsula. Another rocky islet, 8.5m high and surrounded by a drying sand bank, lies about 1.25 miles SSE of the SE extremity of the Horse Peninsula.

The channel that leads to Port Douglas is marked by lighted beacons and buoys.

Caution.—The shoals and soundings are subject to change and the beacons should not be passed close to.

7.41 Mount Dutton Bay (34°34'S., 135°25'E.) lies between the E side of the Horse Peninsula and the mainland. There are depths of 3.7 to 7.3m in the S part of the bay, which is relatively steep-to on its E side, but the N part of the bay is shallow. A small rocky islet lies in the NE part of Mount Dutton Bay.

Kellidie Bay (Killidie Bay) (34°36'S., 135°28'E.), E of the S part of Port Douglas, is shallow and obstructed across its entrance by a rocky ledge which almost dries. A submarine telephone cable, marked by notice boards, is laid across the entrance to Killidie Bay. A jetty, 28m long, with a depth of 3.4m alongside, extends from the shore of the bay for the use of fishing vessels.

Anchorages.—The outer part of Coffin Bay is exposed and not recommended as an anchorage. However, there is sheltered anchorage for small vessels in a bight formed in the shoal bank SE of Sir Isaac Point. The anchorage has a depth of 4.6m, sand and mud, with Frenchman Lookout bearing 062° and the NE extremity of Sir Isaac Point bearing about 340°.

In Port Douglas, the best anchorage can be taken, in a depth of 4m, sand and mud, with the W point of the entrance of Mount Dutton Bay bearing 043° and the 8.5m rocky islet bearing 094°.

In Mount Dutton Bay, anchorage can be taken, in depths of 2.7 to 3.7m, mud, with Mount Dutton just open W of the rocky islet and bearing 356°, and 0.5 mile from the islet.

At the entrance to Port Douglas, the tidal currents commence 1 hour after high and low water, respectively. Inside the entrance, the currents set in the direction of the channel where the fairway trends in a N and S direction, but where the channel trends in an E and W direction, the currents set across the channel. After a continuance of W winds, the tidal currents are very strong at the entrance from 1 hour after high water to 1 hour after low water.

Directions.—A vessel approaching Coffin Bay from the SE should pass about 4 miles WNW of Reef Point, with Mount Greenly open N of Sir Isaac Point and bearing more than 063°. Sir Isaac Point should then be rounded at a distance of 0.5 mile. Vessels intending to anchor in the outer part of the bay should steer for the conspicuous 46m sand hill in the SW part of the bay bearing 167° for about 2 miles or until Frenchman Lookout bears 062°. Course can then be altered to the W for the previously-described anchorage.

Local knowledge is necessary for vessels intending to anchor in Mount Dutton Bay.

Coffin Bay to Spencer Gulf

7.42 Greenly Island (34°39'S., 134°47'E.), about 16 miles WSW of Whidbey Point, is a bold mass of granite that rises to a 230m summit in its E part. The island is almost divided into two parts near its NW part. The isthmus that connects its two parts is awash at times. A rock, 61m high, stands 0.5 mile E of the island. Considerable depths exist about 1 mile from the island.

Rocky Island (34°39'S., 134°42'E.), about 10.5 miles SSW of Greenly Island, is a precipitous granite rock, 68m high. A sunken rock, which breaks, lies 0.5 mile W of the N extremity of the island, and rocks extend about 0.2 mile from the S extremity of the island; otherwise it is steep-to. Rocky Island has been reported to be a good radar target at distances of up to 28 miles.

The **Whidbey Islands** (34°44'S., 135°08'E.) consist of the Four Hummocks Islands, a rock to the E of them, Perforated Island, Price Island, and an island near the S side of Avoid Point; all of this group lies between Rocky Island and Avoid Point, which lies 12 miles SE of Whidbey Point.

The **Four Hummocks Islands** (34°46'S., 135°01'E.) are four steep rounded granite islands with several small rocks among them, most of which are above water. The S and highest of the group rises to a height of 110m and stands 15 miles E of Rocky Island. A large rock lies close off its SE side. A light is shown from the summit of the S island.

The two middle islands are almost joined and appear on most bearings as one island with two peaks; the N peak rises to a height of 88m and is the higher of the two. The passage between the S island and the two middle islands is about 0.3

mile wide and fouled by rocks, the highest of which is 15.2m high. The N island of the group, 89m high, stands about 2 miles NNE of the S island. The passage between this island and the two middle islands is about 0.75 mile wide, clear of dangers, and has depths of 27.5m and more.

A bare 23m high rock stands 2 miles E of the N island and is separated from it by a clear passage with depths of 38.4m and more. A depth of 42m was reported to lie 3 miles WNW of the S island. A depth of 31m was reported to lie 5 miles W of the island. Depths of 34m were reported to lie 0.5 mile farther NW. Depths of 33m and 35m were reported to lie 6 miles SW of Four Hummocks Light.

7.43 Perforated Island (34°43'S., 135°09'E.), about 8.25 miles SSE of Whidbey Point and nearly midway between Four Hummocks and Avoid Point, is 72m high, irregular in shape, and surrounded by steep cliffs almost as high as the summit. The heavy sea which breaks on the island has washed the island into rugged forms. There is a hole through the island near the top, about 0.25 mile from its N end. A breaking sunken reef extends about 1 mile W from the S end of the island.

Caution.—There is much foul ground S of an E-W line tangent to the S extremity of Perforated Island and within 3 miles of that extremity. Vessels should not approach the island nearer than 4 miles on any bearing more than 090° or less than 270°.

A depth of 8m lies about 1.5 miles N of the NE end of Perforated Island.

7.44 Price Island (34°43'S., 135°17'E.), about 2.5 miles SW of Avoid Point, is 64m high, surrounded by limestone cliffs, and steep-to, except for a reef which extends 0.2 mile N from its N end. A limestone island, 55m high, stands 0.75 mile S of Avoid Point and is joined to it by an above and below-water ledge. A sunken reef extends about 1 mile W from the W extremity of the island.

Currents.—The currents between Greenly Island, Rocky Island, and the Whidbey Islands are very strong. During and after a gale, these currents cause a confused sea in many places about the islands. Among the outer islands, from November to May, and after a continuance of SE winds, the current sets NW and attains a velocity of up to 2 knots. From May to November, during W winds, the current sets E at about the same velocity.

7.45 Avoid Bay (34°37'S., 135°14'E.) is entered between Whidbey Point and Avoid Point, about 12 miles SE, and recedes about 4.5 miles to the NE. There are considerable depths in Avoid Bay, with soundings of 18.3m and more being found up to 1 mile offshore.

Black Rocks (34°37'S., 135°17'E.) lie about 5 miles NNW of Avoid Point. The largest and highest of this group is an islet 47m high. A reef, which breaks, extends about 0.75 mile SE from the islet. A small above-water rock stands on the SE extremity of this reef. A flat rock lies about 0.1 mile WNW of the islet and a reef, with a small rock on its NW end, extends 0.3 mile farther WNW from the flat rock.

Avoid Point (34°40'S., 135°19'E.) is fronted on all of its seaward sides by limestone cliffs, about 46m high, which change abruptly to sand hills E of its S extremity. A green hill rises to a height of 57m above the point and a sand hill tops a rocky point in the N part of Avoid Point.

A rock, which seldom breaks, lies about 0.25 mile NE of the above-mentioned rocky point. A flat above-water rock lies close to the W side of Avoid Point. A sunken rock, which almost always breaks, lies about 1 mile W of the flat rock and must be avoided when entering Avoid Bay from the SW.

The sandy coast from the S side of Avoid Point extends about 10 miles SE to where the cliffs begin. The beach along the SE stretch of this coast is backed by bare sand hills that extend about 5 miles inland and attain their greatest height of 165m about 2 miles behind the beach. The shore is fairly steep-to and always marked by breakers.

A wooded hill, which slopes down to the cliffs NNW of **Shoal Point** (Stuart Point) (34°47'S., 135°29'E.) and joins the sand hills to the N of it, rises to a summit 193m high, about 2.5 miles N of Shoal Point. This is the highest land between Whidbey Point and Cape Catastrophe. Shoal Point, which is fronted by cliffs about 122m high, has a round green hill, about 137m, high for a summit.

Stuart Reef (34°50'S., 135°22'E.), a dangerous sunken reef which breaks heavily at times, lies 6.5 miles WSW of Shoal Point. The coast from Shoal Point extends regularly SE for 10 miles and then extends SSW for 2 miles to the extremity of Cape Carnot. This entire stretch of coast is fronted by high cliffs which are steep in places. Sand hills rise an additional 15.2 to 30.5m above these cliffs.

D'Anville Bay, a slight indentation, lies 3 miles N of Cape Carnot. A sunken rock, which seldom breaks during SE winds, lies about 0.5 mile offshore, 3 miles SSE of Shoal Point.

Cape Rock (34°55'S., 135°32'E.), 6.4m high, stands 4.5 miles WNW of Cape Carnot. A small breaking sunken rock lies 2 miles NE of Cape Rock.

7.46 Cape Carnot (34°56'S., 135°37'E.) is the SW extremity of a broad promontory of which Cape Wiles, 3 miles to the E, is the SE extremity. The summit of Cape Carnot is a round stony hill, 89m high, which slopes to the shore. Low cliffs commence at the extremity of Cape Carnot and rise gradually with the E trend of the coast, attaining their greatest elevation at Cape Wiles; the summit of Cape Wiles, 143m high, rises just above these cliffs.

A breaking rock lies about 0.75 mile NW of Cape Carnot and an uncovered ledge extends about 0.3 mile S from the cape. A 7.8m shoal depth lies approximately 1.5 miles SW of Cape Carnot. Two high rocks, conspicuous from the W or from Sleaford Bay, are just detached from Cape Wiles, and an above-water rock, about 0.2 mile long, lies about 0.3 mile S of the cape.

Liguanea Island (35°00'S., 135°37'E.) about 2 miles S of Cape Carnot, is cliffy and rather flat-topped. The highest part of the island, 56m high, stands near the S end. A detached reef, with its S end above water, extends about 0.5 mile SSW from the S extremity of the island.

Cabbage Patch, a shoal with a depth of 14.6m over which the sea breaks, lies 16 miles S of Liguanea Island. A bank, with a depth of 29m, which also breaks, lies 3 miles N of Cabbage Patch.

7.47 Sleaford Bay (34°54'S., 135°46'E.), entered between Cape Wiles and Cape Tournefort, about 8 miles to the ENE, indents the coast in a N direction for about 4.5 miles. There are depths of 18.3 to 36.6m about 1 mile offshore around the perimeter of the bay, but anchorage is not recommended because of the heavy swell which sets inward. During bad weather, a very confused sea can be expected.

Cobbler Hill, conspicuous, conical, and 198m high, stands about 6.5 miles N of the head of the bay. North Side Hill, 195m high and conspicuous when viewed from the W part of the bay, stands 5.5 miles E of Cobbler Hill.

From Cape Wiles, the coast extends N for 2 miles to the S point of the entrance of Fishery Bay and is fronted by cliffs. Fishery Bay, about 0.5 mile in extent, is fronted by cliffs. Anchorage is not recommended in this bay. A breaking rock lies about 0.5 mile E of the N entrance point of the bay.

The coast of Sleaford Bay from the entrance of Fishery Bay extends about 4 miles N and then generally SE for 7.5 miles to Cape Tournefort. The shores of the bay are fronted by sandy beaches and backed by cliffs and hills. A rocky islet, about 7.6m high, stands close offshore about 2.25 miles NNW of Cape Tournefort. Another rocky islet, 55m high, stands about 0.75 mile SE of the above islet.

7.48 Cape Tournefort (34°55'S., 135°51'E.), which extends about 0.75 mile SW from the coast, rises to a 104m green summit that is bare of trees. The E side of the cape is fronted by high cliffs.

Jussieu Bay (34°57'S., 135°54'E.), a slight indentation, is entered between Cape Tournefort and West Point, about 6.5 miles SE. A chain of low rocks and islets, the highest being about 37m high, extends 2 miles S from the coast about 1 mile SE of Cape Tournefort. The coast of Jussieu Bay has been reported to be a good radar target at distances up to 24 miles.

West Point (35°00'S., 135°57'E.), the S extremity of Cape Catastrophe, is a cliffy headland that rises to a 140m high conical summit.

Williams Island (35°02'S., 135°58'E.), about 1 mile SSE of West Point, is separated from the mainland by a passage with considerable depths. The top of the island is almost flat. The S side of the island is very rugged, with long ledges of rock extending out from the cliffs.

A bay on the N side of the island has depths of 8.2m at its head, but is not suitable as an anchorage, except as a last resort. A light is shown from the W summit of the island.

A sunken rock lies close off the SE point of the island. A bank, with a depth of 44m, lies 4.5 miles SSW of Williams Island; a rocky bank, with a depth of 68m, lies 1.75 miles farther SSW.

Cape Catastrophe (34°59'S., 136°00'E.) is high and generally rocky. The cliffs, 15 to 30m high, consist of red and white limestone formation. Behind the cliffs, the land rises to conical hills, which are densely covered with scrub; farther inland the land rises to a rocky range of considerable height, upon which there are a few trees. A ledge of black rocks, which breaks, extends about 100m S from the cape.

Spencer Gulf

7.49 Spencer Gulf (34°38'S., 136°53'E.) is entered between Cape Catastrophe and Cape Spencer, about 48 miles to the ESE. The gulf extends about 180 miles in a general NNE direction to Port Augusta, at the head of the gulf. Port Lincoln, Tumby Bay, Franklin Harbor, and Port Whyalla are on the W side of the gulf. Port Victoria, Tipara Bay, Wallaroo Bay, Port Broughton, Port Pirie, and Germein Bay are on the E side of the gulf.

The gulf is navigable over most of its area by deep-draft vessels; vessels of moderate draft can reach and lie at Port Augusta. In the middle of the entrance of the gulf lie the Gambier Islands; Thistle Island lies in the entrance near the W shore. Low Rocks and Neptune Isles are located in the offing to the S of Thistle Island.

Tides—Currents.—Strong tidal currents flow close around Cape Catastrophe, and between the cape and Williams Island. The ebb sets SW and the flood sets NE. With onshore winds, these tidal currents cause a race dangerous to small vessels.

Caution.—Local magnetic disturbances affecting the compass to a very marked degree have been reported by vessels navigating Spencer Gulf, especially between Middle Bank and Tiparra Reef. This magnetic attraction is stronger on the W side of the gulf, but it has been reported that there were considerable magnetic disturbances on the E side as well. Vessels traveling S find that their compasses become sluggish after shaping course from Middle Bank to Tiparra Reef, and the farther W the vessel happens to be, the more sluggish the compass becomes. It has been reported that the variation changed from 001° W to 008° E within a distance of 2 miles of a position about 11 miles WSW of Tiparra Reef Light.

Spencer Gulf—Islands off the Entrance

7.50 The **Neptune Islands** (35°16'S., 136°06'E.), consisting of South Neptunes and North Neptunes, stand 22 and 15 miles SSE, respectively, of Cape Catastrophe.

South Neptunes (35°20'S., 136°07'E.), two islands composed of black-colored granite, are separated by a narrow foul channel. The S island is 37m high and covered with stunted vegetation; the N island is 35m high. The sea breaks very heavily on the S side of both islands. A rock, with a depth of less than 1.8m, lies within 0.2 mile of the NW side of the N island. An above-water rock lies 0.2 mile NW of the S island. A light is shown from the summit of the S island. A racon transmits from the light. The light on South Neptunes has been reported to be a good radar target at distances up to 19 miles.

A jetty, with a depth of 1.8m alongside its outer end, extends from the S island.

Caution.—Because of the irregularity of the bottom and lack of detailed surveys, deep-draft vessels should not approach within 5 miles of South Neptunes.

7.51 North Neptunes (35°14'S., 136°04'E.) consists of an island, an islet, and several detached rocks. The island is 49m high and almost flat-topped. Granite cliffs, against which the sea breaks heavily, front the S and SW sides of the island. A heavy surf breaks on the sand

A rock, on which the sea breaks only at times, but then with great violence, lies 0.25 mile E of the SE extremity of the island. A 12.8m shoal lies 1 mile E of the same extremity. A granite islet, 29m high, stands 0.25 mile E of the NE extremity of the island. A large rock, on which the sea breaks heavily, lies about 0.5 mile E of the islet. A light is shown from the summit of the island. North Neptunes have been reported to be a good radar target at distances of up to 19 miles.

Low Rocks (35°10'S., 136°27'E.), about 3.5 miles N of North Neptunes, are a straggling mass of rocks, about 9.1m high. A rock, which breaks heavily, lies awash about 0.5 mile NNE of Low Rocks.

7.52 The **Gambier Islands** (35°10'S., 136°27'E.), consisting of Wedge Island, North Islet, and a number of rocks and dangers in the vicinity, are located in the entrance of Spencer Gulf, about midway between Cape Catastrophe and Cape Spencer.

Wedge Island (35°10'S., 136°28'E.), about 19 miles ENE of South Neptunes, consists of limestone covered with low bushes, trees, and some grass. The island rises gradually from its N part and attains a height of 202m at its SE end, where it forms a nearly perpendicular cliff facing S. This cliff gives the island a wedge-shaped appearance when seen from a distance. Wedge Island has been reported to be a good radar target at distances up to 22 miles.

Sunken rocks extend about 0.25 mile offshore from a low point 1 mile SE of the NW extremity of the island; a 10.7m patch lies about 0.25 mile offshore, 0.5 mile N of the island's E extremity. Wedge Island Light is shown from the SE point of the island.

Louise Shoal (35°13'S., 136°32'E.), an 18.3m patch, and Suzanne Shoal, a 15.8m patch, lie about 3.5 and 5.25 miles SE of the SE extremity of Wedge Island. During and after SW gales, there are heavy breakers in this area.

Lake Macquarie Bank (35°19'S., 136°39'E.), with a depth of 29.2m, lies 11.5 miles SE of Wedge Island Light.

Peaked Rocks (35°11'S., 136°30'E.), 64 and 43m high, are two conical islets which lie 0.5 mile SW and 0.25 mile SSE, respectively, of the SE extremity of Wedge Island. A detached 10.1m patch lies 0.5 mile SE of the westernmost Peaked Rock.

Southwest Rock (35°11'S., 136°25'E.), about 1.75 miles SW of the SW end of Wedge Island and separated from it by a clear deep passage, is a mass of granite, 21m high. A cleft runs in a NNE direction in the rock and divides it into two unequal parts.

West Rock (35°09'S., 136°27'E.), which always breaks, lies awash about 0.5 mile W of the NW extremity of Wedge Island.

North Islet (35°07'S., 136°28'E.), about 1.25 miles NNE of the NW extremity of Wedge Island and separated from it by a passage with a depth of 9.1m, is 47m high. It has a few trees and some vegetation on it.

Ward Rock (35°07'S., 136°27'E.), with a depth of 12.8m, rises abruptly from depths of 37m about 0.75 mile W of North Islet. The rock is dangerous during a heavy swell because the sea then breaks violently over it. The rock does not break in fine weather.

7.53 Middle Rock (35°06'S., 136°29'E.) and Northnortheast Rock, both awash, lie 1 mile N and 3 miles NNE of North Islet. Deep water lies between Middle Rock and North Islet, and also between Middle Rock and Northnortheast Rock, but the latter, which stands on a foul area, should be given a berth of at least 1 mile.

A 16.5m patch, which breaks at times, lies at the W end of the passage between North Islet and Middle Rock, about 1.25 miles WSW of the latter. Southwest Rock, open its own breadth or more, W of the W end of Wedge Island and bearing less than 198°, leads W of Middle Rock and Northnortheast Rock. The 43m high Peaked Rock, open E of the E end of Wedge Island and bearing more than 190°, leads E of the rocks.

There is a good anchorage off the sandy beach on the NE side of Wedge Island, in depths of 11 to 12.8m, rocky bottom, sheltered from NW through W to S winds. The anchorage is located SE of the sunken rocks which extend from the low point near the NW extremity of the island, about 0.25 mile offshore, with the stone house, or the E corner of the field, on the island bearing 184° and the E point of Wedge Island bearing 139°.

Vessels approaching the anchorage from the W between West Rock and Ward Rock should keep the high cliff on the E end of Wedge Island just open E of the N extremity of the island bearing 128°. The N extremity may be passed close, but a good berth should be given to the sunken rocks off the low point about 1 mile SE of it.

Tidal currents in the vicinity of the Gambier Islands vary in velocity from less than 0.5 to 0.75 knot. The flood sets to the NW and the ebb sets to the SE.

Spencer Gulf—West Side

7.54 Thistle Island (35°00'S., 136°09'E.) lies on the W side of the entrance of Spencer Gulf, about 4 miles E of Cape Catastrophe. Thorny Passage separates Thistle Island from Cape Catastrophe. The island is irregular in outline, being about 9 miles long in a NW-SE direction. It rises to a 228m high summit near the middle of the island.

Good anchorage can be taken off the E and NE side of the island.

Waterhouse Point (35°04'S., 136°12'E.), the SE extremity of Thistle Island, is a rugged cliffy head, 46m high. The rock fringed point is steep-to. A small bight indents the coast between Waterhouse Point and another point about 1 mile to the W, but no good anchorage is available because of the S swell which rolls in. Waterhouse Point Light is shown from this point.

Albatross Islet (35°04'S., 136°11'E.) lies 0.5 mile S of the W entrance point of the above bight and is separated from it by a passage with depths of 4.6 to 11m. During gales, the sea breaks across this passage.

South Rock (35°05'S., 136°11'E.), which breaks, lies awash about 1 mile S of the above islet. The rock is steep-to and has a depth of 13.4m about 0.3 mile N of it.

Caution.—Vessels rounding Waterhouse Point should give it a berth of more than 2 miles to clear South Rock and the race off the point.

7.55 Fossil Point (35°02'S., 136°09'E.), about 3.5 miles NW of Waterhouse Point, extends WNW from the W coast of Thistle Island.

O'Loughlin Bay (35°01'S., 136°09'E.), a small bight, indents the coast NE of Fossil Point. From the N point of this bay, the coast extends NW for 3.5 miles to a sandy beach backed by a causeway of sand extending 0.75 mile NE to a remarkable hill, 82m high. The stretch of coast from Fossil Point to this sandy beach is fronted by red limestone cliffs 120 to 180m high.

From the N end of the sandy beach, **Carrington Point** (34°58'S., 136°05'E.), a high white cliffy projection, extends about 1 mile W from the coast. A ledge of breaking rocks fronts the S side of this projection for a distance of about 0.2 mile offshore. A small bay lies between Carrington Point and **Nose Point** (34°57'S., 136°05'E.), the NW extremity of the island, about 1 mile to the N. Observatory Point is located 2 miles farther NE.

Observatory Point (34°56'S., 136°06'E.), the N extremity of Thistle Island, is the low projecting extremity of a long sandy beach. A foul sand flat, which is occasionally marked by breakers during strong S or SW winds, extends 0.75 mile NW from the point. From Observatory Point, the coast extends about 5.5 miles SE to Whalers Bay.

Whalers Bay (35°00'S., 136°11'E.), which lies W of Horny Point, provides anchorage for coasters with local knowledge. Shelter is provided from S to W winds, in a depth of 7.3m, sand, with Horny Point bearing 071°, distant 0.25 mile. A rock, awash, lies in the S side of Whalers Bay, about 0.15 mile W of Horny Point. The coast between Horny Point and Waterhouse Point, about 3 miles to the S, consists of sandy beach. Depths of 36m and more lie about 1.5 miles offshore along this stretch of coast.

Caution.—A restricted area, with a radius of 2 miles, lies about 1.5 miles E of Horny Point.

7.56 Waterhouse Bay (35°03'S., 136°12'E.) provides shelter to coasters with local knowledge. A rocky patch, which occasionally breaks, lies almost awash, about 0.3 mile offshore, 0.25 mile NW of the S entrance point of the bay.

Anchorages.—On the NE side of Thistle Island, the soundings gradually shoal to the NW. A vessel may take good anchorage, in a depth of 12.8m, sand, with Observatory Point bearing 276°, distant 0.75 mile, and the SE end of the sandy beach bearing from 194° to 184°.

Waterhouse Bay provides shelter for small vessels, in a depth of 5.5m, near the S part of the bay. Caution is necessary to avoid a 0.1 mile long rocky patch which lies 0.25 mile NW of the point.

Tides—Currents.—The tidal currents in the vicinity of Waterhouse Point attain a rate of 2 knots; the flood sets N around the point, and the ebb sweeps S around the point. Near the anchorage off Observatory Point, the tidal currents never attain a velocity that exceeds 0.5 knot. Sometimes they reverse direction, with the flood setting SE and the ebb setting NW. However, there is no regularity to these currents, and frequently they set in one direction all day and night. Between Observatory Point and Porter Rock, about 3 miles to the N, the currents attain a velocity of about 1.5 knots; the flood sets NE and the ebb sets SW. A dangerous race occurs off Waterhouse Point when the S current meets the SW swell during S winds.

Note.—The dangers extending NNE from Observatory Point are described beginning in paragraph 7.59.

7.57 Thorny Passage (34°57'S., 136°02'E.), which lies between Thistle Island and Cape Catastrophe and the mainland N of it, is interspersed with a number of islands and dangers. Between Hopkins Island and Cape Catastrophe, the passage is restricted to its narrowest part, about 2.5 miles wide, which in turn is divided by Smith Island.

The best channel in the passage lies between Cape Catastrophe and Smith Island. This channel is about 1 mile wide and has depths of over 36.6m. In the S part of Thorny Passage, there are general depths of over 40m, which decrease gradually to about 18.3m NW of Thistle Island. Vessels navigating this channel at night do so in the white sector of Taylor Island Light between the bearings of 355° and 001°.

Smith Island (34°59'S., 136°01'E.), 1 mile E of Cape Catastrophe, is 30m high, oval in shape, flat-topped, covered with stunted vegetation, and steep-to. A shoal, with a depth of 11m, lies about 1.5 miles SE of the S extremity of Smith Island.

Hopkins Island (34°58'S., 136°03'E.), located 1.25 miles NE of Smith Island, is separated from the NW extremity of Thistle Island by a passage about 0.5 mile wide. This passage is fouled by rocks. Rollers break across this passage during a S current. The island is about 69m high, sandy, and flat-topped, with steep cliffs that resemble the white cliffs at the NW end of Thistle Island. Several detached rocks lie off the N end of the island.

Hopkins Island is dangerous to approach from the S because the S side of the island is fronted by foul ground and a sunken rock, with a depth of 4.2m. This rock, which only breaks during bad weather, lies 0.5 mile SSW of the SW extremity of the island.

The W side of Grindal Island, described below, in range 353° with the E side of Lewis Island leads about 0.5 mile W of the foul ground off Hopkins Island in depths of 49.4m.

Lewis Island (34°57'S., 136°02'E.), 44m high and steep-to, lies 1.5 miles N of Smith Island. This island is peaked, whereas the others are flat-topped. A shoal patch, with a depth of 10.4m, lies about 1 mile NE of Lewis Island.

Little Islet (34°57'S., 136°02'E.), about 0.5 mile NW of Lewis Island, is an irregular mass of black granite, 8.2m high. A 6.4m shoal patch lies about 2 miles NNE of this islet.

Caution.—It is dangerous to pass between Lewis Island and Little Islet because the currents sweep from one side to the other at a rate of more than 3 knots, forming eddies and tide rips. With a strong N current, these rips extend more than 0.5 mile N from Little Islet.

7.58 Grindal Island (34°55'S., 136°02'E.), about 3.75 miles N of Smith Island, is 25m high, flat-topped, and brush covered. Several rocks, awash, lie off the NE extremity of the island. A coral ledge, with depths of 7.3 to 12.8m, extends about 0.75 mile N from the N end of the island.

Doolan Shoal, a detached 6.1m shoal patch, lies about 0.75 mile SE from the SE extremity of the island; elsewhere, there are depths of 16.4 to 18.3m close offshore.

Taylor Island (34°53'S., 136°01'E.), the N island in Thorny Passage, is about 1.25 miles NNW of Grindal Island; the fairway between the islands has depths of 17.4 to 18.3m. A 69m high summit stands near the N end and a high cliff fronts the E side of the island. A light, with sectors which aids vessels through the passage, stands on the NE side of the island. With

the exception of a sand flat that extends about 0.25 mile N from its N end, the island is steep-to. An islet, 12.2m high, stands on the N extremity of the sand flat. An islet off the S end of Taylor Island is separated from it by a narrow passage.

Anchorage.—The passage between Taylor Island and the mainland, about 1.5 miles to the W, is clear of dangers and provides anchorage, in a depth of 16.5m, marl bottom, with the S extremity of Taylor Island bearing 139° and a remarkable high striped limestone cliff on the mainland bearing about 229°.

Tidal currents in Thorny Passage attain a rate of 3 knots; between Taylor Island and the mainland a rate of 1 knot is attained during spring tides. The flood sets to the N and the ebb to the S. In the vicinity of the islands between Cape Catastrophe and Thistle Island, there are tide rips which are strong enough to swamp a boat.

Directions.—When proceeding N through Thorny Passage, pass Cape Catastrophe at a distance of about 0.5 mile and then proceed between Grindal Island and Taylor Island.

7.59 Black Rock (34°55'S., 136°06'E.) lies awash at high water about 1.25 miles N of Observatory Point, but at low water the rock appears as a mass of black granite, 1.8m above water. Sunken rocks surround the rock; a ledge extends about 0.2 mile SSW from it.

There are depths of 3.7 to 5.5m between Black Rock and the sand flat off Observatory Point. The small projection SE of Observatory Point kept open between the high cliffs and Horny Point leads between Black Rock and the sand flat NW of Observatory Point. The E end of Hopkins Island kept well-open of Thistle Island leads W of Black Rock.

Porter Rock (34°53'S., 136°09'E.), about 0.2 mile in extent, lies about 3 miles NNE of Observatory Point. There is a least depth of 1.2m over several knobs near the N end of this rock, but near the S end of this rock there are depths of 3.7m.

Between Black Rock and Porter Rock, there are depths of about 11m, rocky bottom. Black Rock is dangerous because the sea seldom breaks over it enough to be seen. Frequently, there is no broken water over it for some days.

Hopkins Island closed in by Thistle Island leads E of Porter Rock, while the same islands kept well-open of each other lead W of the rock. The northernmost of the high wooded conical hills N of Memory Cove kept open N of Taylor Island, bearing 274°, leads about 0.75 mile N of Porter Rock.

Simms Rock (34°52'S., 136°08'E.), on which the sea does not always break, lies about 4.75 miles NNE of Observatory Point. It consists of a number of pinnacle rocks, with a least depth of 3m. There are depths of 12.8m at a distance of 0.25 mile from the rock.

Howard Rock (34°50'S., 136°09'E.), on which the sea seldom breaks, lies about 6.5 miles NNE of Observatory Point and about 2.75 miles WSW of the center of Dangerous Reef. This steep-to rock has a depth of 3.9m. The W tip of Hopkins Island bearing not more than 200° leads clear of Howard Rock, Porter Rock, Simms Rock, and Black Rock. A shoal, about 0.75 mile long and 0.25 mile wide, lies 8.5 miles NE of Observatory Point and about 2.5 miles SE of the center of Dangerous Reef. The depths over this shoal are less than 9.1m and decrease to a least depth of 2.7m near its middle, on which the sea occasionally breaks heavily during S gales.

Dangerous Reef (34°49'S., 136°13'E.), which consists of four large rocks and a number of small rocks, lies about 9 miles NNE of Observatory Point. These rocks, the highest of which is 3m, extend 0.75 mile W and about 2.5 miles SE, respectively, from the largest rock. The depths exceed 18.3m about 0.25 mile from the reef. A light is shown from the center of the reef.

A 12.2m patch, with depths of 14.6 to 18.3m all around, lies 4.5 miles NW of Dangerous Reef Light.

Spencer Gulf—West Coast

7.60 The coast between Cape Catastrophe and the E entrance of Memory Cove, about 1.5 miles to the N, is fronted by high cliffs.

Memory Cove (34°58'S., 135°59'E.), a small bight, is sheltered from all winds from the NNW through W to SE. Winds from other directions raise a short sea in the bay.

Anchorage can be taken by moderate-sized vessels, with local knowledge, in a depth of 9.1m, sand, with the E entrance point of the cove in range 088° with the cliffs on the N side of Hopkins Island and the E end of the beach in the bight bearing 184°.

Larger vessels anchor farther out, in depths of 14.6 to 16.5m, with the N extremity of Smith Island bearing 128° and the E end of the beach in the bight bearing 195°.

The coast between Memory Cove and Maclaren Point, about 10 miles NNE, consists of rocky points bordered by sandy beaches in between.

Maclaren Point (34°48'S., 136°01'E.) extends about 0.5 mile E of the general line of the coast and has a small bight on either side of it. A rock, with a depth of 1.8m, lies about 0.15 mile NE of the E extremity of the point.

The coast from the inner end of Maclaren Point extends N for 4 miles to Cape Donington. It consists of sandy beaches broken by rocky points and backed by high hills. A rock, about 3m high, stands 1.5 miles N of Maclaren Point. Depths of 11 to 12.8m are found about 0.5 mile offshore along this stretch of coast.

Cape Donington (34°44'S., 136°00'E.), the S entrance point of Port Lincoln, is the N extremity of a peninsula which extends 4 miles N from the coast. This extension forms the E side of Spalding Cove. About 0.5 mile SW of the cape, the land rises to a wooded summit, 53m high. Cape Colbert is the NW extremity of the peninsula and is cliffy. A light is shown from Cape Donington.

Donington Reef (34°43'S., 136°00'E.), with a depth of 1.8m over its outer end, extends about 0.25 mile N from a rock, 3m high, which lies 0.25 mile NNE of Cape Donington. Depths of 10.3 and 11m lie about 0.25 mile ESE and 0.25 mile E of the same rock.

Helen Shoal, with a depth of 14m, lies 3.5 miles E of Cape Donington. Jane Shoal, with a depth of 10.9m, and Nicolette Shoal, with a depth of 13.5m, lie about 7 and 6 miles, respectively, ENE of the same cape. A 15.5m patch lies about 0.5 mile W of Nicolette Shoal.

7.61 Port Lincoln (34°43'S., 135°56'E.), a large bay that indents the coast very irregularly in a general W direction for about 6 miles between Cape Donington and Boston Point, about 5.5 miles to the NW, has several smaller bays within it. It

is divided into two parts by Kirton Point, which is located 4.75 miles W of Cape Colbert, and Boston Island. The S part of the bay consists of Spalding Cove, Proper Bay (Port Lincoln Proper), and Porter Bay. The N part consists of Boston Bay. Boston Island lies 1 mile inside the entrance of Port Lincoln and separates it into two entrances. The N entrance lies between Boston Island and Boston Point; the S entrance lies between Cape Colbert and the SE extremity of Boston Island.

Port Lincoln is the terminal for the Eyre Peninsula Railway System and is considered the finest harbor in South Australia The bay can provide landlocked anchorage for a large number of deep-draft vessels between Boston Island and the mainland to the W.

The town of Port Lincoln is situated in the SW part of Boston Bay. Alongside berthing facilities, described in paragraph 7.66, are provided for ocean-going vessels.

The approach channel to Port Lincoln is dredged to a depth of 14.6m.

Boston Point (34°39'S., 135°56'E.), the N entrance point of Port Lincoln, is broad and low. It is also the S extremity of a peninsula that forms the NE side of Boston Bay. A light is shown from Boston Point. Davidson Rock, with a depth of 14m, lies about 2.75 miles SSE of Boston Point.

Boston Island (34°42'S., 135°56'E.) is generally hilly and rises to a summit, 90m high, near the middle of the island. It is wooded and in the winter is covered with very green grass. The coast of the island is irregular and composed of sandy bays and sloping points. The island is fairly steep-to, with depths of 11 to 14.6m lying 0.25 mile offshore.

Caution.—Marine farms, best seen on chart, have been established E of Boston Island. Marine farms, which may be floating or fixed structures, and their associated moorings should be avoided. The farms are usually marked by buoys or beacons, which may be lit.

7.62 Fanny Point (34°44'S., 135°56'E.), the S extremity of Boston Island, is low. A reef, with a depth of 2.7m over its outer end, extends about 0.15 mile S from the point. A light is shown from the point.

The coastal bank, with a depth of 6.1m over its outer end, extends 0.3 mile NE from Hayden Point, the SE extremity of Boston Island. A depth of 1.5m lies midway along the length of this bank 0.15 mile NE of the point.

Maria Point (34°40'S., 135°55'E.), the N end of Boston Island, is low, rocky, and the end of a narrow projection which is about 12.2m high. A steep-to reef, with a depth of 0.9m, extends about 0.25 mile W from a small white cliff, with a house near it, on the W side of the island, about 0.6 mile S of Maria Point.

Kangaroo Reef (34°40'S., 135°55'E.), with depths of less than 5.5m, has a least depth of 1.2m. This steep-to reef extends about 0.75 mile NE from Maria Point and is marked by a buoy.

7.63 Spalding Cove (34°46'S., 135°58'E.), entered between Cape Colbert and Surfleet Point, about 2 miles SW, extends about 3.5 miles S. The shores of the cove consist of sandy bights and low, rocky points; its E side is bordered by sandy cliffs. There are general depths of 9.1 to 14.6m within 1 mile of the cove head and within 0.5 mile of both sides.

Anchorage can be taken anywhere because there are no known dangers. The best anchorage lies in the small bay located close S of the summit of Cape Donington. During strong N winds, there is a short sea in this bay.

Surfleet Point (34°46'S., 135°57'E.) and the Bickers Islets separate Spalding Cove from Proper Bay. The Bickers Islets, two in number and small, lie NW of Surfleet Point. A ledge extends about 0.15 mile S from the S side of the N islet, but there are depths of 12.8 to 14.6m about 0.1 mile from the other sides.

A stony bank extends about 0.1 mile SE from the SE end of the S islet. There are depths of more than 9.1m about 0.1 mile off the W side and 0.25 mile off the E side of the S islet.

Sunken Brother Rock, with a depth of 2.7m, lies about 0.5 mile WSW of the summit of the southernmost of the Bickers Islets. A short distance off there are depths of over 9.1m.

7.64 Proper Bay (Port Lincoln Proper) (34°46'S., 135°54'E.), which is entered between Surfleet Point and Billy Lights Point, the S entrance point of Porter Bay, about 3.25 miles to the WNW, extends almost 8 miles in a general SW direction. The coast between Surfleet Point and a point SE of Horse Rock, about 5.75 miles to the SW, consists of rocky points and sandy beaches backed by low scrub-covered rises, over which the sand hills inland from Sleaford Bay are visible.

Horse Rock (34°48'S., 135°51'E.), about 0.6m high, lies 5.75 miles SW of Surfleet Point. The rock is connected to the point SE of it by a sandy spit with a depth of 0.4m. The coast between the point SE of Horse Rock and a sandy beach at the head of Proper Bay, about 3.75 miles to the W, consists of low limestone cliffs that have scrub-covered hills rising directly above them.

From the N end of the sandy beach at the head of the port the low limestone coast extends NE for 4.75 miles to the W end of the sandy beach on the S side of the peninsula of which Kirton Point is the NE extremity.

A drying sand spit extends about 0.5 mile offshore from a sandy beach located about 1.75 miles NE of the head of the port. The coast from the W end of the sandy beach on the S side of the peninsula curves E for 0.5 mile, then S for 1 mile, and forms a shallow bay.

From **Murray Point** (34°46'S., 135°52'E.), the E entrance point of this bay, the coast extends NE for about 2 miles to Billy Lights Point. This section of coast consists of low cliffs with sandy beaches and two slightly projecting points backed by hills, about 46m high. A sand flat, with shallow depths, extends SE from the S part of this stretch of coast to Grantham Island.

General depths of 5.5 to 9.1m are found in Proper Bay, with depths of 6.4 to 9.1m completely across the entrance. In the S part of the port, from Surfleet Point to within 1 mile of the head of the port, there are depths of more than 5.5m about 0.5 mile offshore; however, the NW part of the port is shallower, with depths of 5.5m and less N of a line from Grantham Island to the head of the port.

Grantham Island (34°47'S., 135°52'E.), about 4 miles WSW of Surfleet Point, is 15.2m high and scrub-covered. It has a cliffy coast, with rocks extending a short distance from all sides except the SE, which is steep-to.

Caution.—Shoals, with depths of 5.5 to 9.1m, extend about 1.5 miles ENE from Billy Lights Point and occupy the greater part of the W side of the passage between that point and Fanny

Point. A shoal patch, with depths of 6.7 to 7.3m, lies in the deeper part of Port Lincoln Proper about 1 mile NE and 1.75 miles ENE of the NE extremity of Grantham Island.

An 8.5m patch lies S of the above patch, about 1 mile ENE of the NE extremity of Grantham Island. A 5.5m patch lies about 1.25 miles W of Horse Rock. The summit of the northernmost of the Bicker Islets, in range 062° with the S end of Grantham Island, leads N of this patch; the SE extremity of Boston Island, in range 050° with the S end of Grantham Island, leads S of the patch.

7.65 Porter Bay (34°44'S., 135°53'E.) indents the peninsula which forms the SW side of Boston Bay for about 1 mile. The S side of the bay consists of low sandy beach backed by scrub-covered hills. Foul ground extends about 0.25 mile in all directions from the S entrance point of the bay; depths of 7.3 to 9.1m exist between the entrance points, shoaling gradually toward the bay head. A small craft harbor is located in Porter Bay; a range bearing 261° marks the approach to the entrance.

Kirton Point (34°43'S., 135°53'E.), the N entrance point of Porter Bay, is a broad projection that rises to a 67m high summit covered with scrub; a radio mast stands on the point.

Boston Bay (34°41'S., 135°53'E.), protected from the sea by Boston Island, is an indentation in the coast between Kirton Point and Boston Point. It can be entered by either the S or N entrance. The 10m curve lies about 0.75 mile off the W shore and about 1.5 miles off the NW and N shores of the bay.

Le Hunte Shoal (34°42'S., 135°52'E.), with a least depth of 6.1m, soft mud over a rock bottom, lies about 2 miles NNW of Kirton Point. North Side Hill in range 223° with Town Jetty leads 0.25 mile SE of Le Hunte Shoal; the Roman Catholic Church in range 198° with the outer end of Town Jetty leads about 0.25 mile W of the shoal.

Bass Shoal (34°41'S., 135°53'E.), a detached 8.5m patch, lies about 2.25 miles N of Kirton Point. A fish haven, marked close E by a buoy, lies W of Bass Shoal.

7.66 Port Lincoln (34°43'S., 135°52'E.) (World Port Index No. 54350) lies about 1 mile W of Kirton Point and is fronted by a sandy beach that extends W for 0.5 mile, and then NW for another 0.5 mile. The coast then extends almost due N for about 5 miles to the village of North Shields. From North Shields, the coast extends NE, then E for about 1.25 miles, and is bordered by a sandy beach backed by low sand hills. From the E end of this beach, the coast extends SSE for 2 miles to Boston Point. Port Lincoln is a first port of entry.

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Winds—Weather.—Prevailing winds are from the W.

Tides—Currents.—There is very little tidal current in any part of Port Lincoln, but about 2 to 3 miles outside the port entrance the currents set N on the flood and S on the ebb. The tidal range is 0.9 to 1.5m.

Depths—Limitations.—The principal berths in Port Lincoln are at the Shipping Pier, which extends N from the S shore of Boston Bay. Berth No. 1 through Berth No. 4 are situated on the W side of the Shipping Pier; Berth No. 5 through Berth No. 10 are situated on the E side.

Berth No. 1 (Old Grain Berth), is 204m long, with a depth alongside of 9.7m; this berth is no longer used and alongside depths are no longer maintained by dredging. The berth extends E, at a right angle, from the root of the Shipping Pier.

Berth No. 2, a general cargo berth situated at the root of Shipping Pier, is 189m long and has a dredged depth of 8.5m.

Berth No. 3, in the middle of the W side of the Shipping Pier, is not used.

The seaward end of the Shipping Pier is equipped for loading deep draft bulk grain ships. Berth No. 4 lies the W side and Berth No. 5 lies on the E side. Both are 349m in length, have a dredged depth of 14.9m, and can accommodate vessels up to 60,000 dwt.

Berth No. 6 is in the middle of the E side of the Shipping Pier and is 247m in length, with an alongside depth of 11.9m.

Berth No. 7 through Berth No. 10 are situated along the E root of the Shipping Pier, have alongside depths of 4.6 to 8.2m, and are used for local shipping and fishing craft.

A ro-ro ramp, dredged to 5.5m alongside, is situated at Berth No. 9.

Kirton Point Jetty, about 0.25 mile E of the Shipping Pier, extends from the shore close W of Kirton Point. An oil tanker berth, formed by a 61m long T-head with four dolphins, is situated at the head of the jetty. An acid berth lies close S of the T-head. The tanker berth is 280m long, with a depth of 9.9m alongside; a vessel up to 198m in length, with a draft of 8.7m, has been accommodated.

Proper Bay (Port Lincoln Proper) lies in a small bight about 0.5 mile SW of Billy Lights Point and contains facilities for the loading of limestone. An L-shaped pier extends from the shore at the head of the bight and is approached from the ENE through a channel with a least fairway depth of 9.1m. A lighted beacon marks the E side of the channel 0.75 mile SW of Point Fanny. The L-shaped pier at Proper Bay has a berthing length of 274m between the dolphins, with a depth of 9.6m alongside.

Vessels up to 76,500 dwt, with lengths of up to 245m and drafts up to 14.7m, can be accommodated in Port Lincoln. At Proper Bay, the maximum length permitted at the berth is 183m; the maximum beam permitted is 24m.

The depth in the approach channel to Port Lincoln through Boston Bay is 14.4m.

Aspect.—A power station is situated on Kirton Point.

Pilotage.—Pilotage is compulsory. Pilots board incoming vessels off the N entrance of Port Lincoln, about 1.5 miles SE of Boston Point.

Pilotage should be requested through the harbormaster at least 2 hours prior to arrival; if a pilot is required outside normal working hours, the request should be sent at least 4 hours in advance. The pilot vessel is equipped with radiotelephone. There is a Port Radio Station at Port Lincoln.

Regulations.—Vessels should send their ETA 24 hours and 4 hours in advance.

Berthing is allowed during daylight hours only. Unberthing may be done at any time.

Vessels normally berth port side-to.

Signals.—At Proper Bay, berthing signals are shown from the ship loader, as follows:

1. Four green neon strips—Jetty open for berthing.

2. Four red neon strips—Jetty closed for berthing.

Anchorage.—Vessels may anchor 2 miles SE of Point Boston, in 18 to 22m, good holding ground.

The anchorages at the N and S ends of Boston Bay, in 13m, are more sheltered; however, the holding ground is reported to be fair to moderate.

Directions.—The preferred approach to Port Lincoln and Boston Bay is to pass N of Boston Island rounding Point Boston close-to, avoiding Kangaroo Reef. Vessels should then follow the 14.4m dredged channel, which is marked by lighted beacons, taking care to avoid Bass Shoal and Le Hunte Shoal.

7.67 Louth Bay (34°34'S., 136°00'E.) indents the coast between Boston Point and Bolingbroke Point, about 10 miles NE, and is divided into three distinct smaller bays by the irregular coastal formations. There are general depths of 16.5 to 21.9m in the entrance of Louth Bay between Rabbit Island and Berlin Rock and 12.8 to 18.3m in the middle of the bay.

In the smaller bays within the limits of Louth Bay, there are general depths of 7.3 to 14.6m in the middle bay, and 10 to 11m in Peake Bay and the N bay. The S bay is shallow.

A range of wooded hills, about 2 miles inland, parallels the W shore of the bay. Mount Knott, the highest of these hills, is well-wooded and flat-topped, and rises to a 254m high summit about 8 miles NNW of Boston Point. Mount Gawler, also flat-topped, rises to a height of 248m about 2 miles WSW of Mount Knott.

On the N side of the bay, between the foot of the range of hills and Bolingbroke Point, the country consists of low hills covered with dense scrub, but the land on the W side of the bay is well-grassed and has open woods. Mount Liverpool, 322m high, about 16 miles N of Boston Point, and a conical hill, 259m high, about 1.5 miles ENE of Mount Liverpool, are both very conspicuous from Louth Bay.

7.68 Bolingbroke Point (34°33'S., 136°05'E.) is a round rocky point about 12.2m high. A reef, with a depth of less than 1.8m, extends about 0.5 mile S from the point, and a detached shoal, with a depth of 6.4m, lies about 1.5 miles S of the point. A light is shown from the point. A dangerous wreck lies 0.75 mile SE of Bolingbroke Point.

Berlin Rock (34°36'S., 136°04'E.), with a depth of 4.9m, lies about 3.25 miles SSW of Bolingbroke Point. A rock with a depth of less than 2m lies 1.75 miles NNW of Berlin Rock.

Rabbit Island (34°36'S., 135°59'E.), 10m high, lies about 3.5 miles NE of Boston Point and about 1.5 miles E of the entrance of the S bay. Its E side is cliffy, but its W side slopes gradually to the waters edge. A rock, with a depth of less than 1.8m, lies about 0.25 mile N of the N end of the island; a shoal, with a least depth of 7.6m, lies almost 0.75 miles farther N. Nowland Shoal, with a depth of 6.7m, lies about 0.5 mile S of the S end of the island. Elsewhere, there are depths of over 9.1m about 0.25 mile offshore and 9.1 to 12.8m between the island and the entrance of the bay.

Hawkers Devil (34°38'S., 135°57'E.), a rock, awash at low water, lies 1.25 miles NNE of Boston Point. Shoal water lies between the rock and the shore to the W. The S bay lies between a point about 2.5 miles N of Boston Point and Louth Island, which lies about 1 mile farther NE. With the exception of Hawkers Devil, the 10m curve extends from a position about 230m E of Boston Point to a position about 0.25 mile S of the S end of Louth Island. There are depths of 5.5 to 7.3m in an area about 1 mile in extent close within the entrance of the bay.

7.69 Louth Island (34°34'S., 135°57'E.), almost 1.75 miles NW of Rabbit Island, has two wooded peaks, both 23m high. A dry sandspit extends about 0.75 mile W from the NW end of the island and is connected to the mainland about 1 mile farther W by a sand bar which almost dries. The middle bay lies between the S extremity of Louth Island and Peake Point, about 5.5 miles to the NE, and has depths of more than 11m about 1 mile from its head. A pier extends from the shore of a cove about 2 miles NNW of Louth Island. The pier is 91m long, with a depth of 1.5m alongside, but is closed to commercial shipping. A reef lies close E of the pier. A rock, with a least depth of 0.9m, lies 0.25 mile offshore, about 0.75 mile N of the pier. Another reef lies about 0.5 mile offshore, about 1.5 miles NE of the pier.

Peake Bay (34°30'S., 136°03'E.) indents the E part of Louth Bay between Peake Point and Bolingbroke Point, about 4 miles ESE. There are depths of 10 to 11m in an area about 2 miles in extent in the middle of the bay.

Bolingbroke Reef, which uncovers and is steep-to off its W end, extends about 3 miles W from Bolingbroke Point and restricts the entrance of the bay to a width of 0.75 mile between the 10m curves. The E extremity of Peake Point, bearing N, leads close off the W extremity of Bolingbroke Reef.

Anchorages.—The best anchorage in Louth Bay lies N of the sandspit extending from Louth Island, in a depth of 5.8m, sand, with the extremities of Louth Island bearing 128° and 173°, respectively.

There is good anchorage, except during S gales, off the long sandy beach on the E side of Peake Bay, in a depth of 5.5m, sand, with the W side of Bolingbroke Point bearing 167° and the S extremity of some rocks that extend seaward from the middle of the beach bearing 055°.

Directions.—Vessels approaching Louth Bay from the N must pass about 3 miles E of Bolingbroke Point, and then steer to pass S of Berlin Rock, taking care to avoid the 6.4m patch and the foul ground between Bolingbroke Point and Berlin Rock. Care must be taken to give Berlin Rock a good berth.

Vessels intending to enter Peake Bay must have local knowledge.

The Sir Joseph Banks Group

7.70 The **Sir Joseph Banks Group** (34°35'S., 136°18'E.) consists of about 20 islands, islets, and above-water rocks located E of Louth Bay and Bolingbroke Point. The S part of the group lies as far as 23.5 miles E of Cape Donington and the N part lies about 11 miles ENE of Bolingbroke Point. The N part of the group, excepting Kirkby Islet and Dalby Islet, is located on a shoal bank, with depths of less than 9.1m, that extends 9 miles N from positions 8.25 and 12 miles ESE of Bolingbroke Point; the islands of the group to the S are all detached.

Anchorages near Spilsby Island, Blyth Islet, and Reevesby Island are included in the principal description. Spilsby Island and Reevesby Island are the only two islands of the group which are inhabited and on which the vegetation is higher than low bushes.

Buffalo Reef (34°43'S., 136°28'E.), 3m high, the southernmost and outermost of the group, lies about 23.5 miles E of Cape Donington and about 14 miles ENE of Dangerous Reef. Sunken rocks extend about 0.2 mile W and 0.1 mile NE from the reef; otherwise, it is steep-to. The sea sometimes breaks with considerable violence on this reef.

Rosalind Shoal (34°48'S., 136°33'E.), with a depth of 16.5m, lies about 6 miles SE of Buffalo Reef.

Spilsby Island (34°40'S., 136°21'E.), about 6 miles NW of Buffalo Reef, is the highest and only wooded island of the group; its N part rises to a round wooded summit, 41m high. Its coast is cliffy and bordered by sandy beaches and sand hills. A drying ledge extends about 0.2 mile offshore on the SW side of the island.

A sunken reef, about 0.5 mile in extent, extends about 1 mile W from the S end of Spilsby Island. There are depths of less than 1.8m on the reef, but the foul outer end projects S for about 0.5 mile to a depth of 3.7m.

A shoal bank, with a depth of 2.4m, extends about 1.25 miles NE from the NE extremity of the island. Boucaut Islet, 9.1m high, with Seal Rock close SE of it, lies near the NE edge of this shoal. The E side of Seal Rock is steep-to. The sea sometimes breaks over the shoal area between Spilsby Island and Boucaut Islet. A shoal area, with depths of 9.1m and less, extends between 1 and 1.25 miles from the N, NW, W and SW sides of the island.

7.71 Bridget Shoal (34°43'S., 136°18'E.), with a depth of 11.9m, lies about 5 miles SW of the S extremity of Spilsby Island. A detached patch, with a depth of 11.3m, lies about midway in between. A 10m patch lies about 1 mile N of the latter patch.

Rosemary Shoal (34°42'S., 136°22'E.), with a depth of 7.9m, lies about 1 mile SE of the S extremity of Spilsby Island.

Duffield Islet (34°39'S., 136°20'E.), about 6m high, lies about 0.75 mile W of the NW extremity of Spilsby Island. Foul ground lies between the islet and the island; rocks extend about 0.2 mile S from the islet.

There is good anchorage, sheltered from winds from W to S to SE, in a depth of 9.1m, off the N side of Spilsby Island. During E winds, small craft can anchor with the extremities of Spilsby Island bearing 088° and 167°, in a depth of 5.5m, but this position lies close to the 1.8m bank extending NW from the island. Local knowledge is required for both anchorages.

Stickney Islet (34°41'S., 136°17'E.), about 2.5 miles WSW of Spilsby Island, is 30.5m high and almost divided by two inlets. An above-water rock lies about 0.2 mile off the islet's SE point, being connected to it by drying rocks. The islet is steep-to at a distance of 0.5 mile offshore.

Sibsey Islet (34°39'S., 136°11'E.), about 24m high and steep-to, lies about 4.25 miles WNW of Stickney Islet; a light is shown on Sibsey Islet.

English Islet, about 0.75 mile NE of Sibsey Islet, is about 9m high, rocky, and steep-to, except on its N side. There are depths of 12.8 to 16.5m between these two islets.

Karen Shoal, with a depth of 14.6m, lies about 1 mile NE of the N extremity of English Islet.

Caution.—The islands comprising the N part of the Sir Joseph Banks Group all lie within the limits of a shoal bank, with depths of less than 9.1m.

7.72 Roxby Islet (34°36'S., 136°19'E.) lies near the SE extremity of the above bank, about 3.5 miles NNW of Spilsby Island. The islet is 23m high and cliffy on its N and E sides, but slopes to sandy beaches on its S and W sides. A reef, with a rock awash on it, extends about 0.5 mile SSE from the SE extremity of the islet.

Hareby Islet (34°35'S., 136°18'E.), located about 0.5 mile NW of Roxby Islet, rises to a height of 15m in its E part, which is the highest part of the islet. Shoals and drying rocks extend about 0.75 mile W from the islet and there are depths of 4.6m between it and Roxby Islet.

Langton Islet (34°36'S., 136°15'E.), 9.1m high, lies at the SW extremity of the above bank and about 2.5 miles W of Roxby Islet. The NE side of the islet consists of a sandbank about 0.2 mile long. The islet is steep-to about 0.5 mile off the E and S sides. A shoal, with a depth of a little over 5.5m, extends about 1 mile W from the islet.

Smith Rock (34°35'S., 136°16'E.) lies above water about 0.5 mile NE of Langton Islet. A channel, with a fairway depth of 6.4m, lies midway between Langton Islet and the rock. Also, between Smith Rock and the foul ground that extends W from Hareby Islet, there is a narrow channel with a fairway depth of 6.4m.

Blyth Islet (34°34'S., 136°18'E.), about 0.75 mile N of Hareby Islet, is 11.6m high, round, and sandy. Depths of less than 1.8m extend up to 1 mile NW from the islet; an above-water rock lies 0.3 mile NE of the island, with drying rocks in between.

Anchorage can be taken by vessels with local knowledge with Blyth Islet bearing 308° and the N extremity of Hareby Islet bearing 240°. Shelter is provided from W and S winds.

7.73 Reevesby Island (34°32'S., 136°17'E.), the largest island of the N group of the Sir Joseph Banks Islands, lies 1.25 miles NNW of Blyth Islet. The island has a general height of 9.1 to 12.2m, but a round green hill, with a clump of bushes near the top, rises to a height of 33m near the S end of the island. A sandy peninsula, topped by a sand hill, extends 0.5 mile E from the N part of the island. A farm house and some sheds stand near the S end of the island.

The coast consists of sandy beaches and low rocky points. The 10m curve lies about 0.5 mile off the E side of the island, but on the W side foul ground extends W to Partney Island, Marum Islet, and Lusby Islet. A sandspit, with a rock awash, at its extremity, extends about 0.5 mile W from a position 1 mile S of the NW extremity of the island.

Good anchorage can be taken by vessels with local knowledge, in depths of 5.5 to 9.1m, N of the above sandspit, except during N and NW winds. Small vessels can anchor, in a depth of 6.4m, about 0.25 mile offshore.

Winceby Island (34°30'S., 136°17'E.), 10m high and the N island of the group, lies 0.5 mile N of Reevesby Island. The intervening channel has a fairway depth of 7.3m. This channel is available only to vessels with local knowledge.

Shoal water, with a depth of less than 9.1m, extends 1 mile NW and 0.75 mile N from the island. Winceby Island Light is shown from a tower situated on the summit of the island.

Judith Shoal (34°28'S., 136°21'E.), with a least depth of less than 15.5m, lies about 3 miles ENE of Winceby Island.

Marum Islet (34°31'S., 136°15'E.), 8.8m high, lies 1.5 miles WSW of the NW extremity of Reevesby Island. The 10m curve lies about 0.3 mile N and W of the islet.

7.74 Partney Island (34°31'S., 136°16'E.), 14m high, lies 0.5 mile SSE of Marum Islet and is joined to it by a sandspit which dries in places. A rocky patch, with a depth of less than 1.8m, lies about 0.75 mile W of Partney Island.

A detached reef, with depths of less than 1.8m and with a rock, awash, near its center, lies about 1.75 miles WSW of Partney Island. The reef marks the W extremity of the shoal bank on which the N part of Sir Joseph Banks Group lies.

Lusby Islet (34°32'S., 136°15'E.), 8.8m high, is joined to the W part of the S extremity of Reevesby Island by a drying sandspit, approximately 0.5 mile long. Rocks that dry in patches extend about 0.25 mile W and N from the NW extremity of the islet. The 10m curve lies close S and W of the islet.

Kirkby Islet (34°33'S., 136°13'E.), located about 6 miles E of Bolingbroke Point and 2 miles W of Lusby Islet, is 26m high and cone-shaped. Shoal water, with depths of less than 5.5m, extends about 0.5 mile NW from the islet. A small rock, with a depth of 8.2m and 18.3 to 20.1m all around, lies 0.75 mile NNE of the islet.

Dalby Islet (34°34'S., 136°15'E.), 8.8m high, lies about 1.25 miles SE of Kirkby Islet. The islet is steep-to, except on its SW side, where the 10m curve lies about 0.25 mile offshore.

Spencer Gulf—West Coast (continued)

7.75 The coast between Bolingbroke Point and Cape Euler, about 7 miles to the N, consists of low, red cliffs and sandy beaches, with drying rocks extending up to 0.5 mile offshore in places. Massena Bay is an indentation in the coast about 4 miles N of Bolingbroke Point. A red cliff stands on the N entrance point of the bay.

Tumby Island (34°24'S., 136°09'E.) stands about 2.25 miles NNE of Cape Euler and off a low point to which it is connected by a spit. There are depths of 14.6 to 20.1m between this stretch of coast and Sir Joseph Banks Group, but the coast should be given a berth of at least 1 mile between Bolingbroke Point and Cape Euler. Tumby Island should be given a berth of 2 miles.

Secret Rock (34°31'S., 136°07'E.) lies, awash, almost 0.5 mile E of a point located about 2 miles N of Bolingbroke Point. Quilty Rock, with a depth of 5.5m, lies about 1.25 miles SE of the same point. There are depths of less than 5.5m between the former point and the rock, and shoal water, with depths of less than 9.1m, extends about 0.75 mile S from Quilty Rock.

Rabbit Island, bearing 243° and well open S of Bolingbroke Point, leads clear of the shoal water S of Quilty Rock. The same bearing of Rabbit Island leads NW of the 6.4m shoal that lies 1.5 miles S of Bolingbroke Point, although this course is not recommended.

7.76 Tumby Bay (34°23'S., 136°10'E.), also known as Harvey's Bay, lies between Tumby Island and a point about 4.75 miles NE. Depths in the middle of the entrance range from 9.1 to 11m, shoaling gradually to the shores around the bay.

From a position about 3 miles E of Tumby Island, the range of hills to the N of the bay is conspicuous; Sheep Hill is the summit of this range. The red cliffs of Tumby Island and the coast between the island and Bolingbroke Point are prominent marks; however, the low hills that back this coast are barely visible above the cliffs.

A remarkable range, of which Mount Liverpool is the most conspicuous summit, is visible inland. The town of Tumby is situated in the SW corner of the bay, about 2.5 miles NW of Tumby Island. A jetty, about 0.2 mile long, with a depth of 5.2m, extends from the shore abreast of the town but is now closed to commercial shipping. A light is shown from a white post on the jetty head.

Anchorage can be taken, in depths of 5 to 9m, with the jetty at the town bearing 269°. Local knowledge is necessary.

Small vessels can anchor, in depths of 4.6 to 5.5m, about 1.25 miles NW of Tumby Island with the NE extremity of the island bearing 122°.

Pilotage is not compulsory, but a pilot can be obtained at Port Lincoln if needed.

Directions.—Vessels approaching Tumby Bay from the S should pass about 2 miles E of Tumby Island on a N course until the jetty at the town of Tumby bears 269°. Course should then be altered to approach the jetty on that bearing.

Vessels approaching from the N should give the N entrance point of the bay a berth of about 2.25 miles until the jetty at Tumby bears 269°, then proceed as directed above.

7.77 The coast between the N entrance point of Tumby Bay and Lipson Cove, about 5.5 miles NE, consists of a sandy beach backed by low land for a distance of 3.5 miles and then high rocky points with sandy beach for the remaining distance.

Lipson Cove (34°16'S., 136°16'E.) is formed by a sandy beach and a rock that extends 0.2 mile in a NE direction from the S end of the beach; the cove contains a damaged and disused jetty.

Vessels with local knowledge may anchor, in a depth of 5.5m, about midway between the NE end of the rock and the N end of the beach. The anchorage is only 0.3 mile across and provides little swinging room during NE winds. It should only be used during offshore winds that are likely to continue from that direction.

7.78 Cape Hardy (34°11'S., 136°20'E.), 30m high and grassy, lies 5 miles NE of Lipson Cove. A range of wooded hills parallels the coast between Lipson Cove and Cape Burr, 8 miles NE.

Sheep Hill (34°14'S., 136°15'E.), the summit of this range, rises about 1.75 miles NNW of Lipson Cove.

Cape Burr (34°07'S., 136°21'E.) lies 4 miles NNE of Cape Hardy. With the exception of a rock with a depth of 1.8m, which lies 0.75 mile S of the cape, the coast between Lipson Cove and Cape Burr is fairly steep-to close offshore.

Mount Hill (34°04'S., 136°11'E.), the highest and most conspicuous landmark along this coast, consists of an isolated, truncated cone, 378m high, which stands 8.5 miles WNW of Cape Burr.

Mottled Cove (34°06'S., 136°21'E.), a small sandy bight about 1 mile N of Cape Burr, is the site of Port Neill, a small settlement. A jetty extends about 250m offshore abreast the settlement and has a depth of 4.6m alongside its outer end. The jetty is now closed to commercial shipping.

Lighted beacons, in range 279°, indicate the axis of the jetty. By keeping N of the range with the lights slightly open, vessels may approach in the deepest water right up to the seaward end of the jetty.

Small vessels with local knowledge can anchor, in a depth of 5.5m, between Cape Burr and the jetty, with Cape Burr bearing 162°.

Dutton Bay (34°05'S., 136°24'E.), formed by a slight curve in the coast between Cape Burr and a sandy point about 11 miles to the NE, consists of sandy bays and cliffs. The cliffs along this stretch of coast are higher than those S of Cape Burr, and the country immediately behind the cliffs is lower and covered with dense scrub. The land behind the sandy point mentioned above is very low.

The 10m curve lies about 1.75 miles off the N and S parts of the bay, but in the middle of the bay, where the cliffs are highest, there are depths of more than 9.1m about 0.5 mile offshore.

Vessels with local knowledge can anchor on the bank in the N part of Dutton Bay, in a depth of 5.5m, sand, 1 mile offshore, with Cape Driver bearing 043° and the SW extremity of the long beach, 7.75 miles N of Port Neill, bearing 263°.

7.79 Cape Driver (33°57'S., 136°35'E.), a broad point 16m high, with rocks around its seaward face, lies 5 miles NE of the N point of Dutton Bay. A red cliffy point, of similar height and appearance to Cape Driver, lies 2 miles SW of Cape Driver.

Elbow Hill (33°43'S., 136°48'E.), which rises to a height of 216m about 6.5 miles NNE of Gibbon Point, appears by itself on the extreme right to the NE. Triple Hill, the first conspicuous summit W of Elbow Hill, rises to a height of 283m, in three summits of almost equal height, about 9 miles NW of Gibbon Point.

In clear weather, two ranges can be seen WSW of Triple Hill; the most conspicuous part of these ranges is a summit which rises to a sharp peak, 408m high, about 16.5 miles NW of Gibbon Point. The land to the SW of these ranges is much lower, and there are no conspicuous peaks as far as Mount Priscilla.

Mount Priscilla rises to a sharp cone, about 244m high, 12 miles NW of Cape Driver. Cone Hill and a ridge about 1 mile long rise to elevations of 122m midway between Mount Priscilla and Cape Driver.

Towards the W and SW, there is nothing conspicuous to be seen except Mount Hill, which may be seen if it is sufficiently clear. The land immediately behind the coast consists of low rises covered with dense scrub, and is barely higher than the cliffs or coastal sand hills.

7.80 Arno Bay (Salt Creek Cove) (33°55'S., 136°35'E.) indents the coast between a sandy point about 0.5 mile N of Cape Driver and another similar point about 1.5 miles farther N. A reef, which dries, extends 0.2 mile from the S point of the bay; a similar reef extends 0.3 mile SE from the N point of the bay. A sunken rock lies about 0.2 mile SW of the extremity of the latter reef.

A salt creek discharges into the SW part of the bay. A pier, with a depth of 3.7m alongside its outer end, extends from the shore close N of the creek, but is closed to commercial shipping.

Anchorage can be taken by small vessels with local knowledge, in a depth of 5.8m, sand, with Cape Driver bearing 195°, distant 1.25 miles, and the mouth of the salt creek bearing 257°. Shelter is provided from N to SW winds.

A sandy bight is formed in the coast between the N point of Arno Bay and a position about 1.75 miles NE. From this position, the coast extends NE for 9 miles to Gibbon Point. The first 5.5 miles of this coast is cliffy with an occasional sand hill, and the remaining 3.5 miles consists of a sandy beach backed by low sand hills. A green hill, 45m high, rises on the highest part of the cliffy coast, about 0.75 mile NE of the SW end of the cliffs.

All of the dangers between Arno Bay and Gibbon Point are contained within the 10m curve, which lies about 0.5 mile offshore. A marine farm is situated here.

7.81 Gibbon Point (33°50'S., 136°47'E.), which lies about 12.25 miles NE of Cape Driver, consists of a sandy point, 16.8m high, with drying rocks on either side.

Port Gibbon (33°49'S., 136°49'E.) lies in a bight between Gibbon Point and a low, rocky point about 3.75 miles NE. The S half of the bight consists of low, red sandy beach backed by low sand hills.

A jetty, 60m long with a depth of 2.1m alongside, extends from the shore about 2 miles NNE of Gibbon Point. This jetty is now closed to commercial shipping.

Anchorage for small vessels with local knowledge can be taken, in a depth of 6.4m, with Gibbon Point bearing 229°, distant 0.5 mile. Shelter is provided against W winds.

The coast between Port Gibbon and Germein Point, the SW entrance point of Franklin Harbor, about 7 miles ENE, is sandy.

7.82 Franklin Harbor (33°44'S., 136°57'E.) is a large landlocked body of water which is half-filled with drying sand banks; it is available only for vessels of not more than 2.4m draft, to which it offers shelter in all weather.

The harbor is entered over a bar that lies about 1.25 miles seaward of the entrance between Germein Point and Victoria Point, 1.25 miles to the NE. An intricate channel, marked by beacons and indicated by ranges, leads to the town of Cowell about 4 miles NW of Germein Point.

The shores of the harbor are generally very low, swampy, and covered with mangroves, except in the NE corner, where there is a bare sandy beach.

A narrow passage, with depths of 2.4 to 4.9m, leads from the main channel in the vicinity of Cowell through drying sand banks to a large pool that forms the SW part of the harbor that has depths of 2.4 to 4.3m.

With the exception of the low sandy beach that extends SW for about 5 miles from Germein Point, the land between the SE side of this pool and the sea is swampy and nearly covers at spring tides.

Entrance Island fronts the harbor entrance about 0.75 mile within the entrance points. The island is infested with highly-venemous Death adders.

Germein Point (Germain Point) (33°45'S., 136°58'E.) is low and composed of masses of sand and weed which shift about from time to time. A spit, with depths of 0.6 to 1.4m, extends about 0.3 mile E and 1.25 miles SE from the E end of the point;

this spit forms the W side of the bar. There are depths of less than 1.8m within 230m of the N side of the point. An obstruction lies about 1.75 miles S of Germein Point.

Victoria Point (33°45'S., 136°59'E.), the NE entrance point of Franklin Harbor, has a red cliff, 15.2m high, for a sea face. A drying bank, composed of sand and reefs, extends about 0.5 mile W and 0.75 mile S from the point, and a shoal, with depths of less than 1.2m, extends 0.75 mile farther S from the drying bank. This foul ground forms the E side of the bar. The underwater remains of a beacon lie about 1.5 miles S of Victoria Point.

Cowell (33°41'S., 136°56'E.), a small town and fishing port, is situated in a gap in the mangroves on the W side of the N part of the harbor. The town jetty consists of a causeway extending 0.25 mile E from the shore at Cowell. New Jetty extends 320m SE from the head of the causeway and has a depth alongside of 3m. A light is shown from the head of the jetty. Old Jetty extends 147m E from the head of the causeway.

7.83 The coast between Victoria Point and a sand hill at the entrance of a swamp about 3.5 miles ENE is very low, with the exception of one wooded rise. From the sand hill, the coast extends E for 6 miles to a very low point and then NE for 2.5 miles to Shoalwater Point. Three wooded rises stand 7 miles ENE of Victoria Point; off these rises, the edge of the drying bank lies a little over 1 mile from the beach. From Victoria Point and up to 4 miles to the E, the 10m curve lies 2 miles offshore; from there to Shoalwater Point, it lies from 3 to 4 miles offshore. The majority of coastal dangers are contained within this curve. A dangerous wreck lies 3 miles SE of Victoria Point.

Shoalwater Point (33°40'S., 137°12'E.) is not more than 3m high and backed by swampy land up to 15 miles inland. The shore bank dries up to 1.5 miles offshore and there are depths of less than 9.1m within 4 miles offshore. A conspicuous house stands about 1 mile inland of Shoalwater Point. A light is shown at the point and a beacon stands about 2.5 miles SSE of the light structure marking the shore bank.

At a distance of about 3 miles off Shoalwater Point, the flood sets NE and the ebb sets SW, at a rate of about 2 knots.

Good anchorage can be taken anywhere on the bank off Shoalwater Point, in depths of 3.7 to 9.1m, good holding ground. The coast between Shoalwater Point and Plank Point, about 15 miles NNE, never rises higher than 6.1m. A drying sand bank extends about 1 mile off this coast; depths of less than 9.1m are formed up to 5 miles offshore.

Clan Macdougall Shoal (33°53'S., 137°13'E.), with a depth of 10.6m, lies 11 miles S of Shoalwater Point beacon.

Dillon Shoal (33°49'S., 137°08'E.), with a least depth of 11.6m, lies about 8.5 miles SSW of Shoalwater Point beacon. A shoal, with a least depth of 3m, lies with its outer edge about 5 miles offshore, about 11.25 miles NE of Shoalwater Point beacon. Depths of 9.1m and less extend about 2 miles SSE from this shoal. A shoal, with a least depth of 7.6m, lies 6 miles ESE of Shoalwater Point beacon.

Plank Point (33°27'S., 137°21'E.) may be easily identified by the obelisk on it. The point lies close to the northernmost of three prominent sand hills. A lighted beacon stands about 6 miles SE of Plank Point and marks Plank Shoal; this shoal lies 7 miles ESE of the obelisk on Plank Point and is 2.5 miles in extent, with a least depth of 8.8m.

The coast from Plank Point extends in a general NNE direction for 21 miles to the foot of Mount Young and forms a shallow bay close S of the mount. This section of coast is bordered by a shallow bank that extends about 2 miles offshore in places and is steep-to.

A shoal area, about 0.75 mile in extent, with depths of about 10m, lies 5 miles offshore about 9 miles NNE of Plank Point. A 5.2m patch lies about 5 miles NE of Plank Point.

7.84 **Mount Young** (33°06'S., 137°29'E.), about 22 miles NNE of Plank Point, is the most conspicuous feature of this part of Spencer Gulf; it rises steeply to an elevation of 135m about 1 mile inland. When viewed from a distance, it appears as a double peak. The land between it and the coast is swampy. Mount Young has been reported to be a good radar target at distances up to 10 miles.

The country inland of Mount Young is an extensive plain gradually rising to the W and is covered with stunted scrub. Mount Middleback, 457m high, stands 19 miles WSW of Mount Young. This mount and the surrounding ranges are too far distant to be of any use to navigation. An aeronautical radiobeacon is situated about 3 miles NE of Mount Young.

Western Shoal (33°09'S., 127°32'E.), with depths of less than 5.5m, extends about 5 miles offshore in the vicinity of Mount Young. A part of the shoal, about 3.5 miles S of Mount Young, dries; depths of less than 1.8m are formed up to 3 miles E of the drying patch. A lighted beacon stands about 2 miles SE of Western Shoal.

The coast between Mount Young and Hummock Hill, about 6.5 miles NE, is very low and swampy for some distance inland, and is fringed by mangroves. Drying sand flats extend from 0.5 to 1 mile offshore along this section of coast.

Hummock Hill (33°02'S., 137°36'E.), about 6.5 miles NE of Mount Young, is a grassy, round hill that rises to an elevation of 61m a short distance inland. A conspicuous metal framework tower, 78m high, stands 0.75 mile WNW of Hummock Hill.

Mount Laura (33°00'S., 137°31'E.), a conspicuous sharp wedge-shaped hill with a nearly perpendicular W face, is 182m high and is located 4 miles NW of Hummocks Hill.

7.85 **Port Whyalla** (33°02'S., 137°36'E.) (World Port Index No. 54320) is one of the major ports of call in Spencer Gulf; it consists of an inner harbor and an outer harbor, both approached through dredged channels marked by lighted beacons and indicated by ranges. The berthing facilities are situated in the SW part of False Bay. Port Whyalla is a first port of entry.

Winds—Weather.—The climate is hot and dry. The warmest weather is from November to March. South of the port, the heat is modified by the sea breeze. July and August are the coldest months. The prevailing winds are from the SW.

Tides—Currents.—The tide rises 2.5m at springs and 1.5m at neaps. About 0.5 mile offshore, in the vicinity of Hummock Hill, the flood sets N and the ebb sets S. Off Black Point, the flood sets E and the ebb sets W.

Depths—Limitations.—The Preferred Route to Whyalla from the Spencer Gulf is charted as far S as in the vicinity of 15

miles W of Cape Elizabeth. The route is approximately 77 miles long from its commencement off Cape Elizabeth to the entrance buoy 6.5 miles SSE of Port Whyalla.The tracks shown have not been surveyed in accordance with IMO standards for recommended tracks, but are the preferred routes for vessels with regard to the charted depths. A least depth of 20m is charted along this route.

Outer Harbor (South Harbor) consists of two jetties. The N jetty extends ESE from the coast at the foot of Hummock Hill. The ore berth, on the N side of the outer end of the N jetty, is dredged to a depth of 11.6m and is 250m long. A dolphin to assist vessels in turning lies off the head of the jetty. The maximum length of a vessel permitted at the berth is 250m.

The jetty S of the ore jetty is lighted and has alongside depths of less than 2m

The approach channel, dredged to a depth of 10.7m, is marked by a lighted beacons; the center line of the channel is indicated by lighted beacons, in range 280°.

The channel, leading in a 251° direction toward the ore jetty and dredged to a depth of 7.6m, is unmarked.

Inner Harbor (North Harbor) is located 1 mile N of Outer Harbor and is entered through a channel dredged to a depth of 10m. The sides of this channel are marked by lighted beacons; the alignment of the channel is indicated by lighted beacons, in range 306.5 °.

Main Harbor Wharf (Blast Furnace Wharf), on the N side of Inner Harbor, is 700m long, with four berths having a depth of 10.7m alongside, including one berth for ro-ro traffic. The main wharf is equipped with loading facilities for bulk cargo, coal, limestone, and salt.

There is a berth, 180m long, on the S side of the basin used by the shipyard.

Vessels up to 69,000 dwt can be accommodated at Port Whyalla.

One Steel Whyalla Steelworks has a floating offshore terminal vessel in operation at Whyalla consisting of the “Spencer Gulf,” a Floating Offshore Transfer Barge (FOTB), which is serviced by the transfer barges “Middleback” and “Barngala.”

Aspect.—Several buildings and a conspicuous convoluted blast furnace stand on the NE side of Inner Harbor. A radio tower stands at the seaward corner of the Main Wharf.

A high radio tower stands on high ground about 1 mile WNW of the ore-loading jetty. A hospital is situated 0.75 mile WNW of Hummock Hill.

Radar navigation has been reported to be good within 15 miles of Whyalla.

Pilotage.—Pilotage is compulsory for all non-exempt vessels and vessels over 35m in length, unless performing tansshipment activities.. Pilots board in the vicinity of Whyalla Pilot Boarding Ground, which is situated approximately 1.7 miles SE of Lighted Beacon No. 1 in position 33°03.45’S., 137°39.00’E.

The request for pilot and ETA should be made 48 hours and 24 hours in advance. The signal for a pilot should be displayed when within at least 10 miles of Port Whyalla. The pilot vessel is equipped with radiotelephone. There is a Port Radio Station at Port Whyalla.

After being loaded at the FOTB, cape-size vessels with a draft of more than 16m and heading S must undertake the voyage with a pilot licensed by the South Australian Government for this particular outbound trip. Pilotage will continue to at least a point as far S as Wallaroo. Pilotage should be arranged by the vessel’s owner or agent.

Port Whyalla — Contact Information	
Pilots	
Call sign	Whyalla Pilot
VHF	VHF channel 8 and 16
Telephone	618-864-50924 (Whyalla Pilot)
Telephone	618-844-70652 (Flinders Ports Pilotage Coordinator)
Port Operations	
Telephone	618-863-21455
E-mail	dtei.enquiriesadministrator@sa.gov.au
Web site	http://www.dpti.sa.gov.au

Regulations.—Vessels must have an UKC of 10 per cent of the maximum draft. If the vessel’s draft is less than 6.53m, then a minimum UKC of 0.76m is required.

For trans-shipping operations, once moored, vessels will be provided UHF radio equipment to enable communications between the vessel and the FOTB.

Signals.—Berthing signals are displayed from a tower at the outer end of the Inner Harbor, as follows:

Signal	Meaning
One intensified red light	Vessel may not enter berth.
One intensified green light	Vessel may enter berth.

Berthing signals are also shown from the top of the ore loader at the Outer Harbor Ore Jetty, as follows:

Signal	Meaning
Day signal	
Two yellow balls	Vessel may berth.
One yellow ball	Vessel may not berth.
Night signal	
One green light or neon strip	Vessel may berth.
One red light or neon strip	Vessel may not berth.

Anchorage.—Anchorage can be taken in a depth of 8.2m, clay and mud, with the summit of Hummock Hill bearing 245°, distant 1.5 miles.

The quarantine anchorage lies close off the outer beacons on the 306.5 ° range line and about 2 miles ESE of the ore jetty. At least 48 hours notice for a request for pratique is required.

7.86 False Bay (33°00'S., 137°40'E.) is an indentation in the coast between Hummock Hill and Black Point, about 7

miles ENE. The land at the head of the bay is very low and swampy for many miles inland. The bay shore is bordered by a drying sand flat which extends about 1.5 miles offshore in places.

East of Hummock Hill and S of Black Point, the 5m curve lies close offshore but between the two places it lies up to 2.5 miles offshore; the 10m curve lies from about 1 to 2 miles farther offshore than the 5m curve.

A dumping ground for solid ballast and a spoil ground are situated within the bay and can best be seen on the chart. An obstruction, least depth 2.8m, is situated in the NW corner of the spoil ground.

Black Point (32°59'S., 137°43'E.), a fairly steep-to limestone cliff about 15.2m high, lies 7 miles ENE of Hummock Hill. Although the point is light-colored, its overhanging face is nearly always shadowed and appears black.

The coast between Black Point and Point Lowly, about 3.3 miles E and marked by a light, is bordered by a drying rocky ledge that extends about 0.3 mile offshore in places. Off this section of coast, the 10m curve varies from about 1.5 miles offshore S of Black Point to about 0.25 mile offshore S of Lowly Point.

7.87 Port Bonython (33°00'S., 137°46'E.) (World Port Index No. 54325), situated close E of Stony Point, about 2 miles E of Black Point, is an oil and LPG terminal.

Tides—Currents.—In the area off the berth, the spring floods reach 1.25 knots and the ebbs 1.75 knots; both flood and ebb set slightly across the line of the berth towards the shore.

Depths—Limitations.—The port consists of a jetty 1.25 miles long, with a T-head wharf 340m long, and has a depth alongside of 18m. The jetty will accommodate tankers up to 110,000 dwt; gas carriers of up to 45,0000 dwt may be accommodated. The maximum departure draft is 16m.

A submarine pipeline is laid from the T-head NNE to the shore. A swinging basin, with a least depth of 20m, extends 0.25 mile from the jetty.

The approach channel to the jetty lies E of Fairway Bank and is marked by lighted buoys. The least charted depth in the channel is 18.4m.

Pilotage.—Pilotage is compulsory for all non-exempt vessels. Vessels with a draft of 14m or greater board the pilot 5 miles SSE of Whyalla Entrance Lighted Beacon No. 1. Vessels having a draft less than 14m board pilots either in the vicinity of the Port Pirie Pilot Boarding Ground or the Whyalla Pilot Boarding Ground. The port is equipped with VHF radio.

Regulations.—The following regulations apply to vessels planning on arriving Port Bonython:

1. Navigation is permitted during daylight hours only.
2. Vessels should send their ETA through their agent 48 hours and 24 hours in advance, stating the following:
   a. Draft.
   b. Last port of call.
   c. Whether ballast is clean and hull is sound.
3. A restricted area surrounds the T-head jetty. Berth operation lights indicate vessels are prohibited from entering the area without prior permission from Port Bonython.

Anchorage.—Anchorage is available, in 16m, sand, good holding ground, near the pilot boarding position.

Spencer Gulf—East Side—The Althorpe Islands and Off-lying Dangers

7.88 The **Althorpe Islands** (35°23'S., 136°51'E.) consists of a group of three islands, the southernmost of the group lying about 4.5 miles S of Cape Spencer, the E entrance point of Spencer Gulf. The group has been reported to be a good radar target from distances of up to 16 miles.

Althorpe Island, the S and largest, lies 4.5 miles S of Cape Spencer, with Haystack Island, 3.75 miles NE, and Seal Island, 3.5 miles ENE of it.

Haystack Island (35°19'S., 136°54'E.) and Seal Island are bare rocks, 43m and 30m high, respectively. A submerged rock, which generally breaks, lies 0.25 mile N of Seal Island. Althorpe Island is 93m high, nearly flat-topped, with steep sides, and has a cleft across its S part which is visible from both E and W.

Several rocks and islets lie within 1.5 miles off the NW side of Althorpe Island and the outer rock breaks. A light is shown from the center of Althorpe Island.

A range consisting of a light situated on the NW side of the island and the one at the center leads on a bearing of 157° between the mainland and the off-lying dangers at the SW extremity of the Yorke Peninsula.

Anchorage, sheltered from W gales, can be taken, in depths of 14.6 to 18.3m, sand, off a remarkable yellow overhanging cliff on the E side of Althorpe Island.

A jetty, with depths of 3.4m at its outer end, extends from the NE side of the island.

Southwest Rock (35°20'S., 136°49'E.), which breaks during a heavy swell or in W gales, has a depth of 3m, and lies 3.25 miles NW of Althorpe Island Light.

7.89 Emmes Reef (35°18'S., 136°49'E.), almost 2 miles NNE of Southwest Rock, is a steep-to rocky patch about 2.1m high. The sea breaks heavily on this rock.

Brook Shoal (35°19'S., 136°48'E.), with a depth of 8.8m, lies about 0.75 mile WSW of Emmes Reef.

Iron Whyalla Shoal (35°18'S., 136°47'E.), with a depth of 11.3m and on which the sea breaks, lies 1.75 miles WNW of Emmes Reef; the sea also breaks close NW of this shoal during heavy SW swells.

A shoal, with a depth of 9.1m, lies 2 miles NNW of Iron Whyalla Shoal. This shoal breaks with a SW swell.

Tides—Currents.—South of the Althorpe Islands, the flood sets NE and divides off Cape Spencer, with the E part setting along the coast toward Marion Bay, and the W part setting NW, around West Cape, at a rate of 1.5 knots.

Directions.—Small vessels with local knowledge may pass between Haystack Island and Cape Spencer; Packman Shoal (see paragraph 7.90) lies close to this route.

Vessels approaching from a position midway between Althorpe Island and Seal Island should steer to pass midway between Emmes Reef and the reef extending off Reef Head (see paragraph 7.90).

Emmes Reef is very close to the track of vessels using the inner route and the greatest care should be exercised when navigating in this vicinity.

Spencer Gulf—East Side

7.90 Cape Spencer (35°18'S., 136°53'E.), 79m high, is the E entrance point of Spencer Gulf. When viewed from the S, Cape Spencer appears as a cone with a ledge of rocks at its base. Together with Reef Head and West Cape, two cliffy points lying 2 and 4 miles, respectively, NW, it forms the SW end of the Yorke Peninsula, which separates Spencer Gulf from the Gulf St. Vincent. Cape Spencer has been reported to be a good radar target at distances up to 15 miles. A light is shown on the S extremity of the cape.

Packman Shoal (35°19'S., 136°53'E.), with a depth of 11.6m, lies about 1 mile S of Cape Spencer. A rocky shoal, with a depth of 13.1m, lies about 1.5 miles E of Packman Shoal.

Reef Head (35°17'S., 136°51'E.), about 2 miles WNW of Cape Spencer, has a reef extending about 0.4 mile SW from it. Foul ground lies in the vicinity.

West Cape (35°15'S., 136°49'E.), lies 2.25 miles NNW of Reef Head. A reef of sunken rocks, which breaks during SW gales, extends about 0.5 mile seaward from a cliffy head close S of a point about 0.75 mile NNE of West Cape. West Cape Light is shown from the cape.

Lawry Shoal (35°15'S., 136°46'E.), with a depth of 15.2m, lies 2.75 miles WNW of West Cape.

Waller Shoal (35°13'S., 136°48'E.), with a least depth of 10.4m, lies 2.25 miles NNW of West Cape. An 18.3m patch lies about 3.75 miles NNW of West Cape.

7.91 Pondalowie Bay (35°14'S., 136°50'E.), a small indentation in the coast, lies between a point located 0.75 mile NNE of West Cape and Royston Head, about 2.75 miles farther NNE. The E shore of the bay consists of a sandy beach backed by sand hills. Three islets, dark-colored on their W sides, front Pondalowie Bay. With the sun behind them, these islets appear quite black against the sand hills on the shore.

The S islet is small and is joined to the S point of the bay by drying ground. A light is shown on the S islet.

A rock, with a depth of 2.1m and which breaks at times during SW gales, lies close inside the bay entrance, about 0.25 mile NE of the outer point of the S islet.

The middle islet, about 0.75 mile N of the S islet, is 31m high and separated from the mainland by a rocky channel. A drying reef extends 0.4 mile from its W point; a similar reef extends 0.1 mile from its S side.

The N islet, 38m high, is close to Royston Head and is connected to it by a drying reef.

The S part of Pondalowie Bay provides anchorage from winds between N through E to WSW, in a depth of about 6.4m, about 0.25 mile offshore, over a bottom of smooth limestone with a thin cover of sand. The holding ground is poor.

The entrance of Pondalowie Bay is about 0.75 mile wide between the S and middle islets; there are depths of 11m in it. Small vessels, entering the bay between the middle and S islets, should steer with the high sand hill just open N of the S islet, bearing 105°, in order to avoid the sunken rock NE of the S islet and the reef extending S from the middle islet. This course passes the steep-to S islet at a distance of about 0.1 mile, but local knowledge is necessary.

Royston Head (35°12'S., 136°50'E.), 59m high, lies 3.25 miles NNE of West Cape and is cliffy. The coast between Royston Head and a point about 8 miles to the NE is composed of small sandy beaches and rocky points.

Formby Bay, a small bight, lies between the point about 8 miles NE of Royston Head and Daly Head, 4 miles to the N. This bay has a sandy beach about 4 miles long. High sand hills back this section of coast and most of the rocky points have rocks which extend between 0.1 and 0.2 mile from them.

A heavily-breaking rock lies 1 mile offshore 3.5 miles NNE of Royston Head. During E winds and in very fine weather this rock does not break. A 13.7m shoal patch, over which tide rips occur, lies about 4.5 miles NNE of Royston Head.

7.92 Daly Head (35°02'S., 136°56'E.), almost 11 miles NNE of Royston Head, is a steep rocky point which has a grassy summit, 63m high. This point has been reported to be a good radar target at distances of up to 14 miles.

A reef, part of which is 1.2m high, extends about 0.5 mile seaward from the head.

The coast between Daly Head and Corny Point, about 9 miles NNE, is generally sandy and backed by sand hills. This section of coast forms two bights, with Berry Bay being the N bight.

The coast NE of Daly Head is low and marked by salt swamps and small grassy plains. Two reefs extend about 0.3 mile seaward from a rocky point about 1 mile NE of Daly Head; a number of rocks lie about 0.25 mile farther NE. A rock, with a depth of less than 1.8m, lies off a rocky point 4 miles NE of Daly Head.

7.93 Webb Rock (34°58'S., 136°55'E.) lies about 3 miles N of Daly Head and 2.25 miles offshore. A knob on the outer part of the rock is awash and there are usually heavy breakers over it;. In the summer, during long continued E winds, it breaks only at intervals, but then only slightly. Passage E of Webb Rock should never be attempted except by those completely familiar with the coast. A rock, with a depth of 3.7m, has been reported to lie about 1.25 miles ENE of Webb Rock. Two low, above-water rocks lie in this vicinity.

Corny Point (34°54'S., 137°01'E.), a sloping rocky double projection, lies about 9 miles NNE of Daly Head. The coast on the N side is low and sandy whereas the coast on the S side is higher than the point itself. Corny Point has been reported to be a good radar target at distances of up to 11 miles. A light is shown from the point.

Some detached rocks lie not more than 0.25 mile offshore SW of Corny Point, but it is otherwise free of dangers. The point may safely be rounded at a distance of 0.5 mile, but the depths shoal rapidly E of the point.

7.94 Hardwicke Bay (34°40'S., 137°20'E.) lies between Corny Point and the S extremity of Wardang Island, about 28 miles NE.

Port Turton is situated in the SE part of the bay; Port Minlacowie and Port Rickaby are situated on the E shore; and Port Victoria is situated at the N end.

The bay has general depths of 14.6 to 20.1m, but between 5 and 10 miles SW of Wardang Island, the depths are very

irregular. The rocky bottom raises a disturbed sea in the bay during W gales.

Anchorage, sheltered from all S winds, can be taken in many parts of the bay. These S winds appear to be the only ones with much strength. Although there is a rocky bottom in all parts of the bay, vessels with a good scope of chain should anchor safely.

7.95 Hardwicke Bay—South side.—The coast between Corny Point and Souttar Point, 12.75 miles E, consists of a sandy beach backed by woodlands. Corny Point Settlement is situated 4 miles E of Corny Point.

A spit, with depths of less than 5.5m, extends 3.75 miles NNW from a low sandy point 8.75 miles E of Corny Point. A shoal with similar depths, which extends 2.5 miles offshore in places, fronts the coast between Corny Point and the above low sandy point. A shoal, with depths of less than 9.1m, and with depths of 6.4m near its outer end, extends 7 miles NE from the N point of the spit.

Anchorage can be taken, in a depth of 8.2m, off Corny Point Settlement, with Corny Point bearing 257°. There is good shelter, good holding ground, and smooth water in a depth of 5m, about 0.5 mile offshore, between the lighted beacon, about 4 miles WNW of Souttar Point, and the point itself.

Souttar Point (34°54'S., 137°17'E.), 12.75 miles E of Corny Point, is marked by a 26m high sand hill, which is partly white. A lighted beacon stands about 4 miles W of the point.

The coast between Souttar Point and Point Turton, a cliffy projection about 4 miles to the ESE, consists of stony beaches and low cliffs.

Mount Gore (35°00'S., 137°16'E.), 101m high, is located 6 miles S of Souttar Point.

Port Turton (34°57'S., 137°21'E.), used exclusively by fishing boats, lies close E of Turton Point. A jetty, with a depth of 3.4m alongside its outer end and marked by a light, extends about 137m from the SE side of the point. The jetty is closed to commercial shipping and is now occasionally used to offload fish catches of salmon and prawns.

A number of rocks, with depths of 0.6 to 1.2m, lie off either side of the jetty and at its extremities.

Anchorage.—Vessels with local knowledge can anchor, in depths of 6.1 to 6.7m, with the jetty bearing 230°, distant 0.3 mile.

Small vessels can anchor, in depths of 3.7 to 4.6m, on the alignment of the jetty, bearing 241°, distant 0.15 mile.

The bottom in the vicinity of Port Turton is so rocky that a broken sea rises very quickly but subsides just as quickly when the wind dies down.

7.96 Hardwicke Bay—East side.—A sandy beach, which extends E and NE from Port Turton for a distance of 5 miles, forms the head of Hardwicke Bay. There is low sandy land between the two wooded ranges S of this beach; this is the narrowest part of the Yorke Peninsula, which is only 9 miles across here.

The coast from the NE end of this sandy beach extends N to Gawler Point, about 26.5 miles NNE of Turton Point. This section of coast consists of sandy beaches and low, rocky points, with a coastal range of sand hills. Behind these hills the land rises gradually to an elevation of about 152m.

7.97 Port Minlacowie (34°51'S., 137°28'E.) is situated almost 8 miles NE of Turton Point. The shore in this vicinity is backed by low sand hills covered with bushes and small trees, and fronted by a ledge of rocks which dry up to a distance of about 0.15 mile offshore. A cairn on the shoreline marks where the root of the former jetty once stood. A number of dangerous rocks, with depths of 0.6 to 3.4m, lie up to about 0.2 mile offshore.

Anchorage can be taken about 0.3 mile offshore in depths of 6.1 to 6.7m or about 0.75 mile offshore in depths of 7.3 to 7.9m. Local knowledge is essential.

Brown Point (34°43'S., 137°29'E.), marked by a white-topped sand hill with trees on it, stands 7 miles N of Port Minlacowie.

7.98 Port Rickaby (34°40'S., 137°30'E.), 10.75 miles N of Port Minlacowie, is fronted by a sandy beach. A jetty, with a depth of 5.5m along its outer end, extends from the shore abreast of Port Rickaby but is no longer used by shipping.

Port Rickaby Jetty

A tree-topped 21m high hill rises 0.25 mile S of the jetty. A rocky point lies almost 0.2 mile N of the root of the jetty; a drying reef lies about 0.1 mile off this rocky point, with a 3m patch lying about 0.15 mile farther seaward.

A sandy beach, which is clear of rocks, lies between the above rocky point and a position about 0.4 mile to the N, from which rocky drying ledges extend 0.4 mile seaward. Two bare sand hills rise behind this beach.

General depths of less than 5.5m extend not more than 0.15 mile off this beach, but a number of rocky patches, with depths of 4.6 to 5.5m, lie about 0.4 mile off the middle of the beach; beyond this the bottom is very irregular, but there are not depths of less than 5.8m.

Anchorage can be taken in, depths of 7.3 to 8.2m, about 0.75 mile offshore, with the 16.8m sand hill with a pole on it bearing 095°.

Small vessels can anchor on the same alignment but closer inshore.

Local knowledge is necessary for both anchorages.

In Hardwicke Bay, the flood current sets N and the ebb current sets S, following the direction of the coast. The offshore currents are stronger than the inshore currents.

Directions.—As a general rule, when approaching any of the ports in Hardwicke Bay, there are depths of more than 9.1m to within a distance of 1 mile of the shore, but off Port Victoria and Turton Point such depths are found much closer inshore.

At night, all dangers will be avoided if vessels anchor immediately upon obtaining depths of less than 9.1m.

Corny Point may be safely rounded at a distance of 0.5 mile, but vessels bound for Port Turton should keep Corny Point bearing less than 237° astern until Mount Gore bears more than 181°, at which time the jetty at Port Turton may be steered for.

Vessels drawing no more than 4.6m may keep Corny Point bearing less than 247°, and when Mount Gore bears more than 163°, steer for the jetty at Port Turton.

When approaching Port Minlacowie, and if drawing more than 3m, keep the outer end of the jetty bearing 125°; when within 0.5 mile of the shore; with a draft exceeding 2.4m, the outer end of the jetty must be kept between the bearings of 050° and 140° to avoid the submerged rocks.

Vessels approaching Port Rickaby should not come within 1 mile of the coast until the sand hill, mentioned above and located almost 0.35 mile N of the root of the jetty, bears between 072° and 140°.

7.99 Port Victoria (34°27'S., 137°28'E.) is the bight at the N end of Hardwicke Bay, E of Wardang Island and E of the peninsula of which Pearce Point is the S extremity.

The port has general depths of 6.4 to 9.1m, but the N and W sides of the port are shallow.

Within the harbor is a jetty, which is closed to commercial traffic, having a depth alongside of 3.4m. A ramp is situated almost 0.75 mile S of the jetty. A light is shown from the head of the jetty. The jetty is popular with recreational fishermen and divers.

Anchorage.—The port provides protection from all winds except those from between SW and S. The holding ground is not good and NW and W gales usually end with a gale from the SW, at which time anchorage becomes dangerous.

The shallow N entrance between Wardang Island and Pearce Point is used by small coastal vessels; otherwise, the port is approached from Hardwicke Bay.

Gawler Point (34°30'S., 137°28'E.), the SE entrance point of Port Victoria, is located 10 miles N of Port Rickaby. The low, sloping grassy point is steep-to on its W side, there being depths of 5.5m at less than 0.1 mile offshore. Drying rocks extend about 0.25 mile N from the point.

Eclipse Rock (34°30'S., 137°28'E.), with a depth of 1.8m, and with depths of less than 3.7m extending for a distance of about 100m from it, lies 0.75 mile N of Gawler Point. The rock is marked by a beacon.

7.100 Wardang Island (Wauraltee Island) (34°32'S., 137°21'E.), with its S point about 6 miles WSW of Gawler Point, rises to a height of 29m near its W side. The island is grass-covered except near the coast. Marine farms established in the offshore waters are best seen on the chart.

Above-water and sunken rocks extend as far as 0.5 mile S from the S part of the island. A light is shown from the summit of the island. Stranded wrecks lie close offshore on the W side of the island, 0.5 mile WNW and 1.5 miles SSW of the light structure. Historic wrecks are protected from unauthorized interference.

The W coast of Wardang Island consists of alternate sandy beaches and rocky points, with sand hills toward the N end of the island, where there are some remarkable cliffy points.

Wardang Island Light

A dangerous wreck lies approximately 0.5 mile off the NE end of the island.

Goose Islet (34°27'S., 137°22'E.), a small grassy islet 27m high, lies about 0.3 mile off the N end of Wardang Island, to which it is connected at LW.

Cormorant Islet lies about 0.1 mile NNE of Goose Islet, to which it is connected at LW. The outer edge of White Rock, which dries, lies about 0.3 mile NNW of Goose Islet. An obstruction, with depths of less than 2.7m over it and the position of which is approximate, lies about 0.1 mile N of White Rock.

The E coast of Wardang Island, with the exception of a red cliff located about 0.75 mile SE of the N extremity of the island, is a continuous sandy beach as far S as Cliff Point, the SE extremity of the island.

A drying sandy spit extends about 3.75 miles ENE from Bird Point, the E extremity of Wardang Island. Three narrow channels intersect this spit.

Caution.—Mariners are warned of the presence of marine farms in the coastal waters surrounding Wardang Island. Marine farms, which may be floating or fixed structures, and their associated moorings should be avoided. The farms are generally marked by buoys or beacons, which may be lit.

7.101 Island Point (34°27'S., 137°25'E.) is a low grassy point with a low islet close off it. It is the NE entrance point of the N entrance to Port Victoria and is connected to the peninsula at low water.

Beatrice Rock, which dries 0.6m, lies about 0.5 mile N of the above low islet at Island Point. A small drying rock lies 0.75 mile WSW of the islet.

Green Islet (34°26'S., 137°25'E.), which is connected to the W side of the above peninsula at LW, lies 1 mile SSW of the above low islet.

Pearce Point (34°28'S., 137°26'E.), the S point of the peninsula, lies 1.25 miles SE of Green Islet.

Rocky Islet (34°29'S., 137°26'E.) lies 0.75 mile S of Pearce Point. There are depths of about 1.8m in a channel that leads N of Rocky Islet and into Port Victoria, but local knowledge is necessary for the use of this channel.

The three channels, which intersect the spit extending ENE from Bird Point, lie between Rocky Islet and Wardang Island. These channels are liable to change, both in position and depth, and local knowledge is necessary to use them. Rocky Islet Channel, the E channel of the three, has a least depth of 2.4m and is used by small coastal craft. It is marked by two red can buoys, with red square topmarks, on its E side.

Anchorage.—Anchorage can be taken, sheltered from all but N and NW winds, in the N entrance of Port Victoria. The best anchorage lies, in a depth of 8.2m, sand and mud, with Goose Islet summit bearing 268° and Bird Point bearing 179°. Smaller vessels may anchor farther S.

Anchorage can be taken by vessels with a draft of 5.5m, in depths of 6.4 to 7m, off Port Victoria Jetty, with the outer end of the jetty bearing 134°, distant not less than 0.5 mile; vessels of greater draft can anchor, in depths of 7.3 to 8.2m, with the outer end of the jetty bearing 095°, distant not less than 1 mile.

With the prior permission of the harbormaster, small vessels unable to go alongside the jetty may anchor, in depths of 3 to 3.7m, with the outer end of the jetty bearing 162°, distant about 0.15 mile.

Tides—Currents.—The mean range of the tide is 0.8m; the spring range is 1.2m.

At the anchorage in the N entrance of Port Victoria, the flood sets N at a rate of about 1.25 knots and the ebb sets S.

In the vicinity of Rocky Islet Channel the flood sets NW and the ebb SE at a rate of 2.5 knots at springs.

7.102 Reef Point (34°24'S., 137°27'E.), lying about 3.25 miles NNE of Island Point, is a low projection with a reddish cliff on its W side and a remarkable white sand patch about 0.4 mile S of it. Drying ledges and a sunken reef extend 0.5 mile NW from it.

A number of detached rocks, which generally break at LW, extend about 2 miles N from the point. The coast between Reef Point and Point Warrenne, about 5.25 miles NNE, is low and forms a sandy shallow bay obstructed by numerous rocks and shoals. A drying flat extends about 0.5 mile offshore in the S part of the bay.

Point Warrenne (Balgowan Point) (34°19'S., 137°29'E.) is a low rocky projection with a grassy summit. A disused jetty extends about 138m W from the point. A reef lies about 0.1 mile W of the jetty.

The coast extends N for 3.25 miles from Point Warrenne to some low red cliffs at the head of a small open bay; this section of coast consists of red cliffs that rise, in one place, to a height of 16.5m.

The coast N of the bay consists of sandy beach extending 4 miles N to some bare white sand hills. From these hills a continuation of the sandy beach extends 3.5 miles NNW to Cape Elizabeth, and is bordered by rocky ledges, which in some places extend up to 0.5 mile offshore.

Directions.—When traveling N up the coast between Island Point and Cape Elizabeth, small vessels usually keep close inshore. Larger vessels should not approach the bay N of Reef Point within a distance of 2 miles, as the depths shoal rapidly, in some places, from 11m to 1.8m.

There is no good holding ground along this coast and anchorage is not recommended.

7.103 Cape Elizabeth (34°08'S., 137°27'E.), a rounded sandy point, lies 11 miles N of Point Warrenne. It is covered with sparse vegetation and has a small cliffy point NE of it. Some bush-covered sand hills, which from seaward appear as separate elevations, the highest being 21.3m high, rise close S of the cape.

The land behind the cape is very low, level, and grassy. A drying ledge extends about 0.3 mile W from Cape Elizabeth. A dangerous rocky patch lies awash about 0.4 mile NW of Cape Elizabeth; the outer edge of this patch lies about 0.4 mile farther NW and is marked by a beacon. A dangerous wreck lies 2 miles WNW of the cape.

The 3.6m channel between the rocky patch and Cape Elizabeth should not be used because the currents are strong and attain a rate of 3 knots.

A rocky patch, with a least depth of 4.1m, lies almost 1.25 miles NNE of Cape Elizabeth,.

Tiparra Bay (34°04'S., 137°30'E.) lies between Cape Elizabeth and Warburton Point, about 8.25 miles NNE. Tiparra Reef divides the entrance into two parts.

Port Hughes lies in the middle of the E shore of the bay; Port Moonta lies about 1.5 miles NNE of Port Hughes.

Tiparra Bay has general depths of 5.5 to 11m. The land in the vicinity of Tiparra Bay presents no prominent features. When viewed from about 10 miles offshore, the outline of the land appears almost straight and uniformly dark in color. The objects on the coast are generally low and are not easily seen.

Tiparra Reef (34°04'S., 137°24'E.) is a bank of sand, 2.5 miles in extent, with depths of less than 5m, that lies in the middle of Tiparra Bay. A limestone ledge, 0.1 mile long in a N-S direction and about 20m wide, that just dries, lies on the SW end of the reef 5 miles NW of Cape Elizabeth. A light is shown from the drying ledge.

Tiparra Reef Light

Two patches, which almost dry, lie on the reef NNE and N of Tiparra Reef Light. Unless the wind force is very high, there is only a slight break on the drying ledge. Some of the shallow parts may show white where the sand is clear of weeds.

When navigating seaward of Tiparra Reef, vessels should keep in depths of not less than 12.8m. The entire S shore of the bay is fronted by drying sand flats. The bight in the SE part of the bay is backed by salt swamps. A sand hill, 30.5m high, is located close to the coast about 4 miles ENE of Cape Elizabeth. Although this hill is partly covered with bushes, it may be identified by a bare space on its side; when viewed from the N part of the bay, this hill appears like a point. A drying rocky ledge extends off a point about 0.75 mile NNE of

the 30.5m sand hill, and a sandy beach lies between this drying ledge and Middle Point.

7.104 Middle Point (34°05'S., 137°33'E.), almost 6 miles NE of Cape Elizabeth, is a rocky projection with a smooth grassy summit. The small town of Port Hughes lies on Middle Point.

The coast up to 2 miles NNE of Middle Point consists of sandy red cliffs fronted by rocky ledges that dry. Because of the rolling character of the country in this vicinity, the buildings of the Moonta Mines, about 3 miles inland, can be seen from a W direction. A 32m hill stands close to the coast almost 1.5 miles NNE of Middle Point; Port Moonta lies close N of this hill. A sandy beach extends NNW for about 2.5 miles from Port Moonta to the inner end of Warburton Point.

Warburton Point (Warburto Point) (34°01'S., 137°30'E.), about 4.25 miles NNW of Middle Point, is a rocky projection that extends about 1.5 miles W from the mainland. It is 6.1m high and is fringed by mangroves along each of its sides. The point is marked by a light.

A shoal, with depths of less than 5m, extends about 1.75 miles S, almost 3.5 miles W, and 2.5 miles NW from Warburton Point. The S part of this shoal has been reported to be extending S.

A shoal, with a depth of 5.5m, lies about 4 miles SW of Warburton Point.

The tidal currents in the vicinity of Cape Elizabeth, Tiparra Reef, and Warburton Point are irregular and rapid. Off Cape Elizabeth, the flood sets NW and the ebb SW, at a rate of 2 knots. Over Tiparra Reef, the flood sets NNE and the ebb SSW, at a rate of 2 knots; outside the reef, the currents set in a more N and S direction. In Tiparra Bay, the currents generally follow the direction of the shore; the inshore currents are not as strong as those outside the bay.

Anchorage.—Vessels may anchor about 0.5 mile off Port Hughes, in depths of 7.3 to 9.1m, or about 1 mile off Port Moonta in the same depths.

During SW gales, good anchorage can be taken, in a depth of 8.2m, mud, in the S part of Tipara Bay, with the N end of Cape Elizabeth bearing 238°, and the 30.5m sandhill about 4 miles ENE of that cape bearing 092°.

Directions.—A vessel approaching from the W should not bring Cape Elizabeth to bear more than 128° until at least 1 mile S of Tiparra Reef Light. A course can then be steered for Port Hughes Jetty or the anchorage.

Small craft approaching from the S, having passed W of the buoy off Cape Elizabeth, may enter the bay in a least depth of 7.3m, with the 30m sand hill 4 miles ENE of Cape Elizabeth bearing 084°. Local knowledge is essential.

Vessels of light draft may use the entrance between the bank extending from Warburton Point and Tiparra Reef; the 30m sand hill is a good mark on which to steer. Care should be taken to avoid the detached 5.5m patch 4 miles SW of Warburton Point.

If passing through Tiparra Bay, using the inner route to Wallaroo, pass W of the beacon off Cape Elizabeth, 2 miles E of Tiparra Reef Light, and 0.5 mile W of the W extremity of the 5m bank extending from Warburton Point. The depths on this track are not less than 7.3m.

7.105 Port Hughes (34°05'S., 137°33'E.), a small township and fishing port, lies on Middle Point. Moonta, an old copper-mining center and the center of a large wheat-growing area, lies 3 miles inland from Port Hughes. Port Hughes Jetty extends 412m from Middle Point and has a depth of 6.1m alongside its head. The jetty is closed to commercial shipping.

Port Moonta (34°04'S., 137°33'E.), another fishing port, situated 1.5 miles NNE of Port Hughes, has a jetty 503m long, with a depth of 2.1m alongside.

The coast between Warburton Point and Hughes Point, about 6.25 miles NE, consists of a low, sandy beach partly fringed by mangroves. Rocky ledges and drying sand flats front this section of coast. These drying flats extend as far as 1.5 miles offshore at Bird Reef, a rocky ledge located on the outer edge of these flats about 2.25 miles NNE of Warburton Point. East of Bird Reef, the flat narrows and its outer edge lies close offshore at Hughes Point. Bird Reef is awash at HW.

The **Bird Islands**, between Bird Reef and the coast, are low and covered with mangroves. Bird Islands have been reported to be a good radar target at distances up to 22 miles.

7.106 Walrus Rock (34°00'S., 137°30'E.), a dangerous rocky patch with depths of not more 0.3m in places, lies almost 1 mile NNW of Warburton Point. Although there are strong tide rips over the rock, the sea does not break over it in ordinary weather. A small rock, with a depth of 1.2m, lies almost 1 mile NW of Walrus Rock. The outer edge of the large shoal, with depths of less than 5m, that extends from Warburton Point, lies up to 2.5 miles offshore NW of that point. The outer edge then follows a general NE trend of the coast until the shoal terminates in a narrow spit about 2 miles W of Hughes Point.

A small 5m patch lies about 2.5 miles WSW of Hughes Point.

Hughes Point (33°56'S., 137°36'E.), about 6.25 miles NE of Warburton Point, is a red cliffy projection, 7.6m high; a 15.8m hill rises close to the coast about 0.25 mile SW of the point. Hughes Point cannot be distinguished as a point, and appears only as a small red patch on the coast, until viewed from a position near the anchorage off Wallaroo.

Wallaroo Bay (33°55'S., 137°35'E.), is formed by a bight in the coast which lies between Point Hughes and Point Riley, about 3.5 miles to the N. The town of Wallaroo lies on the SE shore of this bay.

Point Riley (33°53'S., 137°36'E.), 13.7m high, is a cliffy projection fringed by rocky ledges that extend about 0.25 mile offshore. This point is not easily made out until well in, either N or S of it, because the land which backs it is much higher than the point.

7.107 Wallaroo (33°56'S., 137°37'E.) (World Port Index No. 54280), which contains the town and port facilities for the loading of bulk cargo, lies in the SE part of Wallaroo Bay. It is a small commercial port and a first port of entry. Alongside berthing facilities are provided for handling ocean-going vessels.

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Winds—Weather.—There are no prevailing winds from August to November; the wind shifts around the compass every 3 or 4 days. After a day of calms, or land and sea breezes, the former from the E, and the latter from the SW, the wind may shift to the N, accompanied by a clear sky, a falling barometer, and the land on the opposite side of Spencer Gulf coming into view because of the mirage effect.

If the wind shifts to the NW, and the sky becomes overcast, and the barometer does not rise, a gale may be expected. When the barometer begins to rise, the wind shifts to the W or SW and the sky becomes clear.

When the wind shifts to SW or W and then back to NW again, some heavy weather, which sometimes lasts two or three days, can be expected.

The N wind is very hot, even in the winter, and the shift of the wind to the W sometimes brings heavy squalls accompanied by thunder and lightning. If the wind shifts from N to SW, and does not shift back, and the barometer suddenly rises, the weather remains fine.

From November to March the prevailing winds are from the S or SW, sometimes continuing for weeks on end in Spencer Gulf, with land and sea breezes inshore. The SW wind is sometimes very fresh, but occasionally it is interrupted by a day or two of hot winds from the N. The barometer is a very good guide, and rises rapidly as a gale shifts to the SW and the wind soon subsides.

Tides—Currents.—The mean range of the tide is 0.8m; the spring range is 1.5m.

Outside a line drawn between Hughes Point and Point Riley, the flood sets to the NE and the ebb sets to the SW; a W gale causes a N setting current of long duration, and stops the S setting current altogether. The tidal currents are barely felt at the anchorage NW of New Jetty, but a strong W wind causes a set to windward.

Depths—Limitations.—A broad flat, with depths of less than 9.1m, fronts the bay to a distance of about 4 miles from its head; the seaward edge of this flat is fairly steep-to. The outer edge of this flat forms a bar, with a least depth of 8.2m in the fairway of the channel over it. East of this bar, the depths increase slightly and there are depths of over 9m about 1 mile W of the head of the bay. The 5m curve lies from 0.15 to 0.4 mile off the shores of the bay.

The dredged approach channel to Wallaroo is approximately 4 miles long, with a depth of 8.5m. It is marked on its seaward side by Entrance Lighted Beacon, then by lighted beacons, mostly in pairs.

Moonta Shoal (33°54'S., 137°36'E.), with a depth of 4.6m, lies to the N of the fairway, about 1.5 miles SW of Point Riley.

Riley Shoal (33°54'S., 137°35'E.), with a least depth of 3.6m, lies about 1 mile WSW of Point Riley. The shoal is composed of hard sand, and its shallowest part appears white because of the absence of weed, which covers the sandy bottom in other parts of the bay.

The depths for some distance seaward of Point Riley are very irregular. Depths of 4.1 to 6.4m lie between Riley Shoal and Point Riley. A rocky shoal, with a depth of 4.9m, lies 0.75 mile NW of Point Riley; a detached 5m patch lies about 0.2 mile SW of this shoal.

Wallaroo Jetty has three berths on either side, extending over a length of 440m. Depths alongside ranged from 9.5m at the outer berths to 7.3m at the inner berths. A spur jetty used as a fishing wharf projects from the N side of the main jetty.

Vessels up to 65,000 dwt, with lengths up to 200m, can be accommodated.

Vessels normally enter only during daylight hours. Vessels with a draft of less than 8.5m must have an UKC of 0.6m; vessels with a draft greater than 8.5m must have an UKC of 0.75m.

Aspect.—Two lighted beacons, in range bearing 120°30', stand W of Wallaroo Jetty.

A square chimney, 43m high, built of light-colored bricks, and which is the E of several chimneys at the Wallaroo smelting works, is prominent; rising higher than the surrounding country, it may be seen over Warburton Point. During the mirage, which is frequent with N winds, it has been seen distinctly from a position off Cape Elizabeth, a distance of 15 miles.

The large grain silos near the root of Wallaroo Jetty are conspicuous.

Pilotage.—Pilotage is compulsory for all vessels over 35m LOA unless exempt. Pilots can only be arranged by Flinders Ports through vessel's agent or owner. The pilot will board about 1.5 miles W of Channel Entrance Beacon.

Vessels should maintain continuous listening watch on VHF channel 12 within port limits.

Wallaroo —Port Contact Information	
Signal Station	
Call sign	Wallaroo Port Control
VHF	VHF channel 12, 13, 67, and 16
Telephone	618-824-83505
Port Authority	
Telephone	618-844-70611
E-mail	flindersports@flindersports.com.au
Web site	http://www.flindersports.com.au

Regulations.—Vessels should send their ETA 24 hours and 4 hours prior to arrival.

Signals.—Australian weather forecast signals for severe gales are displayed at Wallaroo.

Anchorage.—Good secure anchorage can be taken, in a depth of about 9m, about 0.75 mile NW of the outer end of Wallaroo Jetty. Although the bay is open, the force of the sea is well broken at the anchorage; with suitable light the bottom shows very clearly in the approaches, the weeds on the bottom appearing like rocks with white sand between them.

The quarantine anchorage is defined by a line between Point Hughes and Point Riley.

Directions.—When approaching from the S, proceed to round Tiparra Reef at a distance of about 3 miles keeping in depths of not less than 12.8m. When the 43m chimney at Wallaroo bears 112°, steer for it on that bearing to the pilot boarding station. A vessel using the inner passage, through Tiparra Bay should pass W of the beacon off Cape Elizabeth, avoiding the rocky patch and dangerous wreck off that cape, then about 2 miles E of the light on Tiparra Reef, and then about 0.5 mile W of the W extremity of the 5.5m shoal that

extends W from Warburton Point. The depths along this track are not less than 7.3m.

Caution.—A high pressure system in the Bight of Australia may cause tides to be lower than predicted; a low pressure system may cause tides to be higher than predicted.

7.108 The coast extends NE for 3.75 miles from Point Riley to Myponie Point (Tickera Point), which is marked by a clear grassy space that looks like the face of a cliff. The coast then extends NE for 3.25 miles to the S point of Tickera Bay. The entire stretch of coast between Point Riley and Tickera Bay is rocky and bordered by limestone cliffs.

Tickera Bay (33°46'S., 137°42'E.) is a slight indentation with a smooth sandy beach fringed by sand flats. A red cliff, 13.4m high, with some huts to the S of it, is located about midway along the shore of the bay.

Anchorage, sheltered from winds S of SW, may be taken about 1 mile offshore in Tickera Bay, in a depth of 5.5m, with the huts bearing 174°. This anchorage is partially protected on its W side by a spit, with depths of less than 5m, that extends about 2.75 miles NNW from the S part of the shore of the bay.

The coast for 12 miles NE of the 13.4m cliff at Tickera Bay is formed by a sandy beach; from there to Mundoora Arm, the S arm of the Hamilton Lagoons, the coast is low. This section of coast is fronted by a flat which dries up to 2 miles offshore.

Webling Point (33°37'S., 137°52'E.), about 21 miles NE of Point Riley, is thickly covered with vegetation. A reddish bank, 15.2m high, stands close N of the point, which is higher than any of the land to the N of it.

The **Hamilton Lagoons** (33°35'S., 137°55'E.) consist of two inlets, named Mundoora Arm to the S and Fisherman Bay (Mundoora Bay) to the N. Both lagoons, which nearly dry, are surrounded by swampy land except on their E sides, which are thickly wooded.

The entrance of Fisherman Bay is plainly visible from seaward, there being a red cliff on its N side and a small mangrove islet about 1 mile W of it; the channel of this bay dries.

Mundoora Channel, leading to the jetty at Port Broughton, is marked by beacons. It has been dredged to a depth of 3m, over a width of about 20m. An artificial reef of automobile bodies, with a least depth over it of 4.5m, lies 1.25 miles NW of the channel entrance and is marked by a buoy.

Anchorage, with good holding ground, can be taken about 2 miles W of Port Broughton Light, in a depth of 10.1m.

7.109 Port Broughton (33°36'S., 137°55'E.) lies on the E side of Mundoora Arm, just inside the entrance. Port Broughton Jetty, which is about 366m long, has a T-head with depths of 2.4m alongside; there is a turning basin, 90m in extent, off the jetty. The jetty is now closed to commercial shipping and used only by fishing craft.

Directions.—When approaching from the S, pass about 4 miles W of Point Riley and steer for a position 5 miles WNW of Port Broughton Light, keeping in depths of more than 11m.

Barn Hill (33°35'S., 138°08'E.), bearing 101°, leads up to the entrance of Mundoora Channel. The coast between the entrance of Fisherman Bay and Wood Point, a low sandy projection about 12 miles N of Webling Point, consists of a sandy beach backed by low swampy land. The sand flat that fronts this coast dries up to 4 miles seaward of Wood Point.

Aspect.—The summit of a hill, which can be seen from Spencer Gulf, stands 25.5 miles E of Point Riley; a range of hills, reddish brown in color during the summer months, extends about 30 miles N from this hill.

Barn Hill rises to an elevation of 356m about 11 miles E of Webling Point; this conspicuous hill has a flat top, is barren, and has a saddle with a small peak close N of it. With the exception of Barn Hill, the other hills are too far inland to be easily identified.

Middle Bank (33°38'S., 137°34'E.), with a least known depth of 5.2m, extends about 13 miles N from a position about 10 miles NNW of Point Riley.

A light is shown from a structure standing about 16 miles NNW of Point Riley and marking the center of the bank. The S extremity of the bank is marked by a lighted beacon, with a racon standing about 10 miles NW of Point Riley. There are general depths of 6.1 to 8.2m over most of this bank with the least depths near the center of the E side, NE and SE of the light.

Middle Bank Light

A 7.3m shoal lies about 2 miles NW of the N extremity of the bank. A line of shoals, with depths of 8.5 to 10m, lies in a N-S direction from 6.5 to 8.75 miles NNW of Middle Bank Light.

It should be noted that several patches were reported to lie N and NW of Middle Bank, but were found to be non-existent or inaccurately charted during recent surveys.

To the E of Middle Bank, a shoal spit, with depths of less than 9.1m, extends about 14.5 miles NE in the direction of Wood Point from a position about 5.25 miles ESE of Middle Bank Light; it has depths of 8.5m near its S end.

An 8.5m patch and a 9.1m patch lie about 2 miles S and 1 mile ESE, respectively, of the S end of the shoal spit; these patches lie in the track of vessels approaching Port Broughton.

The channel between Middle Bank and the above shoal spit is obstructed by an 8.2m patch that lies 1 mile NW of the S end of the spit. Use of this channel is not recommended by deep-draft vessels.

7.110 Point Jarrold (33°16'S., 137°49'E.), about 8 miles NNW of Wood Point, is a low sandy projection. The sand and mud flats that border the coast between Wood Point and Point Jarrold dry up to 1.75 miles seaward of Point Jarrold.

The coast extends NNE for 3.5 miles from Point Jarrold to a mangrove point which is the S point of Germein Bay. This section of coast consists of mangroves backed by low partially

flooded land; drying sand and mud flats extend up to 1.5 miles offshore.

The sand and mud flats that front the coast between the entrance of Port Broughton and the entrance of Germein Bay are fronted by shallow water. The 10m curve extends in a general N direction from a position about 7.75 miles W of Wood Point to a position about 5 miles NW of Jarrold Point.

Yarraville Shoals (33°17'S., 137°36'E.), about 4.75 miles long and 2.75 miles wide, lies centered about 10.5 miles W of Point Jarrold. These shoals, with depths of less than 11m, have a least depth of 6.4m and are marked by a lighted beacon.

Musgrave Shoal (33°15'S., 137°39'E.), about 1 mile NE of Yarraville Shoals, is almost 3 miles long and 0.75 mile wide. This shoal has a least depth of 5.2m in its central part.

Eastern Shoal (33°08'S., 137°46'E.) lies with its S end about 1.5 miles ENE of Musgrave Shoal and extends about 10.5 miles NE. Depths over this shoal range from 5.8m at the S end to a drying patch near its NE end. The shoal is marked by lighted beacons at its N and S ends.

A detached shoal, with depths of less than 5m and with a 1.8m patch near its center, lies about 6.5 miles N of Jarrold Point and is marked by a pile beacon.

A similar shoal, with a least depth of 3.3m, lies centered about 8.5 miles N of the same point and is marked by a buoy on the N side.

A detached shoal, with a least depth of 1.5m, lies centered about 3.5 miles ESE of the lighted beacon on the N end of Eastern Shoal and is marked by a beacon.

A clear channel, about 3 miles wide and with depths of 11 to 20.1m, lies between Eastern Shoal and Fairway Bank to the NW. The channel is marked by lighted buoys.

7.111 Germein Bay (33°05'S., 137°55'E.) lies between a mangrove swamp fronted by sand and mud, extending NE of Point Jarrold and Ward Spit, a drying shoal which extends 5.5 miles W from Ward Point (33°01'S., 137°57'E.). Ward Spit is marked by a light shown from a structure about 6.5 miles WSW of Ward Point and a lighted beacon situated 2.75 miles E of the light structure.

The approaches to the bay and the bay itself are fouled by numerous shoals, banks, and shallow depths.

Port Germein lies in the N side of the bay; the dredged channel that leads to Port Pirie is in the SE part of the bay.

Cockle Spit (33°04'S., 137°56'E.), a detached shoal with depths of less than 5m and with a central part which dries, lies in the middle of Germein Bay. Cockle Spit is marked on the N side by a light shown from a structure about 2.75 miles SSW of Ward Point and on the S side by a beacon.

The S shore of Germein Bay consists of thick mangroves with partially-flooded land behind; it is bordered by drying sand and mud flats, which dry for a distance of 1 mile.

Mount Ferguson (33°06'S., 138°02'E.), a rounded grassy hill, isolated by a swamp, rises to an elevation of 41m on the E shore of the S part of the bay. The low country behind the hill is thickly wooded for about 3 miles inland and rises to the Flinders Range. Mount Ferguson shows up well against the dark vegetation that covers the slopes of the Flinders Range, near The Bluff, 700m high, 6 miles inland. A light is shown in the vicinity of Mount Ferguson.

From a position 1 mile NE of Mount Ferguson, a sandy beach and drying sand flat curves round the NE part of the bay to Ward Point.

7.112 Germein (33°02'S., 138°00'E.), a town and a former port, lies 5 miles NNW of Mount Ferguson. A jetty extends from the shore abreast of the town. Lighted beacons stand 1.5 miles W and 1.25 miles WSW of the jetty head, which is marked by a light.

Channels.—Two channels lead into Germein Bay. The N channel, which is lighted, is the principal fairway. It passes between the N end of Eastern Shoal and Ward Spit, where there is a least depth of 6.4m in the fairway, over a width of about 2 miles, this being the least depth to within 2 miles of Port Germein Jetty. From a position between Eastern Shoal and Ward Spit, the channel leads N of Cockle Spit, and then directly to Port Germein Jetty. A fish haven, with a least depth of 3m, lies 1 mile SSE of the head of Port Germein Jetty.

A channel, with a controlling depth of 6.4m, leads SSE from a position about 1.75 miles W of the head the jetty, passing between Cockle Spit and the shoal water extending from the E shore of the bay, to the entrance of the dredged channel leading into Port Pirie.

The Port Pirie Entrance Lighted Beacon stands about 1.5 miles E of the light marking the N side of Cockle Spit.

The S channel, for which local knowledge is necessary, passes between Eastern Shoal and the two shoals to the ESE, then S of the 1.5m shoal that lies WSW of Cockle Spit, and S of the beacon marking the S side of Cockle Spit.

Anchorage can be taken, in depths of 5.5 to 7.3m, S of Ward Point, with the outer end of Port Germein Jetty bearing 084°, distant 1.5 miles. Larger vessels may anchor on the same bearing, distant about 2.5 miles. Anchorage may also be found about 1.5 miles NW of the lighted beacon marking the N end of Eastern Shoal.

Vessels proceeding to Port Pirie, but wishing to anchor off the port first, should anchor as above, or off the entrance of the dredged channel into Port Pirie, taking care to anchor clear of the fairway in the approach to that channel.

Directions.—In the approach to Germein Bay, after a few days of fine weather, the water becomes clear and the shoals can be seen, but during and after foul weather the disturbed mud and sand obscures the bottom and the deepest water is often the most discolored.

Allowance must be made for the tidal currents, which set obliquely across the N channel, the flood setting NE and the ebb SW, at a rate of 1.5 knots at springs.

Entering Germein Bay by the N entrance, pass midway between the lighted beacon marking the N end of Eastern Shoal and Ward Spit Light, and then steering a mid-channel course toward Port Germein Jetty.

If bound for Port Pirie, after passing Cockle Spit, steer to pass between the lighted beacon standing 1.25 miles WSW of the Port Germein Jetty head and the Port Pirie Entrance Lighted Beacon, then steer to pass between the lighted beacons marking the dredged channel to the port.

Local knowledge is essential for entering by the S channel; it is also necessary for the approach to Port Pirie.

At night, the white sector of Port Germein Jetty Light covers the fairway between Ward Spit and Cockle Spit.

7.113 Port Pirie (33°11'S., 138°01'E.) (World Port Index No. 54290), the principal port for the mines at Broken Hill, some 250 miles NE, lies on the W side of a tidal inlet at the SE end of Germein Bay. The chief exports are ores, concentrates, and grain. Port Pirie is a first port of entry.

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Winds—Weather.—Prevailing winds are from the NNE to NW. During January and February, freak thunderstorms, with winds of 40 to 50 knots, may occur.

Tides—Currents.—Neap tides rise 1.7m; springs rise 2.7m. Strong W or N winds can affect the tides.

Depths—Limitations.—The channel leading to Port Pirie from the E side of Germein Bay is dredged to a depth of 6.4m, and is marked by pairs of lighted beacons throughout its length, numbered from seaward. A tide gauge on Lighted Beacon No. 7, on the W side of the channel, displays depths above chart datum.

Three sets of ranges indicate the approach into the channel, harbor, and swinging basin. The speed of vessels in the harbor S of Lighted Beacon No. 43 shall not exceed 4 knots.

Berths are all on the W side of the harbor and are numbered from 1 to 11, commencing at the inner end.

Port Pirie Berth Information			
Berth	**Length**	**Depth**	**Remarks**
No. 1	152m	5.3m	Fishing and recreation
No. 2	190m	8.2m	Grain
No. 3 (Closed)	110m	6.7m	Disused Oil berth
No. 4	107m	4.9m	Tug berth
No. 5	198m	8.2m	General
No. 6	183m	8.2m	Ore exports
No. 7	145m	8.2m	General cargo and containers
No. 8	180m	8.2m	Lead exports
No. 9	180m	8.2m	Lead and coal
No. 10	158m	8.2m	Bulk imports
No. 11	46m	3.7m	Acid

Berth No. 3, a 198m long T-head jetty with dolphins at each end, and a depth of 7.3m alongside, is the oil berth.

Berth No. 5 through Berth No. 10, inclusive, consist of a 1,043m long continuous wharf, which has been dredged to a depth of 8.2m throughout. Berth No. 5 and Berth No. 6 are equipped with ore loaders.

An overhead power cable, with a vertical clearance of 54m, crosses the channel between Berth No. 7 and Berth No. 8.

Berth No. 8, Berth No. 9, and Berth No. 10 are smelting factory berths; coke is discharged at Berth No. 10.

Berth No. 11, 46m long, with a depth of 3.7m alongside, is the acid loading berth.

Vessels of up to 42,500 dwt can be accommodated within the port. The maximum length of vessels is 183m, with a maximum beam of 30.5m. An UKC of 0.9m is required.

A small craft basin, dredged to a depth of 2.1m, is situated at the S end of the main berths.

Pilotage.—Pilotage is compulsory for vessels over 35m, unless exempt. Pilots can only be arranged by Flinders Ports through vessel's agent or owners. Pilots board in the vicinity of the Port Pirie Pilot Boarding Ground (33°04.45'S., 137°45.50'E.). Vessels should maintain continuous watch on VHF channel 11 within port limits.

Port Pirie —Port Contact Information	
Signal Station	
Call sign	Port Pirie Harbour
VHF	VHF channels 12, 13, 67, and 16
Telephone	618-824-83505
Port Authority	
Telephone	618-844-70611
E-mail	flindersports@flindersports.com.au
Web site	http://www.flindersports.com.au

Regulations.—Vessels should send their ETA at the lighted beacon marking the N end of Eastern Shoal 24 hours and 4 hours in advance.

Vessels bound for Port Pirie and requiring to discharge solid ballast must do so in False Bay. Clean water ballast may be discharged in the harbor.

Caution.—Vessels with a length greater than 180m can enter or leave during daylight hours only. Vessels with a length of 180m or less can enter or leave at any time.

Spencer Gulf—Upper Part

7.114 The upper part of Spencer Gulf extends about 36 miles N from Lowly Point, on the W side, and Ward Point, on the E side.

Port Augusta (32°30'S., 137°46'E.), described in paragraph 7.121, lies about 4 miles S of the head of the gulf. The port stands on both the E and W side of the upper gulf. There is a least depth of 8.8m in the fairway of the channel for a distance of about 10 miles N of the entrance of this part of the gulf. Farther N the channel narrows, and there is a least depth of 9.1m in the fairway for a distance for about 15 miles farther N to near the N end of Bluff Reach. North of Bluff Reach, the channel again narrows and there is a least depth of 4.9m in the fairway, which is only 61m wide in places, as far as Port Augusta. About 3 miles N of Port Augusta, the channel dries, and a salt swamp extend farther N for a considerable distance.

Tides—Currents.—The tidal currents, which turn at about the time of high and low water, generally set in the direction of the channel at a rate of 1.5 to 2 knots. However, S of Douglas Bank, the flood sets NW across the channel and the ebb sets

SE. In the vicinity of East Sands, the currents also set across the main channel.

Anchorage.—Anchorage can be taken in any part of the upper reaches of the gulf S of Douglas Bank according to draft. The most convenient anchorage lies off the E shore, in a depth of 11m, where the current is less than in the deeper water along the W shore.

Anchorage is recommended in Backy Bay, in depths of 7.3 to 11m, with Lowly Point bearing 179°, distant 3 miles.

From May to September, when strong N and W winds are frequent, better shelter can be obtained, in depths of 10 to 11m, near the head of the bay, with Backy Point bearing between 050° and 072°, distant about 1 mile. In this position the current is negligible.

During strong SE winds which prevail from December to March, a vessel seeking anchorage for the night or awaiting a tide should anchor in the lee of Ward Spit, in a depth of 11m, when N of the entrance.

Vessels are warned of the existence of a 4.9m shoal 5 miles NE of Lowly Point and an 8.8m shoal about 4 miles ENE of Lowly Point.

Variations in sea level.—Significant changes in normal sea level occur in the N part of Spencer Gulf with the passing of a deep depression across the Great Australian Bight from Cape Leeuwin to Tasmania. The sea level is lowered with the onset of N winds, as the barometer starts falling; but, as the wind backs to the NW, an increase in level occurs. There will be a gradual build-up if the wind remains steady. A strong, gusty NW wind, with such a depression, backing to WSW at about the time of low water, will cause the highest storm surge, and heights of 0.6m to 1.5m above predictions may be expected. These high levels will continue until the wind backs further and the barometer starts to rise. Unless the depression's passage is blocked, the wind usually backs rapidly to the SSE within 12 hours, and, with a rapidly rising barometer, the sea level returns to normal in about the same time.

Caution.—A submarine gas pipeline crosses the gulf from a position about 0.5 mile S of Douglas Point (32°51'S., 137°49'E.), on the W shore of the gulf, to a position on the E shore of the gulf close NW of Mount Mambray (32°52'S., 137°56'E.).

7.115 West shore.—Lowly Point Shoal (32°59'S., 137°48'E.), with a least depth of 3.1m, lies almost 1 mile NNE of Lowly Point.

The coast between Lowly Point and the head of Fitzgerald Bay (Backy Bay), about 5.5 miles NNW, is bordered by low whitish cliffs and stony beaches, with mangroves after the first 3 miles; between 1 and 4 miles from Lowly Point, the whitish cliffs are backed by a ridge of hills, about 100m high.

The 5m curve lies within a distance of 0.25 mile of this coast, to within about 1 mile of the head of Fitzgerald Bay. A hard sand flat, which dries, extends about 0.5 mile from the head of the bay; shallow water extends about 0.25 mile beyond the flats.

A shoal, with a least depth of 7.6m, lies about 3 miles N of Lowly Point Bight. A 4.9m shoal lies 5 miles NE of the same point.

Backy Point (32°55'S., 137°47'E.), about 5 miles N of Lowly Point, is a bold, rocky, black projection, 54m high; it may be approached to a distance of 0.1 mile, but there is a race off it.

Between Backy Point and Crag Point, about 1.5 miles NNE, the coast is bold, broken, and rocky; it is backed by grassy hills, the highest of which is 103m, about 1 mile NNW of Backy Point.

Depths of 10.1 and 10.4m lie about 0.75 and 2.25 miles, respectively, SE of Backy Point. Two small bays lie within a distance of 2.25 miles NNE of Crag Point. Both bays are fouled by hard, drying sand flats. Depths of less than 5m lie within 0.5 mile seaward of these flats.

7.116 Douglas Point (32°51'S., 137°49'E.), about 2.5 miles NNE of Crag Point, is rocky, and backed by a low black cliff. Douglas Hills, which stand NW of the point, are separated by rocky ravines. A hill, 199m high, with a stone cairn on it, stands 2 miles NW of Douglas Point.

The coast for 3.25 miles N from a position 2.5 miles N of Douglas Point consists of thick mangroves with low land behind them; a drying, hard sand flat extends up to 0.5 mile offshore.

Douglas Bank (32°48'S., 137°50'E.), with a least depth of 2.2m, lies about 2.75 miles N of Douglas Point. It is steep-to on its W side, but the depths increase gradually to 11m about 0.5 mile off its E side and 0.75 mile off its S side. A shoal area, having depths of less than 10m, lies 1 mile W of the S end of Douglas Bank.

A clear channel about 0.5 mile wide between the 10m curves lies W of Douglas Bank, but the principal channel lies off its E side.

Backy Point bearing 202° leads SE of Douglas Bank; the N extremity of Two Hummock Point bearing 340° leads NE of the bank.

Two Hummock Point (32°45'S., 137°48'E.) stands about 6.25 miles N of Douglas Point. It is a low, broad projection with alternate rock and sandy beach. South Hummock stands on the point and North Hummock, 29m high, stands about 0.75 mile NNW of South Hummock. A third hummock stands 1.25 miles WSW of South Hummock. A drying sand flat fronts Two Hummock Point to a distance of almost 0.5 mile.

A shoal, with a depth of 5m, lies 0.3 mile E of Lighted Beacon No. 4, which marks the outer edge of the sand flat fronting Two Hummock Point.

Two Hummock Spit (32°46'S., 137°49'E.), with depths of less than 5m, extends about 1 mile SE from Two Hummock Point. A shoal, with a least depth of 6.4m, lies almost 0.75 mile ENE of the N extremity of Two Hummock Point.

7.117 East shore.—The summits of Flinders Range lie from 8 to 12 miles E of the E shore of the upper part of Spencer Gulf. The land is mostly low between the coast and the foot of this range. The most conspicuous summits are Mount Remarkable, Mount Brown and Devil's Peak; **Mount Brown** (32°30'S., 138°00'E.), the highest of the these summits, rises to a height of 968m, about 30 miles N of Ward Point. On a clear day this peak is visible for about 60 miles. Other peaks of considerable elevation stand along the ridge of this barren rocky range, which terminates at Mount Arden.

The coast for almost 3 miles N of Ward Point is covered with thick mangroves, but for 7 miles farther N, to the mouth of Mambray Creek, the coast consists of low sandy beach backed by scrub-covered level land.

Mount Mambray, 34m high, stands 0.75 mile SE of the mouth of Mambray Creek and is covered with thick scrub.

The coast for about 1 mile N from Mambray Creek is covered with thick scrub; farther N, a salt swamp extends to the S side of Yatala Harbor.

Mount Gullet, 64m high, stands 3 miles N of Mount Mambray; it is thickly-covered with scrub and has a broad base with a round flat top. Mount Mambray and Mount Gullet are the only conspicuous features near this coast.

The coast between Ward Point and Yatala Harbor is fronted by a hard sand flat, which dries up to 1.5 miles offshore as far N as Mount Gullet; farther N the sand flat dries to a distance of about 2.5 miles W of a projecting mangrove point on the S side of Yatala Harbor, and depths of less than 5m extends as much as 1.25 miles farther seaward in places.

The depths on the E side of the upper part of the gulf are irregular and range from 5.5 to 12.8m; there is a 3.9m patch about 2.5 miles NW of Ward Point.

Yatala Harbor (32°45'S., 137°53'E.), a shallow bight entered between the mangrove point about 3 miles NNW of Mount Gullet, and a position about 1.75 miles NE, is lined with mangroves and almost completely obstructed by a flat of sand, mud, and weeds.

The anchorage or navigable part of Yatala Harbor, is a shallow basin about 2 miles in extent. The soundings shown on the chart are taken from very old surveys and at that time, the harbor appeared to be shoaling.

Mount Grainger, 78m high, is a round black-colored hill covered with bushes which stands about 2.75 miles N of the above-mentioned mangrove point on the S side of Yatala Harbor.

Red Cliff Point (32°42'S., 137°50'E.) lies 3.25 miles WNW of Mount Grainger; a red cliff, 18.3m high, stands about midway between Mount Grainger and Red Cliff Point.

Approaches to Port Augusta

7.118 Flinders Channel (32°43'S., 137°48'E.) is that part of the fairway which extends up to 5 miles N from Two Hummock Point.

Middle Bank (32°43'S., 137°49'E.), with depths of less than 9.1m and with a least depth of 1.9m, extends about 1.25 miles NNW from a position about 1.25 miles NE of the N extremity of Two Hummock Point.

There is a clear channel, with depths of 11 to 18.3m, on either side of Middle Bank, but the W channel is preferred. It is also the more direct channel.

The low mangrove coast between Two Hummock Point and Mangrove Point, about 3 miles to the NW, is bordered by a hard drying sand bank.

Blanche Harbor (32°42'S., 137°46'E.), with depths of 1.8 to 3.6m, lies W of a drying spit which extends 1 mile N from Mangrove Point. Two narrow channels lead into this harbor which is available only to small craft.

West Sands (32°41'S., 137°46'E.), a drying sand bank that extends almost 1.5 miles NNW from a position about 1.25 miles N of Mangrove Point, fronts the entrance of Blanche Harbor. A spit, with depths of less than 5m, extends about 0.25 mile E from the S end of West Sands; the NE side of West Sands may be passed at a distance of 0.25 mile, in depths of at least 12.8m. A beacon marks the N end of West Sands.

Caution.—An obstruction, with a depth of 7m over it, lies in Flinders Channel, about 0.5 mile N of the beacon.

7.119 The E side of Flinders Channel is bordered by drying sand banks that cover most of a large bay formed between Red Cliff Point and Point Paterson, almost 5.75 miles NNW. Dense mangroves border the shores of this bay up to 3 miles N of Red Cliff Point, but from there to Point Paterson the shore is low and swampy.

East Sands (32°40'S., 137°48'E.), a large drying bank almost 3 miles long, fronts the S and middle parts of the bay between Red Cliff Point and Point Paterson; it borders the E side of the N part of Flinders Channel and the S end of Bluff Reach. East Sands is fairly steep-to abreast Flinders Channel, but at the S end of Bluff Reach, shallow water extends about 0.5 mile from it. A shallow bank extends from the NW end of East Sands.

Bluff Reach (32°39'S., 137°46'E.) is the continuation N of the fairway from Flinders Channel. It extends as far as Commissariat Point, which lies about 6.5 miles N of Mangrove Point.

Caution.—At night, a vessel should not enter this reach because there are no lighted aids to mark the channel N of Beacon No. 9, which stands 3.75 miles N of Mangrove Point. A tide gauge on this beacon indicates the height of the tide above chart datum. The W shore of this reach consists of a stony beach fringed by mangroves and backed by Bluff Range, a range of flat-topped hills.

7.120 The Bluff (32°37'S., 137°44'E.), the highest hill of this range, rises to a height of 301m about 5.5 miles NNW of Mangrove Point. About 4 miles NNW of The Bluff, the range turns sharply inland.

The Sisters, two peaks which stand out well when viewed from the SE, stand on a detached ridge in the vicinity of this sharp turn. A drying sand bank fronts the beach and shoal patches lie off the W side of the reach. The E side of Bluff Reach is bound, in most places, by drying sand banks.

Port Paterson (32°35'S., 137°48'E.), entered between Point Paterson and Snapper Point, about 3 miles NNW, is fouled by very extensive drying sand and mud banks. The shores of the port are mostly swampy.

Port Paterson can be approached through a channel lying between the drying banks near the N end of Bluff Reach. This channel is available only to vessels with local knowledge.

Snapper Reach (32°35'S., 137°47'E.), a continuation of the fairway N from Bluff Reach, extends as far as Curlew Point, almost 3.75 miles N of Commissariat Point. The channel, with depths of 5.2 to 9.2m, is closely bound by banks on each side that dry at half tide. The channel is not less than 0.2 mile wide in most places, but near its N end it narrows to a least width of about 0.1 mile.

Snapper Point (32°34'S., 137°47'E.), about 3 miles NNW of Point Paterson, is the W extremity of a mass of thick mangroves.

Curlew Point (32°32'S., 137°46'E.), almost 1.25 miles NNW of Snapper Point, is fronted by Curlew Island a short distance to the E. This mangrove island lies on a drying bank; a sandy knoll that covers only at high water lies on the N end of this bank.

A power station wharf is situated on the E bank of the channel, about 0.4 mile E of Curlew Island. Four dolphins are situated on the W side of the wharf. Two overhead power cables, with a least vertical clearance of 45m, span the channel in the vicinity of Curlew Island.

7.121 Port Augusta (32°30'S., 137°46'E.), which lies in the upper reaches of Spencer Gulf, is closed to commercial vessels. Port Augusta lies on the E bank, about 3 miles N of Curlew Point; Port Augusta West lies on the opposite bank.

Tides—Currents.—The mean tidal rise at Port Augusta is 3m at springs and 1.8m at neaps.

When the wind shifts from W to S and blows strongly, the water level may rise as much as 1m. With a strong N wind, the water level may be lowered by as much as 0.5m.

Depths—Limitations.—Abreast Snapper Point, the upper gulf narrows to a width of 0.75 mile between the mangroves on either side, and the gulf assumes the appearance of a river. The mangroves on both shores are backed by swampy land, which is flooded at springs.

The navigable channel through this part of the upper gulf is narrow and intricate. The dredged approach channel is no longer maintained.

There are general depths of 6.4 to 7.9m in the SW half of the port area and general depths of 4.9 to 5.8m in the NE half of the port area. The channel limits between Curlew Point and Port Augusta are well-marked by buoys and beacons.

Commonwealth Wharf, which fronts the town, is in ruins.

A T-head jetty, used only by fishing vessels, extends from the shore at Port Augusta West. There is a depth of 3m alongside the T-head.

A causeway crosses the upper gulf N of Commonwealth Wharf and obstructs navigation above the port.

The port is closed to commercial shipping.

Pilotage.—Pilotage for Port Augusta is compulsory. The request for pilotage should be made 24 hours in advance and the vessel's ETA at Eastern Shoal North End Lighted Buoy confirmed 4 hours prior to arrival with the Port Pirie harbormaster. The pilot boards about 2 mile W of the lighted beacon on the N end of Eastern Shoal.

Regulations.—Vessels must have an UKC of 0.6m.

Caution.—Visibility along the approach channel to Port Augusta may be reduced by smoke. Vessels should exercise caution when such conditions exist.

General Directions for Spencer Gulf

7.122 Large vessels bound for Spencer Gulf from the W are advised to keep at least 5 miles S of South Neptunes. The Gambier Isles may be passed on either side, care being taken to clear the foul ground about 5 miles SE of Wedge Island. From there, a middle course may be steered to reach a position 34°09.0'S, 137°09.6'E, about 14 miles W of Cape Elizabeth.

If proceeding from Port Lincoln to Lowly Point from near Boston Point, a vessel should steer to pass S of Berlin Rock, making allowance, if necessary, for the N current; then steer to pass between Sir Joseph Banks Group and the mainland, and then steer to pass midway between Shoalwater Point and Wallaroo Bay.

Between Sir Joseph Banks Group and Shoalwater Point, during the N current, a vessel may be set considerably N of her course, and may get too close to the banks between Franklin Harbor and Shoalwater Point. Frequent sounding is the best guide both by day and night and while off this part of the coast, depths of not less than 14.6m should be maintained. If less depths are found, a S course should be taken immediately.

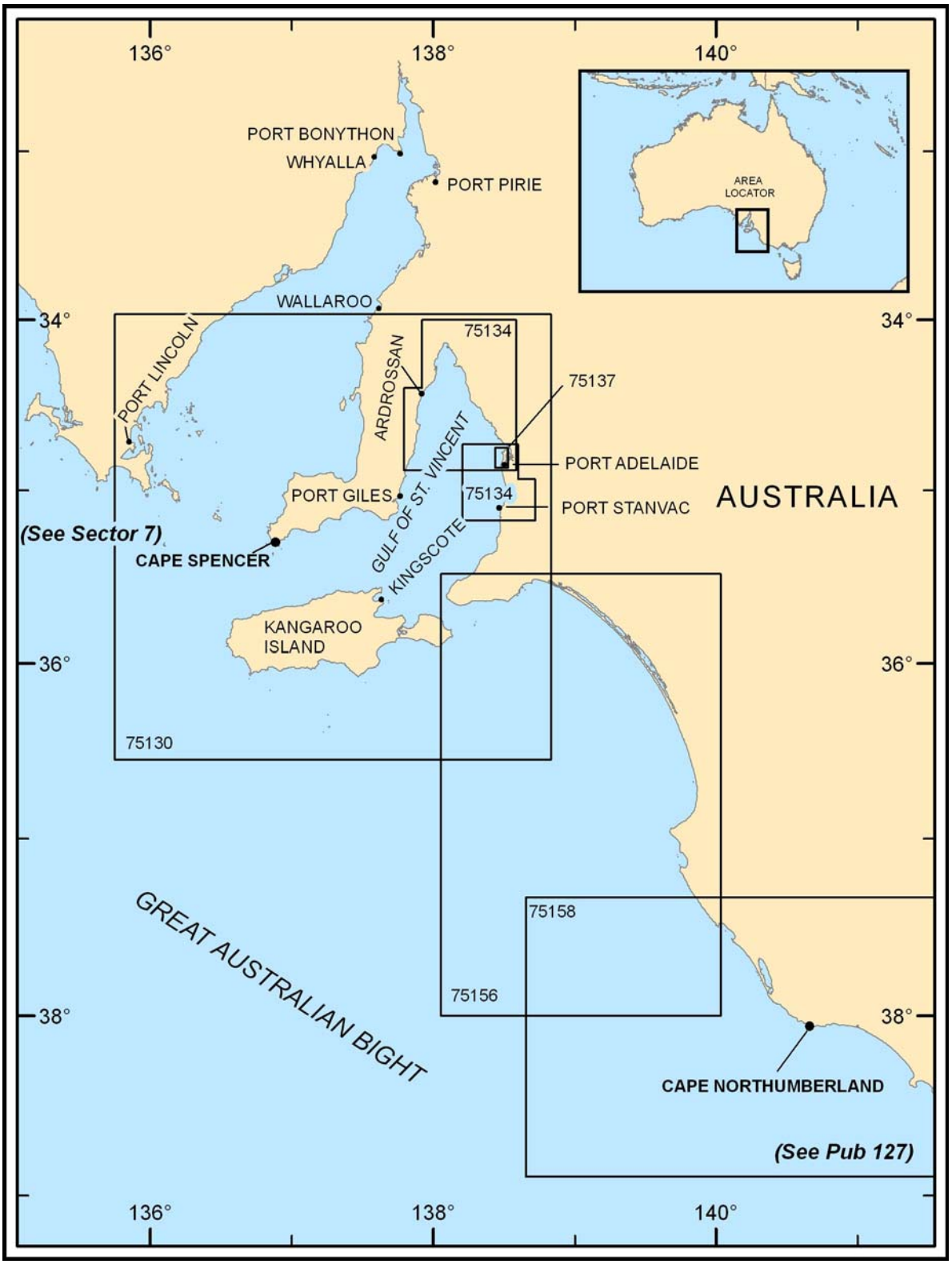
After very hot days, Tiparra Light may be so elevated by mirage that the fact of it being in sight cannot ensure a vessel of being in safety, although, in ordinary weather, it would not be visible if passing too near Shoalwater Point.

Large vessels entering the gulf from Investigator Strait should pass S of the Althorpe Islands and, having rounded the S isle, should not bring it to bear more than 115° until Royston Head (35°12'S., 136°50'E.) bears 040°, when course may be altered N, clear of the shoals lying up to 7.5 miles NW of the Althorpe Islands, and the dangers in their vicinity.

At night, Cape Borda Light, described in paragraph 8.2, should be brought to bear 184° before proceeding into the gulf, keeping on this bearing while passing between Wedge Island and the Yorke Peninsula.

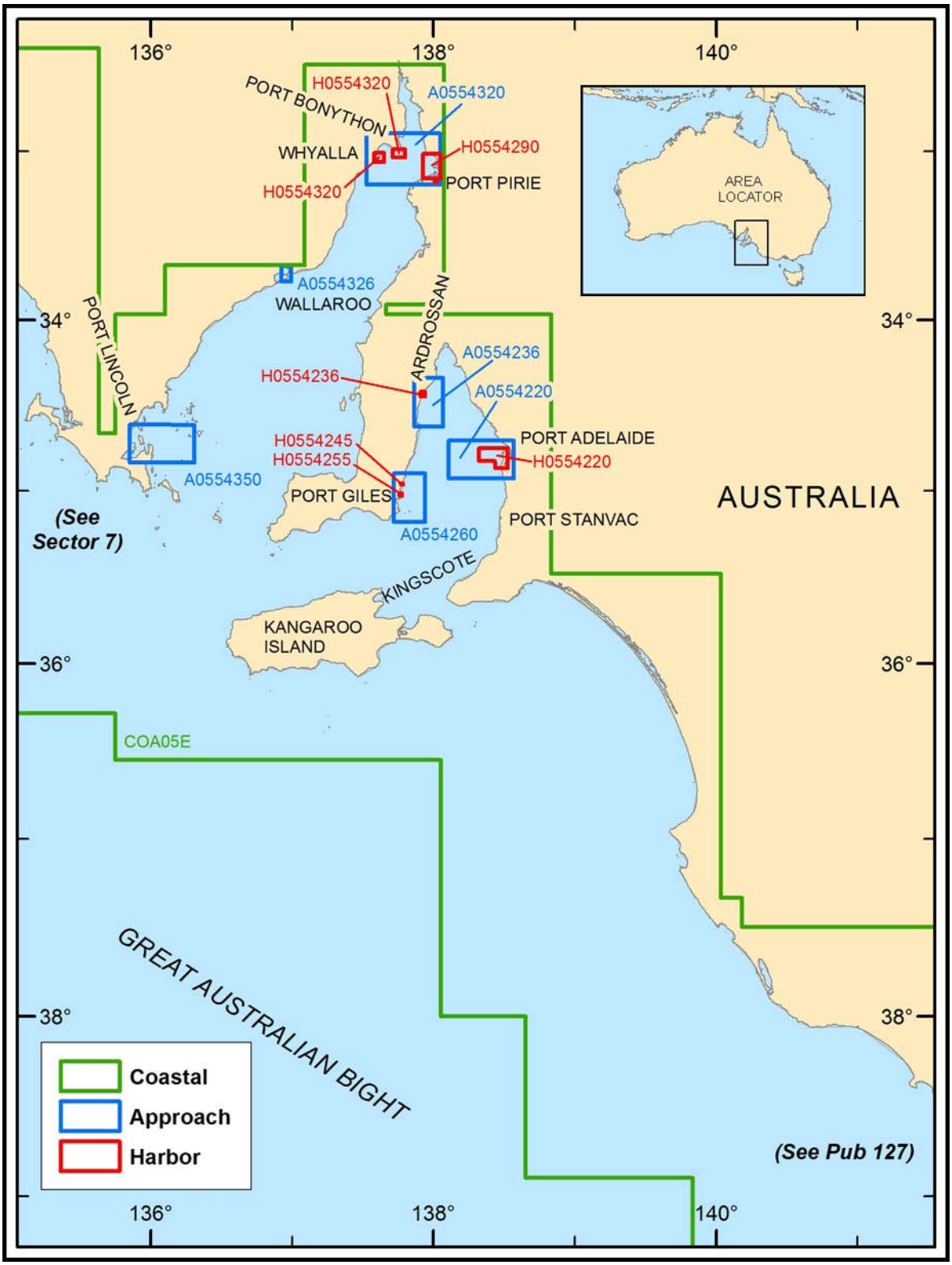
From mid-channel on the W side of Middle Bank, which is marked by a lighted beacon, to Lowly Point, it is advisable to pass W of Yarraville Shoals and then steer to the NE. The lighted beacon on the S end of Eastern Shoal is a good guide, although the W channel is preferred for larger vessels.

When in sight of Lowly Point, Mount Brown kept in range 021° over the point, leads up the gulf in depths of 18.3 to 14.6m, between Eastern Shoal and Fairway Bank.



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

SECTOR 8 — CHART INFORMATION



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SECTOR 8

SOUTH COAST OF AUSTRALIA—CAPE SPENCER TO CAPE NORTHUMBERLAND INCLUDING KANGAROO ISLAND AND GULF ST. VINCENT

Plan.—This sector describes the S coast of Australia between Cape Spencer and Cape Northumberland and includes Kangaroo Island, Investigator Strait, and Gulf St. Vincent. The descriptive sequence is SE.

General Remarks

8.1 The S coast of Australia between Cape Spencer and Cape Northumberland, about 253 miles SE, is indented in its NW part by Gulf St. Vincent, which lies between the Yorke Peninsula to the W and the Fleurieu Peninsula to the E. The central part of the gulf is deep and clear of dangers, but both shores are fringed by shoals with depths of 9.1m and less. In some places these shoals extend up to 12 miles offshore, especially in the N part of the gulf.

Several commercial ports are situated within the limits of the gulf and are available to vessels of moderate to deep draft. Port Adelaide, the largest berthing facility, is situated on the E shore of the gulf about 55 miles N of the entrance.

Kangaroo Island, an elongated island, high and wooded, lies across the entrance of the Gulf St. Vincent.

Investigator Strait, the most direct channel between Spencer Gulf and Gulf St. Vincent, lies between the N coast of Kangaroo Island and the S coast of the Yorke Peninsula.

Depths in the strait seaward of the fringing shoals are deep. Backstairs Passage, the E entrance to Gulf St. Vincent and Investigator Strait, lies between the Macdonnell Peninsula, on the E end of Kangaroo Island, and the W end of the Fleurieu Peninsula, about 7 miles to the NE. It is navigable by the largest vessels and presents no difficulties.

Anchorage can be taken in some of the bays which indent the shores of Kangaroo Island. Kingscote, the principal town, is situated on the NE part of the island, and has alongside berthing facilities for small vessels.

The mainland coast between Cape Jervis and Cape Jaffa, about 115 miles SSE, turns abruptly E and then SSE forming a large embayment. The Murray River, the largest river in Australia, empties into the sea about 37 miles E of Cape Jervis after crossing Lake Alexandrina, a shallow lagoon.

The coast between the entrance of the Murray River and Cape Jaffa, at the S end of Lacepede Bay, about 92 miles SSE, consists of a continuous stretch of sandy beach backed by sand hills which are so much alike that it is difficult to identify any of them. The surf is always heavy along this section of coast and during W and SW gales this surf extends up to 4 miles offshore in places.

Lacepede Bay, although exposed to the prevailing swell, provides safe anchorage in all weather.

Kingston, the port for the offshore anchorage area known as Port Caroline, is situated about 11 miles NE of Cape Jaffa. Only fishing vessels can be accommodated.

The coast between Cape Jaffa and Cape Northumberland, about 83 miles SSE, continues low and sandy and is marked in places by moderately high sand dunes topped by a few trees. Anchorage can be taken off the entrances of the bays which indent the coast along this section of coast, but with onshore winds a heavy swell rolls in.

Winds—Weather.—In the region covered by this sector, the weather is largely controlled by the seasonal N and S movement of the belt of high pressure which extends from W to E across the area, and by the continuous E procession, within the belt, of anticyclones and the troughs or depressions which separate them. The winds circulate in a counterclockwise direction in this area of high pressure.

There is a tendency along the coast for winds between S and E to predominate in the summer and for winds between N and W to be most frequent in July. This seasonal tendency is greatly complicated by the local sea breeze effect.

Land and sea breezes blow on the coasts, in settled weather, throughout the year. The land breeze blows offshore at night and in the early morning, while the sea breeze is best developed during summer afternoons.

At Adelaide, the sea breeze from the SW is pronounced in the afternoon, except in the winter; in the morning the winds are mainly from between N and E. In the winter, the NE land breeze is prominent in the forenoon, while in the afternoon, the winds are mainly from between W and N.

Strong winds are frequent, with their frequency and strength increasing from N to S. It is difficult to assess the frequency of squalls and gales, but it is not unlikely that gales accompany every cold front that crosses the area. These wind changes occur at least once per week; in certain seasons and under some meteorological situations they are more frequent, and if intense, the associated gales may extend intermittently over a few days. Gales have been reported in every month at Adelaide, with the highest frequency occurring in the early winter months.

Visibility is generally good and fog is infrequent. Temperatures are high in the summer near the coast, but low humidity reduces personal discomfort. The winters are mild and frost is rare. From time to time tropical depressions affect these coasts and are a serious, though infrequent, hazard.

There is a marked winter maximum and marked summer minimum in the annual coarse of rainfall.

The S depression, with its accompanying mainly onshore winds, is responsible for the greatest portion of the rain. The depressions and rainfall are most frequent from May to August, with the greatest intensities occurring in June and July.

Tides—Currents.—There is a seasonal variation of currents in this sector, almost entirely due to the S movement of the subtropical anticyclones in the summer. The currents are fairly weak, with a commonly experienced rate of about 0.25 knot. From January to March, the currents are predominantly ESE, while from April to December, the currents are predominantly WNW and NW.

Caution.—Special care is required when navigating along the coast between Cape Martin and Cape Northumberland, about 40 miles to the SE. The prevailing winds are from the SW. A continuous swell sets toward the coast which, together with the uneven bottom, produces an irregular sea. In bad weather, with S winds, soundings should be taken frequently. Several vessels have been wrecked between Cape Buffon and Cape Northumberland from neglecting this precaution.

From November to June, extensive lobster fishing takes place on the continental shelf, inshore of the 150m curve between Cape Jaffa and Cape Northumberland. Vessels are requested, when passage permits, to transit outside the 200m curve, and also to pass at least 10 miles seaward of Cape Banks. From the first day of October through the end of May, extensive giant crab fishing takes place inshore of the 500m curve off the coast of South Australia. Mariners are cautioned that surface floats associated with the activity may be encountered.

Kangaroo Island—West Coast

8.2 Kangaroo Island (35°49'S., 137°15'E.), which stands at the entrance of Gulf St. Vincent, is high and well-wooded.

Cape Borda (35°46'S., 136°35'E.), the NW point of Kangaroo Island, is a predominately cliff-formed headland, 61m high. The upper half of the cliff is formed of white limestone, and the lower half is very dark volcanic rock. The hills at the cape rise to a height of more than 152m and are covered with small scrub. Cape Borda has been reported to be a good radar target at distances up to 25 miles. A light is shown at Cape Borda from the slope of a hill, whose elevation is 155m, about 0.3 mile S of the cape.

Courtesy of Peter Coombs and Malcolm Macdonald's Lighthouses of Australia Page

Cape Borda Light

The coast between Cape Borda and Cape Vennachar, the N point of West Bay, about 8 miles to the S, is composed of dark limestone cliffs, 61m high. Numerous caves, into which the sea runs, mark the face of these cliffs. The Ravine de Casoars, a break in the cliffs about 2.5 miles S of Cape Borda, can be seen from a considerable distance. Scrub-covered hills, 152 to 183m high, rise behind the cliffs. This part of the coast should be carefully avoided as the ocean swell rolls in with considerable force.

During a heavy W swell, there are rollers off the Ravine de Casoars to a distance of about 1 mile. Depths of 21.9m are found about 1 mile offshore for a distance of about 2 miles S from Cape Borda. Farther S the depths are greater.

West Bay (35°53'S., 136°33'E.) lies between the S point of Cape Vennachar and a point about 1 mile farther S. A low islet lies about 0.3 mile off this point. The depths within the bay decrease gradually from 18.3m in the entrance to 7.3m near its head.

Small vessels with local knowledge sometimes anchor in the bay, but the heavy swell which rolls in with a W wind makes this a risky proceeding. The heavy swells are accompanied by rollers about 1 mile S of the entrance. The terrain S of West Bay is much lower than the land to the N.

Cape Bedout (35°57'S., 136°36'E.), about 3.5 miles SSE of the S point of West Bay, is a round point with a scrubby hill at the back. The coast between Cape Bedout and a low sloping point a little more than 1 mile to the SE forms a bight with a sandy beach at its head. The bight in the coast between this low point and Cape du Couedic, about 8 miles to the SE, is known as Maupertuis Bay.

The coast between the NW point of this bay and the mouth of the Rocky River, about 3 miles to the E, consists of low cliffs backed by scrub-covered hills, 30.5 to 45.7m high. A conspicuous bare sand patch extends about 0.75 mile S from a position about 0.5 mile S of the Rocky River. This patch slopes downward from sand hills about 91m high. Southeast of this patch, the cliffs rise to a height of 143m within a distance of 1 mile of Cape du Couedic. The inland hills are highest about 4 miles N of the cape, where the summit of a partially wooded range is 218m high.

8.3 Cape du Couedic (36°06'S., 136°42'E.), the SW tip of Kangaroo Island, is a narrow promontory about 1 mile long. Its SW face slopes to the sea whereas its N and S sides are steep. In 1984, depths of 24m and 12.8m were reported to lie 3.25 miles SE and 21.5 miles E, respectively, of Cape du Couedic. A light is shown at the cape.

Cape du Couedic Light

The **Casuarina Islets** (36°04'S., 136°43'E.), two in number, lie S of Cape du Couedic. The N islet is 29m high and the S islet is 35m high. Both islets are composed of large bare rocks. The S islet has been reported to be a good radar target at distances up to 17 miles.

Deep water, over a rocky bottom, is found between the islets. There is a heavy tide rip SW of the S islet. A shoal, with a least

depth of 7.3m and surrounded by rocky uneven ground, lies about 2 miles SW of the S islet.

Tides—Currents.—The E current divides at Cape du Couedic, with one part setting N along the W coast and strengthening the flood; the ebb sets S but is overcome at times by the N current and the flood.

Caution.—Lipson Reef (36°10'S., 136°50'E.) lies about 8 miles SE of Cape du Couedic. The portion above water is of very small extent. An area of broken water surrounds the reef. A heavy swell usually breaks over this reef. There are considerable depths about 1 mile off the reef, but this area has not been closely examined.

In 1984, a depth of 20m was reported to lie about 4 miles NE of Lipson Reef. A depth of 7.9m lies 1 mile SE of Lipson Reef.

Kangaroo Island—South Coast

8.4 The coast for about 2 miles NE from Cape du Couedic consists of high, steep cliffs, and is steep-to. Farther E, a sandy beach backed by steep cliffs extends about 1.25 miles to Kirkpatrick Point. The cliffs over the W end of the beach rise to a height of 131m.

Kirkpatrick Point (36°03'S., 136°46'E.), a sloping point about 76m high, is marked by three conspicuous boulders on its top. One boulder is about 30.5m high.

Weirs Cove (36°03'S., 136°45'E.), entered close W of Kirkpatrick Point, has a small jetty, with a depth of 3m alongside, extending from its head.

Sanderson Bay (36°02'S., 136°48'E.) lies between Kirkpatrick Point and Cape Younghusband, about 2.5 miles ENE. Fairly high cliffs border the sandy shore.

Hanson Bay (36°02'S., 136°52'E.), entered between Cape Younghusband and Cape Bouguer, about 4 miles E, has depths of 18.3 to 35m over a rocky bottom. This bay is not available as an anchorage because it is open to the prevailing winds. The W and E shores of the bay are predominately cliffs, with hills behind them about 91m high. There are four sandy beaches, with low land behind them, in the N part of the bay. A detached rock, about 15.2m high, stands 0.5 mile E of Cape Younghusband.

Cape Bouguer (36°02'S., 136°55'E.), about 1 mile wide, has three cliffy projections with rocks at their base. Wooded hills, 91m high, stand N of the cape. A conspicuous clump of trees on a plateau about 11.5 miles N of the cape can be seen off this part of the coast.

Caution.—Douglas Rock (36°03'S., 136°51'E.), an isolated pinnacle rock, awash, lies 2.5 miles W of Cape Bouguer. It has depths of not less than 25.5m surrounding it and the sea does not always break over it. Vessels of any size are advised to pass outside Douglas Rock.

8.5 The coast between Cape Bouguer and Cape Kersaint, about 10 miles E, consists of low cliffs and scrubby rises. A remarkable sand patch lies at the top of a cliff, close to the coast, about 2 miles NE of Cape Bouguer. A sunken reef extends about 0.3 mile S from a point about 0.75 mile E of the sand patch. A river flows into the sea, over a sandy beach, about 2.5 miles farther ENE.

Cape Kersaint (36°02'S., 137°07'E.) is a headland with prominent cliffs, and a scrub-covered hill, 96m high, above it. A SW swell rolls in with great force on this part of the island; it is advisable to give this coast a wide berth between Cape Bouguer and Cape Kersaint.

Caution.——Northwest Snare (36°02'S., 137°11'E.) is a dangerous pinnacle rock that lies about 2 miles offshore, 3 miles E of Cape Kersaint. There are depths of 3.6m over it and depths of more than 18.3m close around it. It breaks heavily with a big swell, but only occasionally when the sea is smooth.

An 8.2m patch was reported (1960) to lie about 4 miles SSE of Cape Kersaint, and an 18.3m shoal was reported (1961) to lie about 4 miles SSW of the same cape; a 12.8m shoal was reported (1984) to lie 2.5 miles ENE of the 18.3m shoal.

Southeast Snare, a dangerous pinnacle rock, lies 7 miles ESE of Cape Kersaint. There are depths of 5.5m over it, and depths of more than 18.3m close around it. It does not break as often as Northwest Snare and a good lookout is necessary when in its vicinity. It breaks heavily in bad weather. During a heavy swell, there are rollers in depths of 12.8 to 16.5m over some irregular ground about 1 mile S of Nobby Islet. This area should be avoided because of the possibility of lesser depths.

A group of above-water rocks lies between 17 and 23 miles SE of Cape Kersaint. As they are above-water rocks, they are not dangerous by day in clear weather but at night they should be given a wide berth.

8.6 **Young Rocks** (36°23'S., 137°15'E.) is a group of three above-water rocks and a sunken rock. The largest rock, 9.1m high, lies 21.5 miles SSE of Cape Kersaint. Two low rocks, close together, lie about 0.25 mile NE of the 9.1m rock, and a sunken rock lies about the same distance SW of it. A bank, with a depth of 14.6m at its N end and depths of 10m close S, lies about 0.5 mile SE of the 9.1m rock. In 1989, Young Rocks were reported to lie 1.1 miles ESE of their charted position.

North Rock (36°18'S., 137°15'E.), about 3m high, lies about 4.25 miles N of the largest of the Young Rocks. The sea usually breaks completely over it. **Southwest Rock** (36°23'S., 137°13'E.), 1.5m high, lies 2.25 miles SW of the largest of the Young Rocks. In 1989, North Rock and Southwest Rock were reported to lie 1.4 miles ESE of their charted positions.

8.7 A small bight lies between Cape Kersaint and a point, 59m high, about 1 mile to the ENE. There are depths of 16.5 to 18.3m within this bight and depths of 24m close to the S side of the point. The cliffs between this point and Ellen Point, about 2 miles NE, gradually decrease in elevation; there are depths of 11 to 16.5m about 0.25 mile offshore.

Ellen Point (36°00'S., 137°09'E.), a grassy mound 8.5m high, is bordered by low rocks at its base. A light is shown from the point.

Vivonne Bay (36°00'S., 137°12'E.) is a bight in the coast between Ellen Point and the mouth of the Mary River, about 1.75 miles NNE. The Harriet River flows into the W part of the bay.

Mount Bloomfield (35°58'S., 137°14'E.), about 83m high, conical, and barren, stands about 0.75 mile inland and 2 miles E of the mouth of the Mary River.

During N and W winds, anchorage can be taken in Vivonne Bay, in depths of 9.1 to 11m. The bay is open to the SE, and although the sea is smooth during fresh SE winds, there is no space to get underway if the wind increases and a sea is raised.

From November to April, when the SE winds blow, vessels seeking shelter go to D'Estree Bay, where the sea is smoother and room is available to put to sea.

A small jetty, with depths of 1m alongside its outer end, extends 79m offshore in the W part of Vivonne Bay.

Nobby Islet (36°00'S., 137°16'E.), a rock 75m high, lies 4.5 miles ESE of the mouth of the Mary River and close offshore. Between Nobby Islet and Cape Gantheaume, about 9.75 miles ESE, the coast is backed by cliffs of moderate height and bordered by foul ground which extends about 0.5 mile offshore in places.

Conspicuous hills, which form the summit of a wooded range, stand about 4.5 miles NW of Cape Gantheaume. A sand hill, 95m high, and a green-colored conical hill, 86m high, stand 3.25 and 1.5 miles NW, respectively, of Cape Gantheaume.

8.8 Cape Gantheaume (36°04'S., 137°27'E.), about 46m high, is steep on its W side and sloping on its E side. A reef extends about 0.75 mile WSW from the cape and several rocks on it are just above water. The outer rock is awash. There are breakers about 0.1 mile W of the outer rock.

Quin Rock (36°05'S., 137°24'E.), with a depth of 1.8m, and with depths of more than 18.3m within 0.5 mile of it, lies 2.25 miles WSW of Cape Gantheaume. The rock is small and with a smooth sea seldom breaks. A shoal, with a least depth of 9.1m, lies 3.25 miles SSW of Cape Gantheaume.

Pelorus Islet (36°07'S., 137°31'E.), a bare rock, 12.2m high, lies 4.25 miles ESE of Cape Gantheaume. A reef, with several above-water rocks on it, extends about 0.2 mile E from the islet; an above-water rock lies close to its SW side. A clear deep channel lies between the islet and the cape. With a heavy swell, the sea breaks completely over the islet.

The coast between Cape Gantheaume and Cape Linois, about 7.5 miles NE, is bordered by fairly high cliffs. The latter cape is a headland with prominent cliffs. The highest land near the coast is a scrub-covered hill, 92m high, about midway between the capes.

8.9 Cape Linois (36°01'S., 137°35'E.) is a bold. cliffy headland about 72m high. The cliffs decrease in height NE of Cape Linois and end about 1.5 miles from it.

An 18.3m shoal was reported (1961) to lie about 13.5 miles SE of Cape Linois.

Tinline Point (35°58'S., 137°37'E.), with a remarkable cracked rock on it, lies about 3.75 miles NE of Cape Linois. The crack in the detached rock is open when viewed from the N or S.

D'Estree Bay (35°55'S., 137°39'E.), an open body of water, lies between Tinline Point and Reynolds Point, about 8 miles NE; the latter point is a high headland with a steep-to fringing reef. The first 5 miles of the bay's shore is backed by white limestone cliffs, with the remaining shore being bold with intermittent cliffs.

Osmanli Reef (35°58'S., 137°38'E.), about 0.5 mile NE of Tinline Point, consists of a number of detached patches. The outer patch, with a depth of less than 1.8m, lies about 0.35 mile NNE of Tinline Point. There are depths of more than 9.1m close outside of it. During fine weather, the reef breaks only occasionally, and vessels are advised to give Tinline Point a berth of about 1 mile. Two remarkable sand patches are located on the coast about 1.75 miles WSW of Reynolds Point.

In the W part of the bay, the depths shoal rapidly from 9.1 to 2.7m about 0.5 mile offshore; the N side of the bay is steeper, there being depths of 9.1 to 11m less than 0.5 mile offshore.

Good anchorage can be taken in the W part of the bay, in a depth of 9.1m, sand, with the extremity of Tinline Point bearing 182°, distant 2.25 miles, and the highest of the limestone cliffs in the bay bearing 275°. Little swell is felt in this position in ordinary weather and during offshore winds. By keeping Tinline Point bearing 182°, depths of 8.2 to 9.1m will be maintained to within 0.75 mile of the point. Should landing be necessary, in ordinary weather, or even with moderate SE winds, there is no surf on the beach between 0.5 mile from Tinline Point and 0.5 mile N of the highest limestone cliff.

The coast between Reynolds Point and the low sandy bight of Pennington Bay, about 1 mile NE, is predominantly cliffs. Prospect Hill, N of this bay, rises to a sandy height of 100m and is bush-covered. It stands on a sandy neck of land which connects the Macdonnell Peninsula (Dudley Peninsula) with the main island.

The coast between Pennington Bay and False Cape, about 14 miles ESE, is generally cliffy and fronted in places by sandy beaches. This entire section of coast is steep-to. A river flows into the sea about 4.5 miles WNW of False Cape, but has no commercial value.

8.10 Cape Hart (35°54'S., 138°03'E.), a low rocky point, lies 1.5 miles E of False Cape. A breaking reef extends 0.2 mile S from the cape. Cape Hart has been reported to be a good radar target at distances up to 17 miles.

A 9m patch was reported (1961) to lie about 11 miles S of Cape Hart.

Vessels should avoid a dumping ground for barges which lies within 2.5 miles of a position 7 miles WSW of Cape Hart.

From Cape Hart the coast extends 5 miles NE to Cape Willoughby.

Kangaroo Island—East Coast

8.11 Cape Willoughby (35°51'S., 138°08'E.), the E extremity of Kangaroo Island, is a bold, rocky headland, 53m high. The cape has been reported to be a good radar target at distances up to 18 miles. A light is shown at the cape.

Sanders Bank (36°03'S., 138°20'E.), with depths of less than 36m, extends about 12 miles NNE from a position about 17.5 miles SSE of Cape Willoughby. A least depth of 22m lies on this bank about 15.5 miles SE of the same cape. Sometimes there is a heavy, breaking sea over this bank and 10 to 20 miles S of Cape Willoughby; it may be due to the comparatively shoal depths in this area or to the ebb current from Backstairs Passage meeting a heavy swell.

Carter Knoll (36°09'S., 138°10'E.), with a least depth of 36m, and Fenris Bank, with a depth of 18.3m, lie 18 and 10 miles S, respectively, of Cape Willoughby. The sea occasionally breaks heavily in the vicinity of Fenris Bank.

Threshold Bank (35°55'S., 138°15'E.), which has a least depth of 14.6m, lies 7 miles SE of Cape Willoughby.

Courtesy of Lighthouses of Australia
Cape Willoughby Light

8.12 Cape St. Alban (35°48'S., 138°08'E.) lies about 2.25 miles N of Cape Willoughby and extends in a N direction as a narrow neck of land. The cape has been reported to be a good radar target at distances up to 12 miles. A light is shown at the cape.

A bank of sand and rock, with depths of less than 10m, lies up to 1 mile offshore between Cape Willoughby and Cape St. Alban. The shallowest part of this bank, known as The Scraper, which breaks except in the calmest weather, lies about 0.5 mile ESE of Cape St. Alban. The depths increase rapidly about 1 mile SE of Cape St. Alban, causing a tide rip in fine weather. During bad weather, a heavy breaker rolls right up to the shore.

Antechamber Bay (35°48'S., 138°06'E.) lies between Cape St. Alban and Cape Coutts, about 3.75 miles NW. The SE shore is high and wooded. The SW shore is low, and the NW shore is high and rocky. The Chapman River flows into the W part of the bay, but has no commercial significance.

Vessels can anchor in any part of the bay at distances of 0.5 to 0.75 mile offshore. Good anchorage can be taken, in a depth of 6.4m, sand, in the SE corner of the bay, between the cape and the rocky point about 1.25 miles W of the cape. Smaller craft can anchor farther in according to draft. The current is weak inside depths of 5.5m.

From its appearance it would seem that a heavy swell would enter the bay with ESE winds, but this is not the case. The strong tidal currents in the passage raise such a ripple that the swell is smoothed before it reaches the shallow water. The heaviest swell is raised during strong S gales when the swell rounds Cape St. Alban. The S part of the bay is the smoothest, but with proper precautions, a vessel may anchor in any part of the bay.

8.13 Cape Coutts (35°46'S., 138°04'E.) is bold, high land, with depths of more than 18.3m close offshore. The coast between Cape Coutts and Hog Point, about 6.5 miles WSW, continues bold and steep-to. Snapper Point Light is shown from a tower with shingles which form the letter T standing on the cliff top at Snapper Point, 1.5 miles NW of Cape Coutts.

Hog Bay (35°44'S., 137°56'E.) lies on the E side of Hog Point. A small village lies along its shores. A small jetty, with a depth of 5.5m alongside its outer end, extends 145m E from the NE extremity of Hog Point.

Small vessels can anchor in the bay, in depths of 3.7 to 7.3m, about 0.1 to 0.2 mile offshore.

Kangaroo Head (35°43'S., 137°54'E.), about 1.5 miles W of Hog Point, is a bluff, rocky point marked by a conspicuous white cairn. The land behind Kangaroo Head rises steeply to heights of 91 to 122m. The head is steep-to and the current sets rapidly past it, forming an eddy S of it during the W current and causing strong ripples off the point.

Hardstaff Shoals (35°42'S., 137°53'E.), a group of shoals with depths of 10m and less over them, lie within 3.5 miles NW of Kangaroo Head. There is a least depth of 6.4m over the SE end of the N shoal, and 6.4m on the E side of the S shoal, 1.5 miles off Kangaroo Head.

8.14 Nepean Bay (35°40'S., 137°45'E.) lies between Kangaroo Head and Marsden Point, about 16 miles NW. It comprises the three large anchorages of Eastern Cove, Western Cove, and Kingscote Harbor.

Eastern Cove (35°46'S., 137°51'E.) lies between Kangaroo Head and Morrison Point, about 6 miles W. Morrison Point is a moderately high headland with a few rocks close off it. This cove is used principally by coasters and small craft which have been overtaken by bad weather from the NW while at the outer ports in Gulf St. Vincent. Large deep-draft vessels will not find much shelter from N winds.

The shore of Eastern Cove, between Kangaroo Head and American Beach, 2.5 miles S, is rugged and rocky. Between the SW end of American Beach and Rocky Point, it consists of alternate beaches and low, rocky points. A sandy beach forms the S shore between Rocky Point and Strawbridge Point, 2.75 miles WNW. The S side of the cove is low with wooded hills at the back.

8.15 Strawbridge Point (35°47'S., 137°47'E.) is the S point of the mouth of the American River, which forms the entrance of Pelican Lagoon. Extensive sand flats front the shore from Strawbridge Point to Ballast Head; these flats dry up to about 0.5 mile off Strawbridge Point.

The **American River** (35°47'S., 137°47'E.) and Pelican Lagoon are available only to small craft with local knowledge. The tidal currents in the American River flow at a rate of 2 to 3 knots, changing from 1 to 2 hours after the times of high and low water.

Ballast Head (35°45'S., 137°48'E.), about 2 miles N of Strawbridge Point, is a bluff-looking point with its lower part black-colored.

8.16 Western Cove (35°42'S., 137°38'E.) lies between Morrison Point and Beare Point, about 8 miles NW. The S shore, between Morrison Point and a red cliffy point about 3 miles W, is high and rocky. A range of wooded hills along the S shore falls gradually to the W. Red cliffs extend about 1.5 miles W from the red cliffy point, and from there to the head of the cove is a continuous sandy beach. The land at the head of the cove is low and swampy and continues so to Beare Point, at the entrance of Kingscote Harbor.

The Cygnet River, which flows into the cove about midway between the head of the cove and Beare Point, is navigable only by boats at high water.

Beare Point has been reported to be a good radar target at distance up to 21 miles.

Frenchman Rock (35°43'S., 137°43'E.), a rocky patch with a least depth of 3.7m, lies 1 mile NNW of the red cliffy point and 1.75 miles W of Morrison Point. The depths between this patch and the red cliffy point are very irregular. Two rocky patches, with depths of less than 1.8m, lie about 0.5 mile offshore near the W end of the red cliffs. A drying sand flat lies between 0.25 and 0.5 mile offshore between the red cliffs at the head of the cove up to 1 mile S of Kingscote Jetty and almost to Beare Point.

Good anchorage can be taken in any part of Western Cove, except off the red cliffs on the S side, where the bottom is rocky. The depths shoal gradually from 10.1m in the center of the cove toward the W side.

There is good anchorage, in a depth of 5m, with the easternmost of the W sand hills, on the S side of the cove, bearing 185°, distant about 0.5 mile.

8.17 Kingscote Harbor (35°39'S., 137°39'E.) lies about 1 mile S of the entrance of the Bay of Shoals, between the E side of the promontory of which Beare Point is the SE point and the S end of a drying spit about 2.25 miles ESE. This drying spit extends about 5 miles NW to Cape Rouge.

The harbor is sheltered from N and W winds, in depths of 5.8m. Depths of 7.3m lie S of the SE end of the drying spit, but the shelter is poor.

The coast between Beare Point and Beatrice Point, about 1 mile N, is 1.5 to 61m high, the land behind being high and cultivated on the summit. A conspicuous silo stands 0.25 mile S of the summit.

A narrow drying sand spit extends about 0.5 mile N from Beatrice Point.

A reef, with depths of 0.9m over its outer end, extends about 0.25 mile E from a position on the coast 0.5 mile N of Beare Point.

West of Beatrice Point, the coast curves W and NE to Cape Rouge, enclosing a shallow body of water known as Bay of Shoals. A drying spit, marked by three low, small islets known as Bushy Islet and the Beatrice Islets, extends almost 5 miles SE from Cape Rouge. Depths of less than 5m extend about 1.25 miles farther SE.

The obstructed channel leading into the Bay of Shoals crosses the N part of this spit and has a least depth of 0.9m in the fairway. Within the bay the depths increase to 2.7 to 3m.

8.18 Kingscote (35°39'S., 137°38'E.) (World Port Index No. 54200), the principal town on Kangaroo Island, is the terminal for a car ferry from Port Lincoln and an export terminal for island cattle and agricultural products. Kingscote Jetty, with a depth of 4.6m at its head, extends 350m abreast of the town. The jetty is fitted out for ro-ro freight, with a lift bridge at its outer end where trailer ships berth stern-to.

In the narrow channel that leads into the Bay of Shoals, the currents attain a rate of 3 to 4 knots. The flood sets N at the anchorage while the ebb SSE, at a rate of 0.5 knot at springs.

The best anchorage lies about 0.75 mile E of the jetty, in a depth of 5.8m.

Small craft can anchor with Beatrice Point bearing 286°, in a depth of 3.7m, soft sand.

A vessel approaching from the E, having identified TableTopped Hill, about 6.5 miles WNW of Beare Point, should steer for it on course 285°, passing S of the lighted beacons marking the S end of the sand spit extending SE from Cape Rouge. Beatrice Point on a bearing of 314° leads W of the sand spit to the anchorage. There is a least depth of about 6.4m until within about 0.75 mile of the jetty.

Backstairs Passage

8.19 Backstairs Passage (35°44'S., 138°10'E.), the E entrance of Gulf St. Vincent and Investigator Strait, lies between the Macdonnell Peninsula, the E end of Kangaroo Island, and the W end of the Fleurieu Peninsula, about 7 miles to the NE. It is navigable by the largest vessels and presents but few difficulties.

The SW side of the passage, which is for the most part bold and cliffy, has been previously described in paragraph 8.12 through paragraph 8.14. The NE side, which is bold and rocky, with high scrub-covered hills intersected by deep ravines, is described under the principal description of the W end of the Fleurieu Peninsula, in paragraph 8.55.

North Page Island (35°45'S., 138°18'E.), a rocky islet, 24.4m high, about 8.75 miles ENE of Cape St. Alban, is steep-to on its S side but has depths of less than 9.1m up to 0.25 mile N of it. This islet is the largest and northernmost of The Pages, a group of rocks and islets lying near the middle of the S entrance of the passage.

South Page Island (35°47'S., 138°18'E.), 20m high, lies about 1 mile SSW of North Page. There is a deep channel between the two islets, but a depth of 8.5m lies in the S part of the channel, about 0.5 mile NNE of South Page.

The Pages have been reported to be a good radar target at distances up to 13 miles. Two small rocky islets, about 0.9m high, lie between 0.3 and 0.5 mile SSW of South Page. A light is shown from South Page Islet.

8.20 Yatala Shoal (35°44'S., 138°11'E.), with depths of less than 18.3m, lies centered about 6.5 miles WNW of North

Page and breaks with any sea running. There is a least depth of 5.5m near the middle of the shoal and patches of 6.1 to 8.2m lie on its N part. The upheaval of this shoal, which is composed of gravel, coarse sand, and shell, may have been caused by the action of the tidal currents, which sometimes run at a rate of 4 to 5 knots; the depths over the shoal may vary.

Landing Shoal (35°39'S., 137°59'E.), with depths of less 18.3m, is 3.5 miles in extent in a N-S direction, with a depth of 13.1m at its center, 6.25 miles WSW of Cape Jervis.

Tides—Currents.—The tidal currents in Backstairs Passage are rapid and sometimes irregular; their influence in the S part of the entrance does not extend far outside Cape Willoughby. The flood sets NW and the ebb sets SE. The rate of the current in the passage is charted as 3 knots, but it varies according to the strength and direction of the prevailing wind, and at times is reported to exceed 4 knots.

Vessels traveling E through Backstairs Passage should keep as close to Cape Jervis as wind and weather will permit to avoid being set W by the current from that channel.

Caution.—A submarine power cable extends across the strait from a bay 1.5 miles SE of Cape Jervis to a point on the shore about 1 mile NW of Snapper Point.

A ferry plies across the passage between Hog Point and Cape Jervis.

Investigator Strait

8.21 Investigator Strait (35°30'S., 137°00'E.), the most direct channel to Gulf St. Vincent from the W, and between Spencer Gulf and Gulf St. Vincent, lies between the N coast of Kangaroo Island and the S coast of the Yorke Peninsula. With the exception of the rocks in the vicinity of the Althorpe Islands and the shoal off Point Davenport, both on the N side, and Orcades Bank, which has a least depth of 18.3m and lies almost 14 miles ESE of the Althorpe Islands, it is clear of offlying dangers. The greatest depths are formed on the S side, which is steep-to. The bottom is mostly broken shells mixed with sand, gravel, or coral.

Investigator Strait—South Side

8.22 The coast between Cape Borda and Cape Forbin, about 10 miles E, is bold and cliffy. There is a break in the cliff about 2.5 miles E of Cape Borda, where there is a small cove known as Harvey's Return.

Cape Torrens (35°43'S., 136°43'E.) is a high point, with cliffs about 220m high, about 6.75 miles E of Cape Borda. It divides the space between Cape Borda and Cape Forbin into two bights. In the W bight, the cliffs are high and level for a distance of 4 miles from Cape Torrens, but in the E bight they fall gradually to the De Mole River, a small river of no commercial importance.

Between Cape Forbin, a rugged cliffy point, 54m high, and Cape Dutton, about 18 miles ENE, the coast is very rugged and cliffy.

Snug Cove (35°42'S., 136°50'E.), the next cove E of Cape Forbin, is the most sheltered, being open only to the NW. The cove may be recognized by a small peaked islet, about 27.4m high, lying close to the point and also by a high cliff, with some white marks near its summit, about 1.25 miles E of it.

Small coasters can lie, in depths of 11 to 16.5m, close to the beach on the N side, secured bow and stern.

The coast between Snug Cove and the mouth of the Western River, about 7.25 miles E, is a range of high level cliffs. The highest part of the range rises to a height of 220m, about 3.5 miles E of Snug Cove. Inland, the terrain rises to a height of 267m about 1.25 miles S.

8.23 The **Western River** (35°41'S., 136°59'E.) is a small stream which flows into a cove of no commercial importance.

Snelling's Beach (35°41'S., 137°04'E.), about 5 miles E of the mouth of the Western River, is bordered by cliffs which are lower than those to the W. The Middle River flows into the sea through Snelling's Beach.

During S winds coasters can anchor about 0.1 mile off Snelling's Beach, in a depth of 5m, and about 0.5 mile off, in a depth of 12.8m, but the bottom is rocky at the latter depth.

Vessels anchoring off the beach should give its NE point a berth of 0.25 mile in order to avoid a reef which extends from it; the sea usually breaks over this reef.

Cape Dutton (35°38'S., 137°09'E.), a sloping cliffy point about 61m high, lies 4 miles E of Snelling's Beach. A sunken reef extends about 0.25 mile NE from Cape Dutton, with depths of 18.3m outside it. A tidal race generates off the cape at times; in strong winds, the race resembles breakers.

The coast between Cape Dutton and Cape Cassini, about 9 miles ENE, consists of high broken cliffs intersected by several small coves. Stokes Bay, the largest of these coves, is located about 3 miles E of Cape Dutton. At times, coasters anchor here during S winds, about 0.2 mile offshore, in depths of 7.3 to 12.8m, rocky bottom. Local knowledge is necessary.

8.24 Cape Cassini (35°35'S., 137°20'E.), a white limestone headland, is 39m high. The terrain inland rises to heights of 213 to 244m.

Mount Macdonnell (35°38'S., 137°19'E.), a round-topped hill and the highest land on the N side of Kangaroo Island, rises to a height of 299m about 3.5 miles SSW of the cape. The coast up to 1.5 mile E of Cape Cassini is low and rocky and is bordered by a ledge which extends a short distance offshore. A reef, almost awash, extends about 0.25 mile offshore about 1.25 miles E of the cape. The coast up to 4 miles farther E, rises to high, dark cliffs intersected by small sandy beaches.

Dashwood Bay (35°35'S., 137°24'E.) is a slight indentation in the coast, about 3.5 miles E of Cape Cassini.

Anchorage can be taken in Dashwood Bay, in a depth of 9.1m, about 0.25 mile from the beach.

Smith's Bay (35°36'S., 137°27'E.), marked by a black boulder beach, is located about 6 miles E of Cape Cassini. The land behind the bay is low and rises S to Freestone Hill, flat-topped and 172m high.

Anchorage can be taken during offshore winds, about 0.25 mile off the middle of the beach, in a depth of 10.1m.

Local knowledge is necessary in anchoring in either Dashwood Bay or Smith's Bay.

8.25 Cape d'Estaing (35°35'S., 137°30'E.), a 13.2m high cliff with a white face to the N, lies 2 miles E of Smith's Bay. A breaking reef extends up to 0.25 mile offshore between the bay

and the cape. A rocky ledge extends about 0.5 mile N from the cape and is just awash at high water.

Emu Bay (35°35'S., 137°32'E.) lies between Cape d'Estaing and a rocky point about 3.5 miles to the E. The depths, which are more than 9.1m in the middle of the bay, decrease gradually toward the shore.

A jetty, about 110m long with a depth of 1.2m at its outer end, extends from the W shore of the bay, but is no longer used by commercial shipping.

Good anchorage can be taken, in a depth of 9.1m, with the N extremity of White Point, about 5 miles E of Cape d'Estaing, in range 072° with the E rocky point of the bay. Smaller vessels can anchor closer in

The coast between Emu Bay and White Point is fronted by high, dark cliffs. A rocky ledge, parts of which are awash, extends about 0.25 mile N from the point.

8.26 Mount Marsden (35°35'S., 137°35'E.), round-topped and wooded, rises to a height of 178m, about 1.25 miles SW of White Point. East of White Point, the land becomes lower and forms Boxing Bay. There are depths of 11m near the middle of the bay, which gradually shoals toward the shore.

Marsden Point (35°34'S., 137°37'E.), a rocky headland of moderate height, stands 1.75 miles E of White Point. High wooded land rises about 0.5 mile W of it. Marsden Point has been reported to be a good radar target at distances up to 20 miles. A light is shown from about 0.5 mile W of the point. An aeronautical light is situated about 9.5 miles SSW of Marsden Point.

Good anchorage can be taken, in depths of 7.3 to 11m, good holding ground, with Marsden Point bearing between 325° and 314°, distant about 1 mile. This anchorage is out of the current and is sheltered from W to NW.

A detached 11m patch lies about 3.75 miles ESE of Marsden Point.

Investigator Strait—North Side

8.27 The Althorpe Islands (paragraph 7.88) and Cape Spencer (paragraph 7.90) have been previously described.

The coast of the Yorke Peninsula between Cape Spencer and Penguin Point, the W point of Marion Bay, 5 miles to the ENE, forms three bays which have cliffy and rocky points with low land to the N. The point 3 miles E of Cape Spencer is bold and steep, with high, white cliffs to the W. Several rocky islets lie about 0.2 mile offshore in a position midway between Cape Spencer and this point. There is a reef between the islets and the coast.

8.28 Stenhouse Bay (35°16'S., 136°57'E.) lies between the white cliffy point mentioned above and Rhino Head, a sloping cliffy headland with a remarkable pinnacle rock on its extremity, about 1.5 miles E. This head resembles the head of a rhinoceros.

A jetty extends 205m SE from the W shore of the bay, being protected from the SW swell by the W point. The berth at the head of the jetty, on its N side, is 115m long, with an alongside depth of 6.9m. During SW weather, vessels lie off from the jetty. The jetty is equipped for bulk loading of gypsum.

Foul ground exists about 100m SE of the head of the jetty; the depth in the approach to the jetty is 6.7m. The hull of a sailing vessel was placed about 250m SSE of the head of the jetty and sunk in that position. Part of the hulk is visible at low water. The jetty is now closed to commercial shipping.

The currents within the bay set NNW and SSE at a rate of 1 knot.

Pilotage is not compulsory. There is limited port radio service at Stenhouse Bay.

Stenhouse Bay—Jetty Signals	
Signal	**Meaning**
By day	
One yellow ball	Vessel must not berth
Two yellow balls, disposed vertically	Vessels may berth
Two yellow balls, disposed horizontally	Vessel must proceed elsewhere
By night	
One red light	Vessel must not berth
One green light	Vessel may berth

Stenhouse Bay Jetty

8.29 Penguin Point (35°15'S., 136°58'E.), a low cliffy point with sand hills at the back, lies about 1.25 miles NNE of Rhino Head. A sunken reef extends about 0.1 mile from the point.

Marion Bay (35°14'S., 137°00'E.) lies between Penguin Point and a cliffy point about 4.75 miles to the E. The head of the bay is shallow and fouled by a rocky bottom.

After a strong W gal,e heavy rollers set in from the S, and the whole bay becomes a mass of breakers.

A jetty, 267m long, with a depth of 2.1m at its head, extends from the shore 0.75 mile N of Penguin Point.

For a distance of about 1.5 miles E from the E point of Marion Bay, the coast is cliffy. From here to Hillock Point, a

Marion Bay Jetty

low, rocky point with a hillock on it, about 0.5 mile farther E, the coast is sandy. After SW gales, the sea breaks heavily more than 0.5 mile seaward of these cliffs, off which the bottom is rocky and uneven.

Yorke Point (35°14'S., 137°10'E.), 55m high, lies 3 miles E of Hillock Point. An islet lies close under the cliff at the point. Yorke Point has been reported to be a good radar target at distances up to 18 miles.

8.30 Foul Bay (35°11'S., 137°15'E.) lies between a point about 2 miles E of Yorke Point and Point Davenport, a low sandy point about 8 miles NE. For a distance of about 1 mile N of the W point of the bay, the coast is cliffy; from there the shore of the bay consists of a low, sandy beach.

Foul Bay is shallow, and the depths on its W part decrease gradually to the shore, there being depths of 5.5m from 0.5 to 1 mile offshore. At the head of the bay and toward Point Davenport, the depths are very irregular, with rocky patches having depths of 3.7 to 5.5m over them less than 1.5 miles offshore.

The S swell sets into the bay, but in fine weather there is no surf on the beach. The flood sets NNE into Foul Bay at a rate of 1.5 knots; the ebb sets SW.

A rock, with a depth of less than 1.8m, lies 1 mile offshore, 3 miles WSW of Point Davenport.

8.31 Point Davenport (35°10'S., 137°20'E.), which separates Foul Bay from Sturt Bay to the E, is very low and difficult to make out from the S, as it is hardly a point on the beach.

Point Davenport Shoal (35°11'S., 137°22'E.), with depths of less than 5.5m, extends about 2.5 miles W and N from a position 3 miles SE of Point Davenport.

There is a least depth of 10m in the narrow channel between the shoal and the drying sand flat that extends from Point Davenport. Depths of less than 10m extend about 0.5 mile seaward from the shoal.

Sturt Bay (35°08'S., 137°27'E.), a bight in the coast between Point Davenport and Gilbert Point, about 8.5 miles ENE, consists of a sandy beach with some sand dunes on its W part. A level scrub-covered range, about 91m high, starts near Marion Bay and extends almost parallel to the coast to abreast the head of Sturt Bay, where it ends abruptly, forming a well-defined high shoulder which is a good landmark.

Cootes Hill (35°06'S., 137°28'E.) is a conspicuous, grassy elevation at the head of Sturt Bay. It is 28m high and because of its shape and the lowness of the adjoining land, it is conspicuous. Rocks, with depths of less than 1.8m, extend about 0.3 mile S from Gilbert Point. The depths in Sturt Bay decrease gradually to the shore, there being depths of 9.1m about 1 mile from the beach.

Anchorages.—Sturt Bay provides good anchorage, in depths of 7.3 to 9.1m, fine sand and clay, about 1 mile NE of Point Davenport. Local knowledge is necessary to use this anchorage. Here there is protection from winds from NE through N to SSE; Point Davenport Shoal completely breaks the SW swell. With the wind strong between SE and NE, a short sea sets in, which is made more unpleasant by the tidal currents, which set NE and S at the anchorage.

The shoulder, described above, bearing less than 359°, leads into the bay, E of Point Davenport Shoal, in depths of not less than 11m. When making for the anchorage, vessels should steer for it until Point Davenport is identified, bearing 252°.

8.32 About 1 mile E of Point Gilbert is a point, backed by sand hills, the highest of which is 20m high. A reef, awash, extends 0.2 mile SSW from this point and has depths of not more than 1.8m for a further distance of 0.3 mile.

Port Moorowie (35°07'S., 137°31'E.), an anchorage for vessels with a draft of not more than 3m, lies between the reef and the coast N of it. The anchorage can only be used with local knowledge.

The tidal currents set E along the 20m curve on the flood, following the direction of the coast; the ebb current sets W at a rate of 1.5 knots at springs.

The coast between the E point of Port Moorowie and Troubridge Hill, 6 miles SE, is sandy for about 2 miles, and then becomes cliffy, with sand hills, about 43m high, behind the cliffs, and with sandy beaches at the foot of the cliffs. Troubridge Hill is 31m high, with a cliff face to the sea and a grassy slope on the inland side. A light and a racon are situated on the hill.

8.33 Troubridge Point (35°10'S., 137°41'E.), the W point of the entrance to Gulf St. Vincent, is about 2 miles E of Troubridge Hill. The coast between is formed by a low cliff, with no danger at a distance of more than 0.1 mile from it.

Directions.—It is best to give the N shore of Investigator Strait a wide berth. The N coast of Kangaroo Island, which forms the S shore of the strait, has no offshore dangers, and is very high and bold; on the N side of the strait, the depths vary little and do not give warning of nearing shoals. If it is necessary to approach the Yorke Peninsula, depths of at least 24m should be maintained.

Gulf St. Vincent

8.34 Gulf St. Vincent (35°00'S., 138°10'E.) lies between the Yorke Peninsula and the Fleurieu Peninsula. When entering

the gulf, the high ranges of hills on its E side may be seen for a considerable distance.

Mount Lofty, the highest part of the range, rises near Adelaide to a height of 727m. It is visible from any part of the gulf in clear weather, and is a good landmark. A white obelisk stands near its summit, and three television towers standing together near the summit are conspicuous.

Black Hill, 466m high, and Para Hill, 214m high, are located 5.5 and 11 miles N, respectively, from Mount Lofty. The summit of Mount Bonython is situated 0.5 mile N of Mount Lofty and must not be confused with that summit.

Small vessels anchor and work cargo off any of the beaches in the gulf in fine weather, but the E shore between Cape Jervis and Adelaide is exposed to W winds, and gales from that direction bring in a heavy sea.

Gulf St. Vincent—West Side

8.35 The coast for a distance of 1 mile NNE of Troubridge Point consists of a series of broken cliffs. From this position to Sultana Point, 4 miles farther NE, the coast is formed by a sandy beach, fronted by a drying flat of sand and rocks that extends from 0.5 to 0.75 mile offshore.

Troubridge Shoals (35°08'S., 137°48'E.), with depths of less than 10m over them, and including two large sandbanks that dry, extend 5 miles E from Sultanta Point. Shoaling has been reported S of the E of these two sandbanks.

Troubridge Island, about 5m high, is located on the outer drying sand bank, 3.25 miles E of Sultanta Point. A disused light is situated on the W end of the island.

Marion Reef, which breaks, lies at the S end of Troubridge Shoals, and has rocks with less than 1.8m over them. It is moderately steep-to on its S side. Marion Reef Lighted Buoy is moored 0.25 mile SSE of the reef.

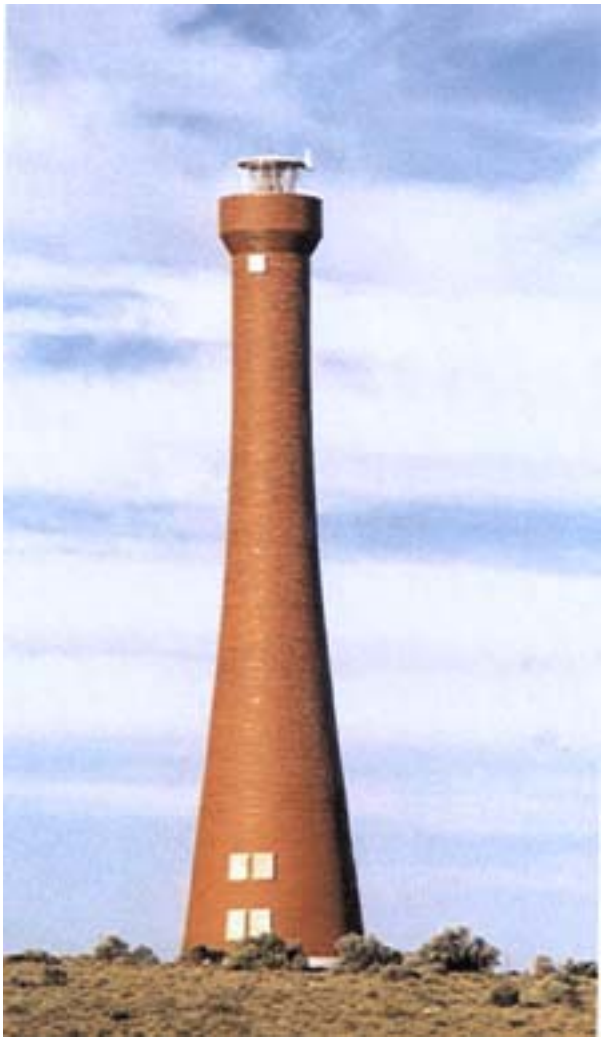
Tapley Shoal (35°05'S., 137°55'E.), with general depths of less than 10m and a least depth of 5.2m, lies 5 miles NE of **Troubridge Island** (35°07'S., 137°50'E.). The depths over the shoal vary due to the effect of the strong tidal currents on the sandy bottom. The shoal is steep to on its E side and the bottom, of sand and weed, can easily be seen. Tapley Shoal Light is shown from a pile at the N end of that shoal, 7 miles NE of Troubridge Island.

The tidal currents outside Troubridge Shoals run roughly parallel with the coast, at a rate of 2 to 3 knots at springs.

McIntosh Bank, with a depth of 17.3m, lies 8.5 miles ESE of Troubridge Island.

Macdonell Sound (35°03'S., 137°50'E.) is an open roadstead that lies N of Troubridge Shoal, between Tapley Shoal and the coast. It is bordered on the N by a coastal bank, which extends in places up to 7 miles offshore, and fronts the coast N to Rogues Point. Macdonell Sound Lighted Beacon stands about 6.5 miles NNE of Troubridge Shoals Light and marks the S extremity of the coastal bank. The sound is entered between this beacon and Tapley Shoal Light. Edithburg, Port Giles, and Wool Bay are situated within the sound.

The best anchorage in Macdonnell Sound is with Troubridge Island bearing between 185° and 140°, distant 2 to 3 miles, in depths of 9 to 12m, fine sand.



Courtesy of Ed Kavaliunas and Malcom Macdonald's Lighthouses of Australia Page

Troubridge Hill Light

Edithburgh (35°05'S., 137°45'E.) is a fishing port that is no longer used by commercial shipping. It is situated 1.75 miles NNW of Sultana Point.

The coast between Edithburgh and Giles Point, 2.5 miles N, forms a bay, most of which is encumbered by a drying flat of mud and sand.

Giles Point (35°03'S., 137°45'E.) is a rounded point, low and grassy on its S side, and cliffy toward the N. Depths of less than 5.5m extend more than 0.5 mile E from it.

Caution.—Marine farms, best seen on chart, have been established near Giles Point. Marine farms, which may be floating or fixed structures, and their associated moorings should be avoided. The farms are generally marked by buoys or beacons, which may be lit.

8.36 **Port Giles** (35°02'S., 137°46'E.) (World Port Index No. 54255) consists of a jetty which extends E from the shore, 4 miles N of Edithburgh. The port is the administrative center for Edithburgh.

Grain is transported from the silos to the ships by a conventional belt conveyor and loaded by telescopic booms which can feed into any hold without movement of a ship along the berth.

Flinders Ports South Australia

http://www.flindersports.com.au

Winds.—The prevailing winds are from the NE.

Tides.—The mean high water springs are 1.9m; mean high water neaps are 1.5m.

Depths—Limitations.—The approach channel has a depth of 13.5m. A jetty extends about 617m from the shore; a berth on the N side of the jetty is 340m in length. The depth alongside is 14.7m.

Vessels up to 40,000 dwt, with lengths up to 205m and beams up to 29m, can be accommodated. The maximum loaded draft allowed is 12.2m. Berthing is done during daylight hours only.

Aspect.—Grain silos, which are conspicuous, are situated near the root of the jetty.

Pilotage.—Pilotage is compulsory and may be arranged for through Port Adelaide. The pilot embarks about 2.5 miles E of the jetty in Port Giles.

Notice of arrival is required 24 hours in advance; the ETA should be confirmed 4 hours before arrival. Entry is made on slack water during daylight hours only. The pilot vessel is equipped with radiotelephone.

8.37 Wool Bay (35°00'S., 137°45'E.), 1.75 miles N of Port Giles, is about 0.3 mile in extent, with a high, cliffy bank behind its beach. A jetty, with depths of 2.4m at its outer end, extends 180m from the beach. The jetty is closed to commercial shipping.

A shoal, with depths of 5.2 to 6m, extends 2.5 miles SE from a position 3 miles ENE of Wool Bay Jetty.

Klein Point Jetty (Farquhar Jetty) (34°58'S., 137°46'E.) (World Port Index No. 54210) extends from the shore at Klein Point, the S point of a small cove, 2 miles N of Wool Bay Jetty. It is a T-head structure providing a berth 150m long, with a depth of 6.5m alongside. The jetty works limestone cargo exclusively.

Anchorage may be taken with Wool Bay Jetty bearing 286° and Giles Point bearing 202°, in depths of 11 to 12.8m.

Small vessels, with local knowledge, anchor about 0.25 mile off the jetty, in depths of 3.7 to 5.5m.

The shore of Wool Bay, contained between Giles Point and Oyster Point, 8 miles NNE, presents a line of cliffs from 18 to 27m, high, until within 1 mile of Oyster Point; the land behind is slightly higher than the cliffs and has a flat, wooded outline.

Oyster Point (34°55'S., 137°48'E.) is a low, sandy point that projects E, about 0.5 mile from the general line of the coast. It is not easily distinguished, but some huts on a grassy slope inside the point aid in recognition.

Caution.—A dangerous wreck lies about 5.25 miles ESE of Oyster Point.

8.38 The coast between Oyster Point and Black Point, about 18 miles NNE, is a mixture of low cliffs and sandy beaches, with a few prominent marks.

Beach Point (34°52'S., 137°49'E.), 2.75 miles N of Oyster Point, is cliffy, but the cliffs are much lower than those S of the point. Beach Point may be identified by a patch of white sand in a gully on its S side.

Oyster Bay (34°53'S., 137°49'E.) is contained between South Spit, a sandy spit, which dries in patches, that extends 3 miles NE from Oyster Point, and Beach Point. It provides sheltered anchorage from all winds, for small vessels with local knowledge, in a depth of 3.7m, with Oyster Point bearing 202° and Beach Point about 270°. A light is shown from a beacon off the N extremity of South Spit.

Caution.—Marine farms, best seen on chart, have been established off Beach Point and Stansbury. Marine farms, which may be floating or fixed structures, and their associated moorings should be avoided. The farms are generally marked by buoys or beacons, which may be lit.

8.39 Stansbury (34°55'S., 137°48'E.), is a small town on the shore of Oyster Bay, 0.5 mile WNW of Oyster Point. A water tower 58m high stands in Stansbury.

The coast between Beach Point and Surveyor Point, about 6 miles NNE, is cliffy to within a distance of about 1 mile from Surveyor Point.

Surveyor Point (34°47'S., 137°52'E.) is similar in appearance to Oyster Point. The coast becomes cliffy about 1 mile N of Surveyor Point.

Dowcer Bluff (34°45'S., 137°52'E.), about 1.5 miles N of Surveyor Point, is composed of white sand and limestone spots. This bluff and two red cliffs N of it are conspicuous from about 7 miles offshore.

Streak Point, about 0.25 mile N of Dowcer Bluff, is so named because of a narrow white mark down the face of the cliff. The coast again becomes cliffy 1 mile N of Surveyor Point, and continues so to Black Point, 9 miles farther N. If the sun is not shining on these cliffs, the land presents a dark flat outline, gradually rising to Black Point; the point itself, however, is a low projection from the beach.

Orontes Bank Light

Orontes Bank (34°44'S., 138°00'E.), with depths of less than 5.5m, extends 15 miles NNE from a position 5 miles E of Beach Point; it consists of two extensive banks, which lie parallel to the coast, about 3 to 5 miles offshore, together with two detached smaller patches. The whole shoal lies on the 10m previously-described coastal bank. Orontes Bank Light is shown from a white metal hut on piles.

8.40 Port Vincent (34°46'S., 137°53'E.) is an open roadstead contained between Middle Spit, which dries in patches, and the coast N of Surveyor Point. Port Vincent is a fishing port only. At the small town of Port Vincent, situated close N of Surveyor Point, there is a wharf with a berth 35m long on its N side, having a depth of 3.4m alongside. The approach to the wharf is indicated by a range.

Good anchorage, for small vessels with local knowledge, in a depth of 4m, may be taken with Streak Point bearing 326°, and the first cliffy point S of Surveyor Point, and just inside that point bearing 210°.

A water tower, 52m high, stands 0.75 mile NW of Surveyor Point.

North Spit is a drying spit that extends 1.5 miles NE from the coast, 4.5 miles N of Surveyor Point.

Port Julia, 7 miles N of Surveyor Point, has a jetty which dries at low water.

Black Point (Kooley Wurtie) (34°37'S., 137°54'E.) is a low beach point about 9.5 miles N of Surveyor Point. A sandspit, which dries in places, extends about 1.5 miles NE from Black Point; it should be given a wide berth.

Caution.—A fish haven, with a depth of 4.1m, lies 3 miles ENE of Black Point.

8.41 Port Alfred, which lies on the N side of Black Point, affords shelter for small craft, in depths of 3.7m, sand and mud. The anchorage is with Black Point bearing 162°, and a gap in the cliff about 1.75 miles WNW of Black Point, bearing 270°.

The coast for a distance of about 6 miles N from Black Point is rocky with red and yellow-colored cliffs. There is a conspicuous red cliff, 32m high, 4 miles N of Black Point.

A sandy beach succeeds the red cliffs for a distance of 4 miles. This beach forms two small points; the N one, on which there are some houses, is known as Perara. The ridge of high land approaches the coast at this point, then gradually rises N toward Hummock Mount. The last of the red cliffs on this part of the coast, commence about 1.5 miles N of Perara. They are 24m high and extend about 2 miles NE.

8.42 Ardrossan (34°26'S., 137°55'E.) (World Port Index No. 54236) is an open roadstead located about 2.25 miles N of Perara. It is primarily a dolomite exporting port but a considerable quantity of grain and some salt are also shipped.

Tides—Currents.—Tides range from 1.8 to 3.1m.

Depths—Limitations.—The approach channel, 125m wide, is dredged to a depth of 9.1m.

BHP Jetty extends ESE from the shore and has a T-head berth formed of dolphins. The berth is 409m in length and dredged to a depth of 9m alongside.

Vessels up to 46,000 dwt and up to 200m in length can be accommodated.

Town Jetty extends about 415m from the shore about 1 mile N of BHP Jetty; it has two berths at its head. The berths, and the channel leading to them, have been dredged to a depth of 3m.

Aspect.—Conspicuous grain silos are situated about 0.5 mile SSW of the root of the BHP Jetty.

The channel is entered close S of Androssan Lighted Beacon; range lights are situated SW of the berth. To assist in the final approach to the berth, two beacons near the head of the jetty bear 226° when in line.

Pilotage.—Pilotage is compulsory for all vessels. The pilot boards about 1 mile E of the berth in 34°27.4'S 137°56.8'E. The port uses VHF radio channels 6, 12 and 16.

Regulations.—Vessels are required to have an UKC of 10 per cent of their deep draft.

Vessels should send their ETA 24 hours in advance.

8.43 Mangrove Point (34°16'S., 138°01'E.) is located about 11 miles NNE of Ardrossan. A light is shown from a pile beacon at the point.

Port Price (34°17'S., 138°00'E.), at the head of Will Creek, which nearly dries, is situated at the S end of a shallow indentation close within Mangrove Point. There is a wharf at Will Creek that is 80m long, with a depth of 1.5m alongside.

Port Wakefield (34°12'S., 138°06'E.) forms the head of Gulf St. Vincent between Mangrove Point and Sandy Point, 6.5 miles E, on the E shore. Its shores, which are generally swampy, except in the S part on the W coast where there are some red cliffs, is fronted by a flat of mud, sand, and weed, which dries about 1.8m.

Although large, the port is so encumbered with sand and mud banks that only a small part is used for shipping.

Ross Rock, with a depth of less than 1.8m, lies near the head of the gulf.

Wakefield, a small town and fishing port, is situated at the mouth of the Wakefield River, a tidal creek, 4.5 miles N of Sandy Point.

The creek and wharf, which dries at low water, can only be used at high water, when there are depths of 3.7 to 4.3m in it and at the wharf. The wharf is closed to commercial vessels.

Anchorage can be obtained 2.5 miles WNW of Sandy Point, with Bald Hill bearing about 103°, distant 3.5 miles, in depths of 7.3 to 8.2m.

Anchorage for smaller craft lies N of the above anchorage, about 2.75 miles SW of Wakefield Wharf, in 3m. Should a vessel anchor in such shallow water as to ground, no damage is likely to occur if care is taken to keep the vessel clear of her own anchor, as the bottom, composed of sand and mud, is soft everywhere, and there is no sea.

Gulf St. Vincent—East Side—Cape Jervis to Port Stanvac

8.44 The coast between Cape Jervis and Adelaide, 50 miles NNE, is exposed to W winds, and a gale from that quarter throws in a heavy sea. On the approach of such a gale, vessels at anchor off this coast should put to sea and seek shelter in Eastern Cove, on Kangaroo Island. The coast for a distance of about 18 miles NE from Cape Jervis is bold, thence to the head of the gulf it is very low, with sand hummocks on it.

Cape Jervis (35°37'S., 138°06'E.), the W extremity of the Fleurieu Peninsula, is a high bold headland having but little vegetation. It is intersected by gullies and has several cliffy projections. The W, and most prominent, of these projections, referred to as The Cape, does not present so steep a face to the sea as the other projections, but slopes down, gradually, from the heights inland, of which Tree Hill, 345m high, 3 miles ESE

of Cape Jervis, is the most prominent. A light is shown from a structure on the cape.

There is a boat harbor, with a jetty, 120m long and having a depth of 2.6m alongside, within the rocks that extend about 0.2 mile offshore near the light.

Cape Jervis Light

Rapid Head (35°31'S., 138°10'E.) projects N about 6 miles NNE of Cape Jervis.

8.45 Rapid Bay (35°31'S., 138°11'E.), 1 mile E of Rapid Head, is an open roadstead with a T-head jetty which extends 500m N from the shore.

Depths—Limitations.—The T-head provides a berth 222m long, including the dolphins, and has a depth of 8.8m alongside. The jetty is equipped with bulk-loading facilities, but the unit does not traverse; ships must warp to load hatches in turn.

The approach has a least depth of 9.1m. Vessels up to 22,000 dwt can be accommodated. It is recommended that vessels berth during daylight hours only.

Pilotage.—Pilotage is not compulsory, but pilots can be arranged through Port Adelaide (see paragraph 8.51).

Regulations.—Vessels should contact the port on VHF channel 16 to obtain berthing clearance.

Signals.—The following berthing signals are shown from the jetty:

Signal	Meaning
By day	
One yellow ball	Vessel may not berth
Two yellow balls, disposed vertically	Vessel may berth
By night	
One red light or red neon strip	Vessel may not berth
One green light or green neon strip	Vessel may berth

8.46 Second Valley (35°31'S., 138°13'E.) is a cove formed by a slight indentation in the coast 2.5 miles ENE of Rapid Head.

The rocky point on the W side of the cove is steep-to. It provides some protection to small vessels with local knowledge from S winds, but the anchorage is exposed to W gales. A heavy sea sets in on the approach of these gales, and vessels should leave at the first sign of approaching bad weather.

A shoal, with a least depth of 4.3m, lies about 1.5 miles offshore about 2.75 miles NE of Second Valley. There is a jetty, with a depth of 4m at its head, projecting from the W point of the cove.

8.47 The **Bungala River** (35°27'S., 138°18'E.) enters the sea through a sandy beach 8 miles NE of Rapid Head. The townships of Normanville and Yankalilla are situated on the banks of the river.

Yankalilla Bay is contained between Second Valley and Carrickalinga Head, a bold headland, 9 miles NE. It affords good anchorage, in depths of 12.8 to 16m, 1.25 miles NW of the Bungala River.

The coast between Bungala River and the S end of Carrickalinga Head is formed by a sandy beach.

A range of hills, rising near the coast about 3 miles NE of Carrickalinga Head, extends NE about 17 miles, then curves N and W behind and beyond Port Adelaide.

Carrickalinga Hill, 258m high, is 1.5 miles ESE of Carrickalinga Head. Mount Jeffcott, 333m high; Black Hill, 343m high; and Mount Terrible, 385m high, are located 4, 5, and 9 miles, respectively, NE of Carrickalinga Hill.

Aldinga Bay lies between Myponga Jetty, 3 miles NE of Carrickalinga Head, and Snapper Point, 6 miles NE. It is open to winds from about N to SW, but its S part is safe during S winds.

A drying reef extends about 0.25 mile NW from Snapper Point. It fringes the coast for a distance of about 0.75 mile S and ENE of it. Foul ground, with depths of less than 5m, extends 0.25 mile seaward of the drying reef.

Port Willunga (35°16'S., 138°27'E.), which can be identified by its white cliffs, is an indentation in the coast between Snapper Point and Blanche Point, 1.75 miles NNE.

Anchorage can be obtained in Port Willunga, sheltered from S winds by Snapper Point and the reef that extends from it. The holding ground is good anywhere the depths exceed 7.3m, but a heavy sea rolls in at times, and a vessel should leave the anchorage immediately on the approach of bad weather.

8.48 Onkaparinga Head (35°10'S., 138°28'E.) is a cliffy projection, 25m high, 5 miles N of Blanche Point. A ledge of submerged rocks extends off the head and the Onkaparinga River flows into the sea through a bar of shifting sand, close N of the head.

The coast between the mouth of the river and Witton Bluff, about 1 mile N, is formed by a sandy beach, which is backed by sandhills. Witton Bluff is a bold, red projection, 35m high.

Port Noarlunga (35°09'S., 138°28'E.) is a safe harbor for small vessels and lies between Onkaparinga Head and Witton Bluff. Two narrow reefs, which dry 1.2m in places and lie roughly parallel to the coast and about 0.2 mile offshore, extend about 0.85 mile NNW from a position about 0.55 mile N of Onkaparinga Head. These two reefs are separated by Middle Entrance Channel, which is very narrow, with depths of 6.4 to 14.6m within the entrance. There are lesser depths on the range line which leads through Middle Entrance Channel.

There are entrance channels both N and S of Middle Entrance Channel, but they are only suitable for vessels with local knowledge.

The coast in the vicinity of Witton Bluff consists of sand hills, with occasional red cliffs NNE of the bluff.

A fish haven, with a least charted depth of 15.8m, lies about 1 mile W of Witton Bluff. Another fish haven has been established 2.5 miles NW of the port, which can best seen on the chart.

A spur of the Mount Lofty range reaches the coast near Black Hill, about 4.5 miles N of Witton Bluff, changing the appearance of the coast from sandhills to abrupt cliffs.

Horseshoe Reef, which dries, lies near the outer part of shoal water that extends 0.5 mile offshore N of Witton Bluff.

Caution.—A submarine pipeline extends about 0.5 mile from the shore close N of Horseshoe Reef.

8.49 Port Stanvac 35°07'S., 138°28'E.), an oil refinery complex, is situated 2.5 miles NNE of Witton Bluff and terminated operations in April 2003. The following information is being kept for continuity purposes should the refinery reopen in the future.

The terminal consists of an offshore SBM for handling crude products and a pier, with an L-shaped head, for handling refined products. Port Stanvac is the deepest refinery port in Australia.

Winds—Weather.—From September to May, the prevailing winds are from E to S; from June to August, the prevailing winds are from SW through N.

Depths—Limitations.—The pier extends over a stone causeway to an L-shaped head which provides one berth with a depth of 10.6m alongside. Vessels up to 42,000 dwt, with a maximum length of 183m and a maximum draft of 10.7m, can be accommodated at the jetty.

A depth of 6.7m, marked on its SW side by a lighted buoy, lies about 0.3 mile NE of the head of the jetty.

The offshore SBM enables vessels up to 233,000 dwt, with a maximum length of 345m and a maximum draft of 17.1m, to discharge crude oil to the refinery. A submarine pipeline extends from the SBM, 2 miles SE to the shore.

The controlling depth in the approach to the SBM is 22.8m.

Aspect.—Two conspicuous chimneys, the N of which has a flare, are situated about 0.5 mile E of the root of the pier.

A conspicuous radio tower, 274m high, stands about 2.5 miles E of the pier; it may be seen from offshore in the vicinity of Port Noarlunga.

Anchorage.—The anchorage for crude carrier vessels, in 20m, hard sand, good holding ground, is with Marino Rocks Light, described in paragraph 8.50, bearing 065°, distant 3.5 miles.

Product carriers anchor on the same bearing, 3 miles distant.

Caution.—Wrecks, with a least depth of 18m, lie 3 miles WSW of the head of the jetty.

Gulf St. Vincent—East Side—Port Stanvac to Port Adelaide

8.50 Hallets Cove (35°05'S., 138°30'E.) is a bight in the coast located about 2 miles NE of Port Stanvac pier. From Hallets Cove, the coast remains rocky for about 2 miles to a sandy beach, which continues N for about 4 miles to Glenelg.

Marino Rocks (35°02'S., 138°30'E.), a 5.5m patch, lie about 0.5 mile offshore, 6.5 miles N of Witton Bluff. A patch with a depth of 5.2m, lies outside the 5m line, 0.75 miles N of Marino Rocks. Marino Rocks Light is shown from a structure about 4 miles NE of Port Stanvac Jetty.

O'Halloran Hill, 200m high, stands 1.25 miles E of the light structure.

Holdfast Bay (34°59'S., 138°30'E.), the open roadstead off the town of Glenelg, about 3.5 miles N of Marino Rocks, has depths that decrease gradually from 11m, 2 miles offshore, to 3.7m 0.25 mile offshore. Southwest gales cause a heavy sea in the roadstead, but the holding ground is good.

Anchorage can be obtained, in depths of 9 to 11m, clay, about 1.5 to 2 miles offshore, with Mount Lofty in line with Glenelg church bearing 087°. The anchorage was at one time the roadstead for Adelaide, but is now seldom used.

The remains of a breakwater, 0.2 mile long, lie parallel with the shore, and about 0.3 mile from it, off Glenelg. Lights are shown from its N and S ends.

Glenelg church stands near the center of town. The town hall tower is near the shore, 0.2 mile WNW of the church; a water tower stands near the coast, 1 mile farther N. A pipeline extends 1.75 miles WSW from the coast in the vicinity of the water tower.

Fish havens, marked by a buoy, lie off the coast in the vicinity of Glenelg.

Patawalonga Creek opens into the sea close N of Glenelg; a breakwater extends 30m NW from the S entrance point of the creek. A boat haven lies within the creek entrance. An aeronautical radiobeacon is situated about 2.5 miles NE of Patawalonga Creek entrance; an aeronautical lighted beacon is shown at times from a position about 0.75 mile NW of the radiobeacon.

The seaside towns of Henley and Grange are situated 4 and 5 miles, respectively, N of Glenelg.

The coast between Grange and Pelican Point, the NW extremity of the Lefevre Peninsula, 8 miles N of Grange, consists of a sandy beach, backed by the buildings of the NW districts of Adelaide.

Point Malcolm, 5.5 miles S of Pelican Point, is the W extremity of the peninsula. Semaphore Jetty is a promenade jetty extending 0.3 mile offshore, 1 mile N of Point Malcolm; Largs Bay Jetty, extends 320m offshore about 1 mile farther N.

Wonga Shoal (34°50'S., 138°28'E.), with depths of less than 5m, extends 2.25 miles in a NW direction from Point Malcolm. There are depths of 2.4 to 3.7m within 0.75 mile of its outer end.

A detached 5.2m patch lies 0.4 mile NW of the outer end of Wonga Shoal; midway between this patch and Entrance Lighted Beacon, 2 miles NW, depths of 6.7 and 7m are charted.

Largs Bay is located in the vicinity of Wonga Shoal. Wrecks, with 11m and 14.6m over them, lie 3.25 miles and 7 miles, respectively, W of Largs Bay Jetty.

Port Adelaide (34°50'S., 138°30'E.)

World Port Index No. 54220

8.51 Port Adelaide is the capital port of South Australia. The port is comprised of the Outer Harbor and Inner Harbor, which are both situated along the Port Adelaide River.

Outer Harbor, situated within the breakwaters at the entrance to the Port Adelaide River, has deep-water wharves; it is intended for the accommodation of large vessels and is regularly used by mail and passenger vessels. The port also provides facilities for petroleum product, general cargo, container, ro-ro, and fishing vessels.

The Port Control Center, 40m high, is situated in the Outer Harbor at the S end of No.1 Berth. The center is equipped with radiotelephone, and all maritime channels are monitored. The station is manned continuously; the call sign is Adelaide Outer Harbor. The station controls all shipping movements in the port and is fitted with radar.

Flinders Ports South Australia

http://www.flindersports.com.au

Winds—Weather.—In the morning the wind, from N to E, is from the land. During the afternoon, the sea breeze comes from the SW, except in winter, when it is mainly from between W and N. The heaviest gales occur in May, June, July, and August.

Occasionally, a depression from the interior of the continent, or the center of a tropical hurricane from the W coast of Australia, may reach the S coast. The latter usually loses much of its intensity by the time it has moved so far S and its winds are seldom destructive.

Vessels may inquire by telephone direct to Adelaide Weather Bureau for the latest information regarding marine weather conditions and forecasts. Weather forecast signals are displayed at the Customs House, which overlooks the harbor.

Tides—Currents.—The mean tidal ranges in the Outer Harbor and in Port Adelaide are 2.4m springs and 2.0m at neaps. Strong NW winds may raise the sea level up to 1.2m above normal, while continuous SE winds may depress it by 0.5m.

The tidal currents between Wonga Shoal and the Port Adelaide River entrance turn S about 1 hour before HW and to the N about 1 hour before LW. The flood sets N and the ebb sets S across the dredged channel entrance.

Between the breakwaters and in the river to Port Adelaide, the current turns at the time of high and low water. The velocity of the current is greatest between the river entrance and North Arm, but it seldom exceeds 3 knots.

Depths—Limitations.—The entrance to the Outer Harbor, and to the river, is through dredged channels marked by lighted beacons and indicated by ranges. The entrance channel to Outer Harbor has a maintained depth of 14.2m.

The main swinging basin in Outer Harbor is about 550m in length, 420m wide, and dredged to a depth of 11m. A swinging basin in the vicinity of the container terminal is about 460m in diameter and dredged to 12m.

The Outer Harbor wharf constitutes a total of six berths. Berth information is given in the accompanying chart.

The dredged channel in the Port Adelaide River to Inner Harbor (Port Adelaide Harbor), a distance of about 7 miles, is well-marked by lighted beacons and lighted ranges.

The main channel is dredged to a depth of 9.1m as far as No. 2 Dock, and then 8.2m to the Birkenhead Bridge. Above the bridge, the river is dredged to a depth of 6.1m.

The Inner Harbor, located over a 4-mile stretch of the river, consists of numerous berthing facilities on both banks. Depths alongside range from 7.5m to 11.2m. The location of the wharves can best be seen on the chart.

Adelaide—Outer Harbor Berth Information

Berth	Length	Depth	Remarks
No. 1	185m	11.5m	General cargo and livestock
No. 2	183m	11.2m	Cruise/ro-ro
No. 3	150m	11.2m	Car Carriers
No. 4	214m	11.2m	Car Carriers
No. 6	300m	13.2m	Containers
No. 7	210m	13.2m	Containers

Adelaide—Inner Harbor Berth Information

Berth	Length	Depth	Remarks
Osborne 1	208m	10.0m	—
Penrice	120m	7.5m	Bulk soda
No. 16	160m	9.3m	General
No. 17	169m	9.3m	General
No. 18	178m	10.0m	General
No. 19	168m	10.0m	General
No. 20	163m	10.0m	General
No. 25	240m	10.2m	W. Mine Corp.
No. 27	204m	10.9m	Bulk grain
No. 29	245m	10.0m	General
H	304m	11.2m	Cement
K	171m	7.5m	Limestone
M	205m	9.7m	Petroleum
N	150m	8.7m	Petroleum

Generally, vessels up to 81,000 dwt, with a maximum draft of 11.3m, can be accommodated at the Outer Harbor. Vessels up to 29,000 dwt, with a maximum length of 206m and a maximum draft of 10.8m, can be accommodated at the Inner Harbor.

Detailed berthing information is provided in the tables titled **Adelaide—Outer (Inner) Harbor Berth Information**.

A fishing harbor is situated close within North Arm at the Inner Harbor. North Haven, a small craft basin protected by breakwaters, is situated close S of the entrance to Outer Harbor.

Power cables span the river at points 1, 1.75, and 3 miles above the Quarantine Station. The cables have a vertical clearance of 54m and are suspended from towers, 110m high, situated on each side of the river.

A fourth set of power cables, with a vertical clearance of 59m, spans the river about 0.6 mile above the Quarantine Station.

Submarine gas pipelines cross the river close N of the ETS Power Station in the vicinity of 34°48'.7S and about 1 mile S of this position in the vicinity of 34°49.5'S. Another submarine gas pipeline runs parallel to the shore and N from the quarantine station.

Aspect.—Prominent landmarks in the approach to Port Adelaide are **Mount Lofty** (34°59'S., 138°43'E.), 727m in elevation, and the Port Control signal station on the S side of the harbor entrance.

Conspicuous landmarks include a water tower, 76m high, about 2 miles S of Pelican Point; a three-story hotel situated near the root of Largs Bay Jetty; and a water tower, about 30m high, close SE of the root of Semaphore Jetty.

In the vicinity of the Inner Harbor, the conspicuous landmarks include the chimney of the Quarantine Station on the E bank about 1.25 miles SE of Pelican Point; a chimney, 82m high, on the W bank about 2 miles S of the same point; and two chimneys, the highest with an elevation of 163m and marked by red obstruction lights, on the E bank about 1.75 miles S of the Quarantine Station.

Entrance Channel Lighted Beacon, which marks the entrance to the approach channel, is shown from a tripod structure, 11m high, 2.5 miles W of the entrance between the breakwaters. Vessels should pass N of the Fairway Beacon and approach the channel with the range beacons in line with the NE of the two conspicuous chimneys in the Inner Harbor at the power station on the E bank.

Pilotage.—Pilotage is compulsory for all vessels entering Outer Harbor or Port Adelaide Harbor over 35m LOA unless exempt. Pilots board SW of the Entrance lighted buoy in position 34°48.23'S, 138°20.82'E. Pilotage is available 24 hours, but vessels are not turned in the harbor at night. Pilots must be requested 2 hours in advance, or 4 hours in advance if outside of office hours, to the harbormaster.

Pilotage is also provided for Port Giles and Rapid Bay.

Notice of arrival is required 24 hours in advance; the ETA should be confirmed 4 hours before arrival. See Regulations for additional reporting requirements.

Port Adelaide —Port Contact Information	
Signal Station (pilots)	
Call sign	Adelaide Outer Harbour
VHF	VHF channels 12, 13, 16, and 67
Telephone	618-824-83505
Port Authority	
Telephone	618-844-70611
Facsimile	618-844-70606
E-mail	flindersports@flindersports.com.au
Web site	http://www.flindersports.com.au

Regulations.—A copy of the harbor regulations should be obtained on arrival. The following information is taken from these regulations. A vessel arriving within 5 miles of Fairway Beacon should, by day, hoist its name, and the name of the port from which it has come, by the International Code of Signals. At night, similar signals should be made by light.

Should the customs boat, showing the customs flag and pennant by day, or a flashing light by night, appear in any part of the gulf, ships should heave to and remain so during the time the customs officer is on board, or until permission is given to proceed.

Port Adelaide - Entrance light beacon

Vessels should not proceed at a speed greater than 7 knots between Beacon No. 6 and Beacon No. 12 or when S of Beacon No. 27.

Vessels should not proceed at a greater speed than 4 knots while in any part of the harbor or river channel between the fairway beacons and the Jervois Bridge; when abreast of any vessel moored at a wharf or any established mooring place, or within 200m upstream or downstream or any such area; or within 200m of any dredge or marine works; or in North Arm between Beacon No. 36 and Grand Trunkway Bridge.

Ships are required to have an UKC of 10 per cent of the maximum draft and a minimum keel clearance of 0.9m.

Vessels must maintain a continuous listening watch on VHF channel 12 within port limits.

Vessels must report to Adelaide Outer Harbour on VHF channel 12 or 16 as follows:

1. At the anchorage.
2. When pilot embarks or disembarks.
3. When passing the Entrance lighted beacon.
4. When passing the Signal Tower (Outer Harbor).
5. When passing lighted beacon No. 39 (Osborne).
6. When vessel alongside and secure.

Anchorage.—Vessels are prohibited from anchoring in the approaches to the entrance channel. A prohibited anchorage zone has been established approximately 6 miles NW of the breakwater entrance and can best be seen on the chart. Vessels anchor according to their draft, clear of the channel and navigational aids.

An anchorage area, with a depth of 18m, lies approximately 1 mile W of the pilot boarding area. A wreck, with a depth of 14.6m, lies about 1.25 miles SSE of this anchorage.

Vessels should take care not to anchor near the historic wreck which lies about 2.3 miles SSE of Fairway Beacon.

Gulf St. Vincent—East Side—Port Adelaide to Cape Jervis

8.52 Torrens Island, a low island which forms the E bank of the Port Adelaide River, has a range of sand hills in its SW part. The greater part of the island is covered with mangroves. A drying sand spit extends about 2.5 miles NW from the N end of Torrens Island, and forms the N side of the entrance to the Port Adelaide River.

A beacon stands about 3 miles NE of Fairway Beacon and marks the N limit of a spoil ground.

A lighted beacon marks the NW extremity of the sand spit and another beacon marks the SW extremity. A channel for small craft lies between Torrens Island and the sand spit on the W side and the mainland on the E.

St. Kilda (34°45'S., 138°32'E.) is situated on the mainland, about 1.5 miles NE of the N end of Torrens Island. **Port Gawler** is a small creek that enters the gulf 6.5 miles NW of St. Kilda.

Long Spit Light

8.53 The coast between Port Gawler and Great Sandy Point, about 14 miles NNW, is low and swampy. It consists of alternating sandy beaches and mangrove coast. The depths decrease gradually to the sand flat that fronts this coast, and depths of less than 5m extend about 8 miles offshore W of Great Sandy Point. Depths of less than 11m extend 12 miles SW from Great Sandy Point, forming Long Spit Shoal. The least depths over the shoal consist of isolated patches of 6.1m, in the vicinity of Long Spit Light, which stands about 9.5 miles SW of Great Sandy Point.

The coast between Great Sandy Point and Sandy Point, the E entrance point of Port Wakefield, 14 miles NNW, is a continuous low sandy beach. Foul ground extends 3 miles offshore between Great Sandy Point and Sandy Point. A rock, with a depth of 1.5m, lies 3.75 miles NW of Great Sandy Point.

8.54 **Sandy Point** (34°16'S., 138°09'E.), 13.5 miles NNW of Great Sandy Point, is a low mangrove point fronted by a drying sand spit that extends 2 miles offshore. A low, wooded range that rises above the mangrove swamp between Sandy Point and Wakefield, about 5 miles to the N, ends in Bald Hill, 18m high, 1 mile within the point.

Bald Spit extends about 2.25 miles WSW of Sandy Point; the spit has depths of less than 5m.

A historic wreck lies about 4 miles NNW of Long Spit Light; unauthorized diving is prohibited in the vicinity of the protected zone around the wreck.

A prohibited area, marked by lighted beacons and the limits of which may best be seen on the chart, is situated adjacent to the shore S of Sandy Point.

Cape Jervis to Cape Northumberland

8.55 The coast between **Cape Jervis** (35°37'S., 138°06'E.) and the Murray River, about 39 miles E, presents a varied appearance, from the bold rocky hills in the W to the sandhills close W of the Murray River which gradually fall to the flat, bare white sand near the river.

The coast trends 1.25 miles S from Cape Jervis to Lands End, then 6.25 miles ESE to Porpoise Head; it is bold and rocky, with high scrub-covered hills intersected by steep ravines. Porpoise Head has been reported to be a good radar target at a distance of 20 miles.

Tunk Head projects S from the coast about 7 miles E of Porpoise Head. There is a bold, cliffy point 2 miles E of Tunk Head, and 5.5 miles farther E is Newland Head, formed by a steep cliff. The coast immediately W of Newland Head is sandy, with rocky points between the beaches and backed by high land.

The depths offshore between Cape Jervis and Newland Head exceed 16.5m, except SE of Porpoise Head, where the 20m curve lies about 2.5 miles offshore.

A strong tidal current is located about 1 mile offshore between Cape Jervis and Lands End.

A detached 16.5m patch lies 2.5 miles SSE of Lands End.

8.56 **Newland Head** (35°39'S., 138°31'E.) is the W extremity of Encounter Bay and the Murray River, 18 miles ENE, marks its E extremity.

The coast between Newland Head and Rosetta Head, about 5 miles NE, is formed by a high, steep cliff, which becomes low and grassy toward Rosetta Head. Newland Head has been reported to give strong radar returns from a distance of 22 miles.

Rosetta Head is a grassy mound, 97m high, cliffy on its E side, and covered with granite boulders; it is steep-to on its E and S sides.

From Rosetta Head, the coast trends 5 miles NE to Freeman Nob. The appearance of the land backing this coast is that of gently sloping hills, rising to an elevation of 150 to 175m, about 2 miles inland, with wooded summits and cultivated sides, broken N of Victor Harbor by the gap formed by the Hindmarsh River as it flows toward the sea.

8.57 **West Island** (35°37'S., 138°35'E.) lies 1 mile SW of Rosetta Head, abreast a small projection on the coast. The island is 40m high and steep-to on its seaward side, but there is a rocky ledge, which generally breaks, between it and the coast.

Wright Islet, 24m high, lies 0.35 mile NNE of Rosetta Head; Granite Island lies 1.75 miles farther NE.

Seal Rock is a mass of granite boulders, 12m high, located 1 mile SE of Granite Island, which shows a light from its E end. A rock, with depths of 8.2m and on which the sea breaks with a heavy swell, lies 0.25 mile E of Seal Rock.

A reef, on which the sea breaks heavily, extends 0.2 mile W of Seal Rock; a rocky ledge, with a depth of 4m in places, connects this reef to the foul ground that fronts the coast W of it. The sea breaks heavily over this ledge, in places, during SW gales.

8.58 Victor Harbor (35°34'S., 138°38'E.) (World Port Index No. 54190) lies at the head of a bight that is formed between Granite Island and Freeman Nob, 2.75 miles NE. A causeway connects the N side of Granite Island to the mainland NW and a breakwater extends about 0.15 mile ENE from the E side of the island.

There is some protection in the harbor except during SE winds.

A jetty, with depths alongside of 4.5 to 5.5m, extends from the island near the root of the breakwater; it is closed to commercial shipping. A light is shown from the head of the jetty.

Anchorage can be obtained, in depths of less than 9m, rock, with a thin coating of sand; the anchorage is not good.

Vessels bound for Victor Harbor should round Seal Rock at a distance of not less than 0.5 mile, however, during a SW gale or with a heavy swell that follows one, it is advisable to give it a berth of 1 mile. After rounding the rock, steer N and then approach the anchorage on a safe bearing of Bracken House, 1.25 miles NNW of Granite Island.

8.59 Freeman Nob (35°33'S., 138°41'E.) is the E extremity of Victor Harbor. A white obelisk is situated on its summit.

Port Elliot is a bight in the coast lying between Freeman Nob and Commodore Point, 0.35 mile NE. The port is used only by boats and small local vessels.

Pullen Island, a mass of granite boulders, 6m high, lies about 0.35 mile E of Freeman Nob.

The Sisters, two above-water rocks, lie 0.15 mile NNW of Pullen Island and The Twins, a detached shoal with two rocks nearly awash, lie 0.1 mile E of Freeman Point. No attempt should be made to pass between Pullen Island and Freeman Nob.

From Commodore Point, the coast trends SE about 10 miles to the entrance of the Murray River.

The coast from Middleton, about 2 miles NE of Commodore Point, to the Murray River is backed by bush-covered sand hills, about 24m high, which slope gradually downward until within 1 mile of the Murray River, which is a flat of bare white sand.

Frenchman Rock, awash, lies about 0.75 mile NE of Commodore Point. About 3.5 miles E of Frenchman Rock, a shoal patch, with depths of 7.3m, extends 1 mile offshore.

Heavy surf rolls in from Middleton to the entrance to the Murray River.

8.60 The **Murray River** (35°35'S., 138°53'E.), the longest river in Australia at 1,600 miles, enters the sea through the large, but shallow, Lake Alexandrina lagoon. A system of barrages, also including locks, provides a navigable channel with a depth of 1.8m, between **Goolwa** (35°30'S., 138°47'E.), 7 miles within the mouth of the river, and Mildura, a town situated on the river about 300 miles from the mouth.

The entrance, now but rarely used, is obstructed by a bar that extends 0.75 mile seaward of it, which is constantly shifting and altering in extent, depth, and position. The bar, consisting of sand, shells, and small stones, usually breaks heavily across the entrance, except in exceptionally quiet weather. There are depths on the bar from 2.1 to 2.4m; however, within 2 hours before or after HW, depths of 3 to 3.4m might be depended on as the least water, except for 3 or 4 days during neap tides with SE winds, when there are depths of barely 3m at HW.

In the entrance to the Murray River, the outgoing current is strongest at low water, the ordinary rate then being 3 knots on the surface in the deep part and 4 knots on the bar.

Without local knowledge of the bar, no attempt should be made to enter the Murray River. There is no difficulty in navigating to Goolwa for any craft not exceeding 1.8m draft that can cross the bar.

The Murray River is no longer used by any commercial shipping. The coast between the Murray River and Cape Jaffa, at the S end of Lacepede Bay, 91 miles SSE, is formed by a continuous sandy beach.

This coast is backed along the whole distance to Kingston by sand hills, from 27 to 50m high, which are so alike it is difficult to identify any of them, though some of the bare patches might be identified. At a distance of 6 to 7 miles offshore, however, no marks can be made out.

The surf is heavy at all times, and in W and SW gales, extends from 3 to 4 miles offshore in places.

Granite Rocks (36°40'S., 139°51'E.) are two conspicuous rocks located on the beach near the sea; the larger of the two is 6m high. These rocks show black against the sand, and some drying rocks extend about 100m seaward from them.

Sunken rocks. with depths of 8.2 to 9.1m, lie from 2 to 5.5 miles NNW of Granite Rocks.

Nation Rock lies 1 mile SW of Granite Rocks; it has a pinnacle, which dries 0.6m, but the sea seldom breaks on the rock. A small rock, with a depth of 2.1m, lies 1 mile SW of Nation Rock.

8.61 Lacepede Bay (36°50'S., 139°44'E.) is formed by a bight in the coast between Granite Rocks and Cape Jaffa, about 19 miles SSW. The sandy shore is backed by sandhills, gradually decreasing in height, for a distance of 7 miles S of Granite Rocks.

Kingston is situated on the S side of the entrance to Maria Creek, at the head of the bay.

Between Kingston and Cape Jaffa, the land is low and swampy, with a wooded bank behind the sandy beach; there is a prominent white sand patch on the bank above the beach, 9 miles SW of Kingston.

Port Caroline (36°49'S., 139°48'E.), an open roadstead, is the name given to the anchorage off the town of Kingston, which is a fishing port only. The jetty at Kingston extends 412m from the shore, and has a depth of 2.4m alongside; it is closed to commercial shipping. A light is shown from the end of the jetty. A conspicuous water tower is situated 0.55 mile SE

of the root of the jetty. There are several marine farms in the vicinity.

Anchorage.—A vessel may anchor safely, according to draft, anywhere between Kingston and Cape Jaffa, in depths of less than 9.1m.

The anchorage off Kingston, for vessels of moderate draft, is with the light on the jetty bearing 109°, 1.75 miles distant, in depths of 8m, sand and weed.

Lacepede Bay, although exposed to ocean swell, affords safe anchorage in all weathers even in W gales.

8.62 Cape Jaffa (36°58'S., 139°40'E.) is a low sandy point; its sea face is about 1 mile long. A wooded range rises near the S part of the cape and reaches a height of 77m at Mount Benson, about 8.5 miles SE. A group of dwellings, called King's Camp, are situated 0.5 mile E of the NW extremity of the cape. An historic wreck, which is protected from unauthorized interference, lies 3.6 miles W of Cape Jaffa.

Margaret Brock Reef is an extensive danger, with depths of less than 3.6m, the outer extremity of which lies 4.5 miles W of Cape Jaffa. A light is shown from a rock, that dries 2m, near the center of the reef. The extremities of the reef do not always break; however, the sea often breaks in bad weather, up to a distance of 5 miles outside the reef, and with such violence as to jeopardize a small, deeply laden vessel.

North Rock, with a least depth of 2.1m over its N extremity and on which the sea breaks at times, lies 1.5 miles N of the light. An obstruction was reported (1956) 1 mile N of North Rock.

South Breaker is a 3.7m patch 2.75 miles S of the light. Several patches, on which the sea breaks at times, lie between South Breaker and Margaret Brock Reef.

Vessels bound for Kingston first make Margaret Reef Light. When rounding the reef, keep in depths of 28m to ensure passing more than 2 miles from any part of it.

There is an appreciable tidal current in Lacepede Bay, but both inside and outside Margaret Brock Reef, there is a strong N set after E winds; this N current, setting NE round Cape Jaffa, causes a set toward the reef.

8.63 Cape Thomas (37°05'S., 139°45'E.) lies about 8 miles SSE of Cape Jaffa.

The coast for about 3 miles S of Cape Jaffa is lined with sandhills that rise to a height of 22m. Farther S, it is formed by a low bank which continues as far as Cape Thomas. The wooded range that rises near the S part of the cape forms the background for this coast.

Rocks and foul ground extend up to 2 miles offshore along this coast, which must not be approached to closely.

Guichen Bay (37°09'S., 139°46'E.) is contained between Cape Thomas and Cape Dombey, 5 miles S. The E shore of the bay, for a distance of about 6 miles S of Cape Thomas, is formed by a sandy beach with a low bank behind it. The inland wooded range, 3 miles from the beach, is about 30m high. The S shore of the bay is composed of rocky points and sandy bays.

There are depths of 9.1 to 11m over the greater part of the bay.

A rocky point projects S about 0.75 mile ESE of Cape Thomas; drying rocks extend a short distance offshore from the S shore of the bay.

The **Godfrey Islands** (37°05'S., 139°43'E.), lying 1.25 miles SW of Cape Thomas, are a rugged broken group of above-water rocks, the highest being 12m.

Foul ground lies between the rocks and the cape. The sea breaks over the submerged rocks that lie about 0.3 mile N of the N rock of this group.

The Black Pigs, awash at LW, are located 0.75 mile SSE of the Godfrey Islands; rocky reefs with depths of less than 5m over them lie between.

8.64 Cape Dombey (37°10'S., 139°44'E.) is the NW extremity of the headland forming the S point of Guichen Bay. A light is shown at the cape.

Snewin Rock, with a depth of 7.9m and with depths of more than 14.6m all round, lies 2.25 miles NW of Cape Dombey; it breaks only when there is a high W swell.

South Reef, composed of rocks, awash, extends 0.6 mile NW from Cape Dombey. The sea nearly always breaks on this reef; it should be given a wide berth.

A shoal patch, with a depth of 7.9m, lies about midway between South Reef and Snewin Rock. A 6.7m patch lies 0.25 mile NNW of South Reef.

Robe (37°10'S., 139°45'E.), a fishing port, is situated on the S shore of Guichen Bay, about 0.5 mile E of Cape Dombey.

Courtesy of Grant and Tracey's Lighthouse Page

Robe Light

A jetty extends 150m ENE from the E side of the headland, 0.35 mile ESE of Cape Dombey. The jetty, which is closed to commercial shipping, has depths of 3m alongside. Robe Light is shown from a tower about 0.5 mile SE of Cape Dombey. A racon buoy is situated near to the south of Robe Light.

Anchorage, in a depth of 7m, fine sand, with Cape Dombey bearing 260° and Robe Light bearing 172°, is safe with SE winds, which are most frequent from November to April. With W and NW winds, which are frequent from May to October, it is unsafe.

Caution.—Heavy breakers may be encountered at times about 1.5 miles E of Cape Dombey.

8.65 Cape Lannes (37°12'S., 139°44'E.) projects W from the coast about 1.5 miles S of Cape Dombey. A reef extends 1

mile WNW from Cape Lannes; there are some above-water rocks at the inshore end of the reef.

The coast between Cape Lannes and Cape Martin, about 23 miles SE, consists of alternate rocky points and sandy beaches, backed by sand hills that are more than 30m high.

Bishop's Pate is a round bare sand hill that rises to a height of 34m in a position near the coast 4 miles SSE of Cape Lannes.

Rabelais Peak is a conspicuous pointed hill that rises to a height of 48m in a position near the coast about 5 miles farther SSE. A wooded range, which rises to a height of 77m about 5 miles inland from Rabelais Peak, is seen above the coastal range when more than 5 miles offshore. Between this range and the coastal sand hills there are four large salt lakes.

Drying rocks and some isolated submerged patches extend up to 1 mile offshore along the coast between Cape Lannes and Rabelais; the sea breaks heavily on this coast. A number of bare sand hills, which rise above the S stretch of this coast, are conspicuous when viewed from S; the highest of these is 33m high. Farther S, between these bare sand hills and Cape Martin, the hills are higher and not so bare. A green-colored point, backed by a wooded hill, 47m high, projects SW from the coast, about 8 miles NNW of Cape Martin. The coast between the point and Cape Martin becomes more cliffy than that farther NW.

The coastal waters between Cape Lannes and Rabelais Peak are encumbered by rocks, which dry, and some isolated submerged patches, extending up to 1 mile offshore in places; the sea breaks heavily on this coast and landing is impossible.

A reef lies roughly parallel with the coast for a distance of 6.5 miles SE of Rabelais Peak, and extends 1.5 miles offshore near its S end. The depths abreast the conspicuous sandhills are irregular for a distance of about 3 miles offshore and for a distance of 3 miles SE of them, causing high rollers and overfalls when the swell is high.

The coast for about 2 miles NW of Cape Martin is fringed with reefs and submerged rocks, which extend up to 0.35 mile offshore in places.

Vessels transiting between Guichen Bay and Rivoli Bay at night should maintain depths of not less than 37m and ensure being at least 5 miles offshore.

8.66 Cape Martin (37°30'S., 140°01'E.), 25m in elevation, projects S from the coast at the NW corner of Rivoli Bay. The cape is fringed by a reef; a large detached reef lies close NW. A light is shown from a structure about 0.5 mile N of the S extremity of the cape.

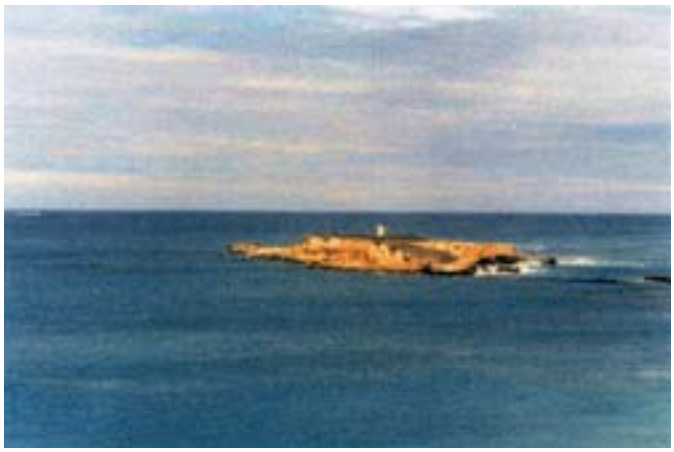
Rivoli Bay (37°33'S., 140°05'E.) is an indentation in the coast between Cape Martin and Cape Buffon, about 6.25 miles SE.

The central part of Rivoli Bay is obstructed by numerous reefs, rocky patches, and shoals and is dangerous for navigation. A marine farm lies at the northernmost end of the bay.

Glen Point is a rocky point located 0.5 mile NE of Cape Martin. A sandy beach forms the shore of the bay between Glen Point and the promontory of Cape Buffon, at the S end of the bay.

Lake George approaches within 0.15 mile of the shore close N of Glen Point. East of the lake, the sandy beach is backed by a range of sand hummocks, about 18.3m high. A range of wooded hills, 46 to 55m high, parallel the E shore, at a distance of 2 to 3 miles inland.

Lake Frome, a freshwater lake, lies about 1 mile E of the S end of the bay. Freshwater swamps extend for a distance of nearly 0.25 mile from Lake Frome toward the beach.



Courtesy of Grant and Tracey's Lighthouse Page
Penguin Islet

8.67 Penguin Islet (37°31'S., 140°01'E.), 16m high, is a rocky islet lying close SE of Cape Martin. On its N end there is a perpendicular cleft down to the water's edge; when open to the E and W, the cleft is a good mark. A white stone tower, formerly a lighthouse, stands on the S part of the islet.

A rock, awash, lies about 0.25 mile SSE of Glen Point.

De Mole Reef, with depths of 4.5m and which breaks in a moderate swell, lies about 1 mile E of Penguin Islet.

The W extremity of Ringwood Reef, which has depths of less than 1.8m, is the outermost danger, and lies 2 miles SSE of Penguin Islet; some parts of this reef always break.

West Rock, with depths of 4.9m and on which the sea breaks heavily at times, lies 1.25 miles SSE of Penguin Islet. An 8.2m rocky patch lies 0.2 mile N of West Rock. With a heavy swell, this patch breaks at times; breakers extend across from West Rock to Lipson Rock, 0.6 mile ENE, which is just awash and on which the sea breaks, even in calm weather.

Sherbert Rock, a 2m high mound of stones, lies 2 miles ENE of the W extremity of Ringwood Reef.

The Beak is a dangerous reef, on which the sea breaks heavily, that lies outside numerous detached rocks off the W side of Cape Buffon. The outer end of The Beak lies 0.75 mile SW of Cape Buffon.

A shoal, with depths of 8.5 to 9.1m and that breaks at times, lies 1.75 miles W of Cape Buffon.

A field of kelp, rising to the surface from depths of 16 and 18m, extends SSE from Ringwood Reef to a position abreast Cape Buffon.

8.68 Beachport (37°30'S., 140°01'E.), a small town, is situated on the shore N of Glen Point close within Cape Martin. An iron jetty, with an alongside depth of 4m, extends

0.4 mile from the beach, abreast the town. The jetty is closed to commercial shipping. A light is shown on the head of the jetty.

Anchorage off Beachport, is suitable for a number of vessels of less than 4.6m draft and with local knowledge, in a pool, with depths of 5 to 7m, firm white marl-like clay, good holding ground, 0.5 mile offshore, E of the town.

There is a least depth of 5.5m in the fairway of the approach, which lies between De Mole Reef and the rock awash 0.25 mile SSE of Glen Point.

Anchorage may be taken in the S part of the bay, with Cape Buffon bearing 231°, 0.5 mile distant, in a depth of 5.8m, marl, good holding ground.

With a W to WSW gale, the swell rolls directly into S anchorage. The sea breaks in heavy rollers across the entrance. In the event of the approach of a W gale, it is advisable to get underway and make for the N end of the bay; these gales are uncertain, but are not frequent in the summer.

In strong S and SE winds, which may continue for weeks in the summer, the S anchorage is smoother.

8.69 Cape Buffon (37°35'S., 140°07'E.), which projects about 0.5 mile NW from the S end of the bay, is 11m high and cliffy. A light is shown from the cape.

Grey (Greytown) lies at the S end of the bay, within the promontory of Cape Buffon, where there is an angled jetty 275m in length and marked by a light, used by fishermen.

Caution.—Special care and attention is required when navigating along the coast between Cape Martin and Cape Northumberland, about 40 miles to the SE. The prevailing winds are SW. A continual swell sets toward the coast, which, together with the uneven bottom, produces an irregular sea. In bad weather, with S winds, soundings should be carefully attended to.

Depths of not less than 46m should be maintained at night; these depths, over a rocky bottom, are found about 5 miles offshore. A 10.9m patch lies about 3 miles offshore, 9 miles SSE of Cape Buffon Light.

8.70 The coast for a distance of about 5 miles SE from Cape Buffon is cliffy and is backed by wooded hills, which rise to a height of 60m. Farther SE, the coastal hills are sandy and not so high; the most conspicuous one is a sand hill, 44m high, about 9.5 miles SE from Cape Buffon.

The most conspicuous hill along this coast, which stands out boldly and is visible to a vessel more than 3 miles off the land, is Mount Muirhead, 150m high, which is isolated in a position about 14 miles E of Cape Buffon.

Mount Burr, 240m high; Mount Lookout, 216m high; and The Bluff, 201m high and with a very steep fall on its S side, are all part of a continuous range. The range rises 18 miles E, and runs about 21 miles ESE of Cape Buffon. A conspicuous radio tower stands on the summit of Mount Burr.

The coast for a distance of 5 miles S of Cape Buffon has drying rocks extending 0.25 mile offshore. For a distance of 8 miles farther SE, the coast is steep-to, except for a rocky patch, with depths of less than 1.8m and that lies 0.5 mile offshore, 6.5 miles SE of the cape.

From a position about 13 miles SSE of Cape Buffon to Carpenter Rocks, 11 miles farther SSE, there are rocks awash a short distance offshore; a reef, on which the sea breaks, fronts the beach for the entire 11 mile distance, and extends up to 1 mile offshore in places.

8.71 Cape Banks (37°55'S., 140°23'E.) is a rocky point, 15m high, 24 miles SSE of Cape Buffon. A light is situated on Cape Banks.

Carpenter Rocks are two black rocks lying close off Cape Banks. The rocks have been reported to give good radar returns up to 11 miles. The coast between Cape Banks and Douglas Point, 12.5 miles SE, is low and sandy, the highest part being a sand hill, 32m high, about halfway between them.

Douglas Point (38°02'S., 140°35'E.) is a green-colored point, 23m high. The coast between Douglas Point and Middle Point, 2.25 miles farther ESE, and then to Cape Northumberland, 2.25 miles farther in the same direction, is low, with one sandhill on it, 1.5 miles E of Douglas Point. Mount Gambier rises to a height of 192m, in a position about 14 miles NE of Douglas Point.

There is a small bay immediately S of Cape Banks, with a reef across its entrance, which extends S from Carpenter Rocks, and another reef off the beach inside. There is a sand hill, 38m high, at the back of the bay.

A rock, with depths of 9.1m, lies 3.75 miles S of Cape Banks. It is steep-to and breaks heavily in a SW swell.

Bucks Bay is a small opening in the reefs 1.25 miles SE of Cape Banks.

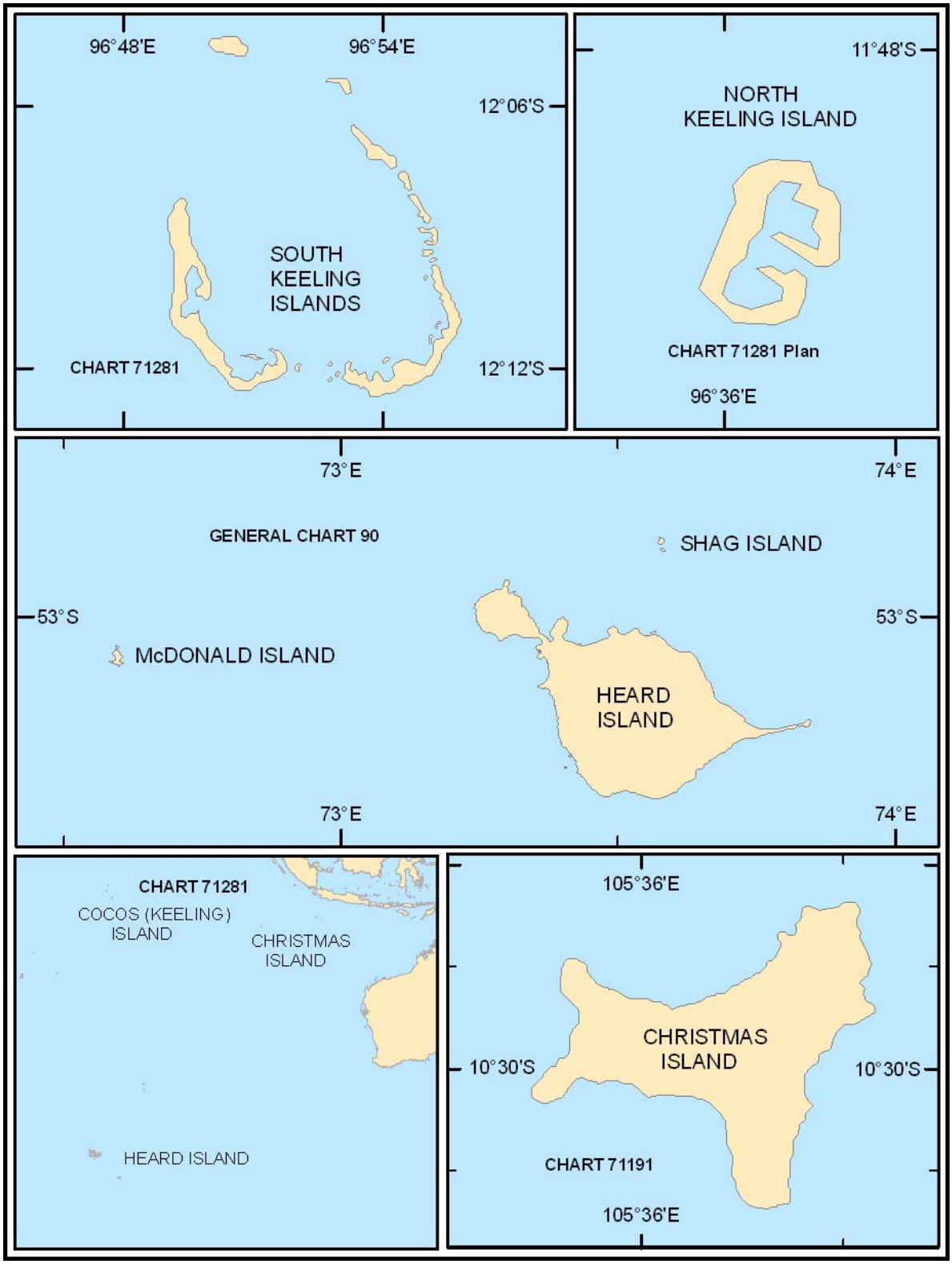
8.72 Pelican Point (37°56'S., 140°25'E.), 3 miles SE of Cape Banks, is fronted by rocks; here the 10m coastal bank extends 2 to 3 miles SW. Bungaloo Bay is a small indentation in the coast immediately NW of Pelican Point.

Umpherstone Bay is contained between Douglas Point and Middle Point; the indentation immediately E of Middle Point is known as Blanche Bay.

Middle Point (38°02'S., 140°37'E.) is formed by a sand hill which rises to a height of 17m. The coast for a distance of 1 mile E of the point is low, with swampy land at the back of it; sand hills then commence and continue as far as Cape Northumberland, about 1.25 miles farther SE. Rocks, which dry, fringe the coast between Middle Point and Cape Northumberland, and foul ground, with depths of less than 1.8m, extends about 0.75 mile offshore in places.

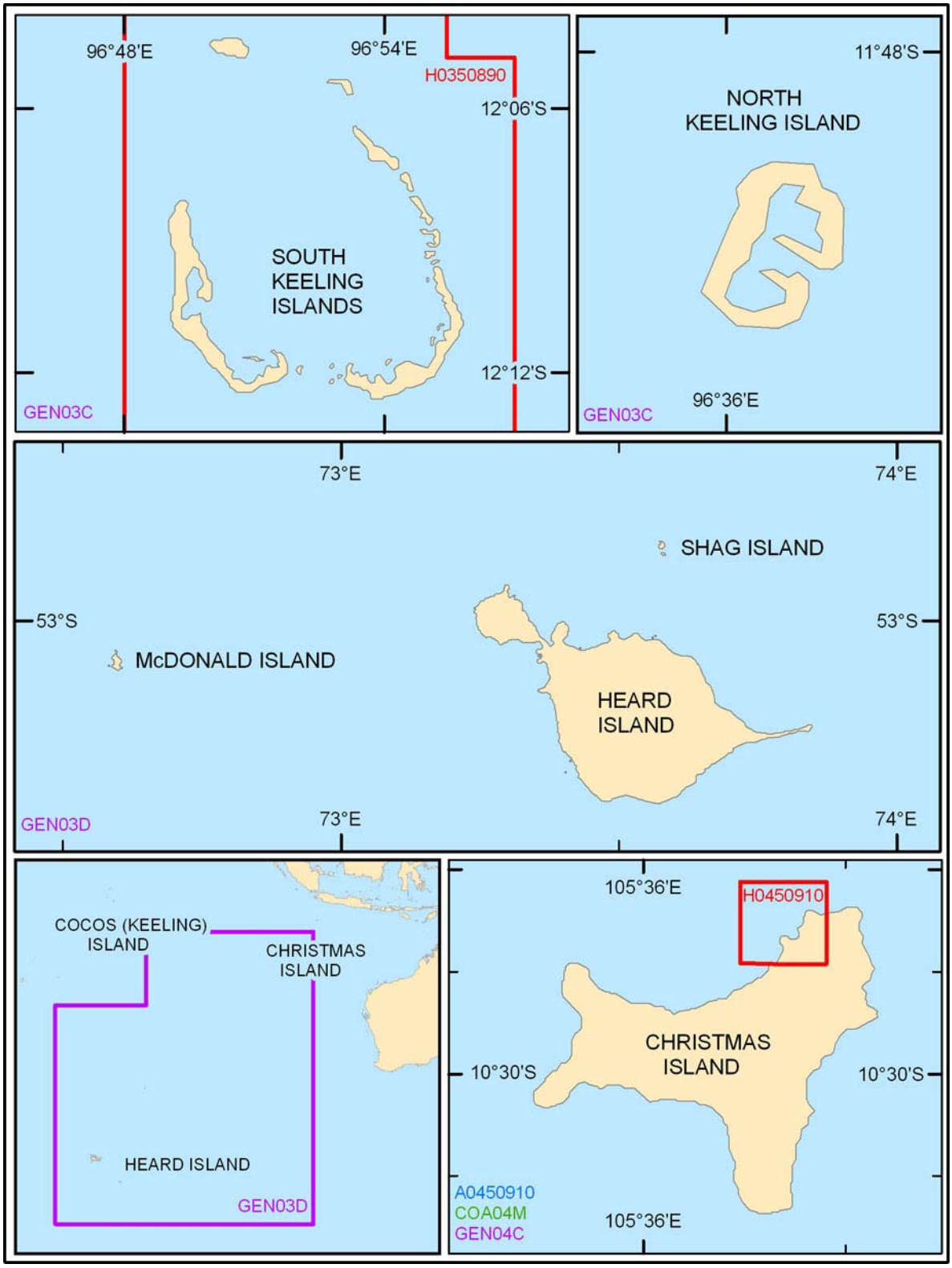
Between Cape Banks and Cape Northumberland, there are fields of kelp which extend for a distance of 1 to 4 miles offshore. The kelp does not appear to grow where the depths are greater than 28m.

For the description of **Cape Northumberland** (38°03'S., 140°38'E.) and the coast of Australia farther E, see Pub. 127, Sailing Directions (Enroute) East Coast of Australia and New Zealand.



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

SECTOR **9** — CHART INFORMATION



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

SECTOR 9

THE COCOS ISLANDS, CHRISTMAS ISLAND, HEARD ISLAND, AND THE MCDONALD ISLANDS

Plan.—This sector describes the Cocos Islands (Keeling Islands) and Christmas Island, which lie about 1,100 miles WNW and 825 miles NW, respectively, of North West Cape, Western Australia and Heard Island and the McDonald Islands which lie about 2,100 miles SW of Cape Leeuwin, Western Australia.

The general arrangement of each group is from W to E with each island group described under a separate heading.

Note.—Ile Amsterdam (37°51'S., 77°33'E.), **Ile Saint Paul** (38°43'S., 77°33'E.), and **Iles Kerguelen** (49°16'S., 69°34'E.) are described in Pub. 171, Sailing Directions (Enroute) East Africa and the South Indian Ocean.

General Remarks

9.1 Sea and swell.—The worst sea and swell conditions are likely to occur between 40°S and 50°S in the Indian Ocean. Swells higher than 4m are present from 30 to 70 per cent of the time in areas between 50°S and 60°S. The maximum wave height to be expected over this area is about 25m, but that rises to 35m near Iles Kerguelen, about 230 miles NW of Heard Island, in the winter.

Caution.—Icebergs from the Antarctic at times drift into the area of the South Indian Ocean. There is a possibility of meeting icebergs at any time during the year S of 35°S; they are most numerous from October to March.

The Cocos Islands (Keeling Islands)

9.2 The **Cocos Islands** (Keeling Islands) (12°08'S., 96°50'E.) lie about 600 miles SW of Tanjung Layar, the W extremity of Jawa. They are in two distinct divisions, lying N and S and are separated by a channel 15 miles wide. The N division has a single island known as North Keeling Island while the S division has about 20 islands, known collectively as South Keeling.

South Keeling Island

9.3 This division of the Cocos Islands is formed of about 20 islands and islets. They lie around a central lagoon in the approximate form of a horseshoe with the opening to the NW; the longer dimension is about 8 miles and the shorter about 7 miles. Horsburgh Island, Home Island, and the W end of West Island are reported to be good radar targets.

A reef, against which the sea breaks continually, fronts the outer sides of the islands and protects the enclosed lagoon. Seaward of this reef the depths increase abruptly except off Horsburgh Island. The greater part of the lagoon is filled with patches of growing coral with deep water between them; it is navigable only by shallow draft boats with the aid of local knowledge.

All the islands are low; the highest land is the 12.5m hill on South Island. They are thickly covered with coconut palms which reach a height of between 12m and 25m above sea level, and can be seen from up to 12 miles.

The land forming South Keeling is evidently rising, and at some time in the future will probably form a circular island with a crater like rim.

Direction Island (12°05'S., 96°53'E.), located at the NE corner of the group is about 2.1m high. The concrete pier at the SW side of the island is 27m long and has a depth of 0.1m at its head. The ruins of a house stand on the W extremity of the island. A light is shown near the ruins; the light is powered by solar cells and may become weak in overcast weather.

Caution.—The light is difficult to distinguish from Port Refuge by day.

9.4 Home Island (New Selma Island) (12°07'S., 96°54'E.), lies about 0.9 mile S of Direction Island and is connected to it by a coral reef that dries in places. Prison Island is conspicuous and lies on this reef. Pulo Gangsa, once an island close N of Home Island, now forms the N peninsula of the island. Pulo Gangsa has a cemetery on it.

Permission from the Home Island Council must be obtained to visit the island. On the W side of the island is a small boat harbor, protected on the N by a breakwater, in which there are depths of 0.3m to 1.0m. There is a group of 11 islets, accessible only to vessels of light draft, S of Home Island.

South Island (12°12'S., 96°55'E.), known locally as Pulau Atas, forms the SE side of the group. Along the E and S sides of the island, is a ridge of sand hills 3 to 6m high, terminating at its S extremity with a hill 12.5m high. Between the W extremity of South Island and the E extremity of West Island are a number of islands, all of which may be seen from the N part of the lagoon and from seaward.

9.5 West Island (12°10'S., 96°50'E.), known locally is Pulau Panjang, forms the SW side of the group. The reef fringing the SW side of the island was reported (1959) to extend farther seaward than charted. It is impossible to land by boats on the NE side of the island at any rate of the tide. There is an airfield on the island.

A wooden jetty, 93m long with a depth of 2.7m at its head, is situated on the E side of West Island, about 0.25 mile SE of Ujong Tanjong, the N extremity of the island. A light was reported to be shown from the head of the pier (1985).

A pipeline extends about 1.25 miles ENE from the E side of the N extremity of West Island. The seaward end of the pipeline and the end of the attached flexible hose are marked by a buoy. Mooring buoys are available. A vessel up to 110m in length, with a draft of 4.1m, can moor here.

A group of masts in the vicinity of the airfield are conspicuous. An aeronautical light is shown from a position about 3 miles S of Ujong Tanjong. Trees obscure the light from

some directions. The light may also be extinguished while an aircraft is making its final approach to the airfield.

Between West Island and Horsburgh Island, the NW island of South Keeling, is a gap of 3.5 miles of almost continuous barrier reef.

Turk Reef, on which the sea always breaks, is located about 1.5 miles N of West Island. The W entrance of South Keeling lies between Turk Reef and the reefs that extend N from West Island. Vessels are advised to stay at least 1 mile from the shore of West Island.

Horsburgh Island (Pulau Luar) (12°05'S., 96°50'E.), flat with areas of grass and coconut palms up to 25m high, is the N island of the group. A boat track leads to a landing place about 0.1 mile NW of Possession Point, the SE extremity of the island. This track may best be seen on the chart.

9.6 Port Refuge (12°06'S., 96°52'E.), in the N part of the lagoon between Horsburgh Island and Direction Island, comprises an outer and inner harbor. The entrance should be approached with caution, as the bottom rises very steeply from the ocean depth to the 20m curve. The change of color of the water from a dark to a light shade of blue is very marked and it can be seen from some distances and may be relied on as a guide. The bottom is generally visible in Port Refuge where the depth is less than 14.6m.

Tides—Currents.—The tides are practically semidiurnal. The mean spring rise is 1.1m while the mean neap rise is 0.9m. The flood current sets S into the harbor at a rate of 0.75 knot, while the ebb current sets NW at a rate of 0.5 knot.

Pilotage.—A pilot boarding station is established in position 12°07.6S., 96°50.6'E, close ENE of the mooring buoys.

Anchorage.—The bay formed by the S side of Direction Island provides good shelter and is the recommended anchorage for small craft. The best anchorage for large vessels is at the entrance to Port Refuge, with Direction Island Light bearing 096° and the E extremity of Pulau Maria bearing 180°, in a depth of about 10m, coral. This anchorage, used by vessels with a maximum draft of 7.6m, is sheltered from the predominant SE winds, but is open to winds and swells from the N and NE.

Smaller vessels, with drafts up to 3m, can use an inner anchorage, with Direction Island Light bearing NE, distant 0.35 mile, in a depth of about 7m.

Vessels may anchor, in a depth of 8m, sand and coral, about 0.3 mile S of the West Island pipeline mooring position previously described in paragraph 9.5.

Directions.—Lighted beacons, in line bearing 196°, lead through Port Refuge to the track marked by lighted beacons, which leads to the pipeline off West Island. Vessels bound for the inner anchorage should leave the channel when Prison Island bears 120°. Vessels proceeding into the lagoon should enter Port Refuge on the range and proceed along the marked channel; odd-numbered lighted beacons mark the starboard side while even-numbered lighted beacons mark the port side.

It was reported (1986) that the least depth in the channel is 2.8m W of Beacon No. 5. The beacons have been reported to be unreliable.

An alternative track, with a least depth of 4.1m, runs direct from Beacon No. 3 to Beacon No. 8. Vessels with drafts up to 4.1m, and on occasion 4.7m, have used the channel at HW.

Swell affects vessels only in the N part of the channel where the depth is ample.

Local knowledge is recommended for all vessels entering the lagoon.

The Western Entrance lies between a reef which extends N from West Island and Turk Reef about 0.75 mile farther NNE. It is encumbered by numerous coral heads. A narrow channel, with depths of 4.8m, exists through the entrance. Vessels should steer 096° with Beacon No. 8 ahead, then shape course for the anchorage when about 0.2 mile from the beacon.

This entrance is not recommended except with local knowledge. A complete line of breakers forms across the entrance with a moderate ocean swell from NW and N wind.

Caution.—Muirfield Seamount (13°10'S., 96°11'E.), with a depth of 16m, lies 70 miles SSW of South Keeling Island.

In 1981, a patch of discolored water was reported about 300 miles SW of South Keeling Island in position 17°19'S, 97°04'E.

North Keeling Island

9.7 North Keeling Island (11°50'S., 96°50'E.), 14 miles N of Horsburgh Island, is an atoll, approximately elliptical in shape, about 1.25 miles long in a N and S direction and about 0.5 mile wide. The coral rim encircling the central lagoon, except for a narrow break in the E side, is from 90 to 350m wide. Dense vegetation and coconut trees rise from this coral rim. The island has been reported to be a good radar target at a distance of 16 miles.

Depths—Dangers.—A spit of coral and sand extends 1.5 miles SW from the island, with depths of less than 30m. Heavy rollers rise suddenly at times off the S end of the island, and make the approach dangerous.

Anchorage.—In good weather, anchorage can be obtained 1 mile SW of the S point of the island, in a depth of 20m. The only landing place is on the W side of the island, which is normally the lee side. If the wind gets to N of E, this landing place is dangerous. A heavy surf makes landing impracticable at times. The lagoon cannot be entered.

Christmas Island

9.8 Christmas Island (10°30'S., 105°40'E.) lies about 530 miles ENE of the Cocos Islands, and about 220 miles S of Tanjung Layar, the W extremity of Jawa. The island is of irregular shape; it is nearly 12 miles between Low Point and Egeria Point, the E and W extremities, respectively, and about 10 miles between Northeast Point and South Point, the NE and S extremities, respectively.

Christmas Island is densely wooded and hilly; it is visible, in clear weather, from distances up to 30 miles. When seen from the N or S, it has the shape of a saddle, with the E and W portions of the island higher than the central portion.

Christmas Island attains a height of 357m in Murray Hill, a summit about 3.25 miles SE of **Northwest Point** (10°26'S., 105°35'E.), and a height of 335m in Headridge Hill, which lies about 1.75 miles SSW of Northeast Point.

Three yellow super mooring buoys lie approximately 1 mile S of Norris Point. An aeronautical radiobeacon is situated on Christmas Island close SE of Flying Fish Cove.

The shores of Christmas Island consist almost entirely of perpendicular cliffs, from 6 to 24m high. These cliffs have, here and there, been undermined by sea action to form caves, some of them vented at the top; it is not uncommon to see spray forced through these vents as high as 18 to 21m.

A reef that does not uncover fringes Christmas Island completely.

The reef is steep-to all around the island, except in Flying Fish Cove, the only harbor, and off Egeria Point, the SW extremity of the island.

The bottom off the E shore of the island is of a volcanic nature.

9.9 Flying Fish Cove (10°25'S., 105°40'E.) (World Port Index No. 50910) lies at the E end of a bight formed on the N coast of Christmas Island between Northwest Point and Rocky Point, 8 miles ENE. The cove is an indentation at the E end of this bight; it is about 1 mile wide between Rocky Point and Smith Point to the SW. The principal part of the harbor lies between Smith Point and a position about 0.1 mile N of Isabel Beach, which is about 0.6 mile NE of Smith Point.

Flying Fish Cove

Winds—Weather.—The wind strength at the reporting station on Christmas Island is much less than the Southeast Trade Wind over the sea around the island. Gale frequency is also low compared with reports from the open sea. Winds of force 7 or more are reported in the vicinity of the island on 1 to 5 per cent of occasions in January and February and also from June to September.

The island normally escapes the tropical storms which affect the sea area towards NW Australia. Heavy downpours accompanied by thunderstorms are common, with 250mm of rain having been recorded in one day.

The Northwest Monsoon reaches its S limit in January and February, when W winds predominate.

At times the haze from Australia will reduce visibility to 3 miles.

Tides—Currents.—The tidal currents set NE and SW; the SW current sometimes attaining a rate of 1 to 2 knots. Strong and erratic currents are often experienced.

The mean spring tides rise 1.6m. The mean neap tides rise 1.3m.

Depths—Limitations.—The cove is fronted by a coral shelf with white sand, which extends a short distance offshore, with depths of 10m. Outside this depth, the water deepens very rapidly, with depths of 128m about 0.2 mile offshore; the bottom is rocky and uneven.

Cargo working facilities are situated 0.5 mile SSW of Rocky Point, where there are cantilever arms for loading bulk phosphate. Vessels moor at mooring buoys laid in deep water.

Vessels up to 35,000 dwt, with lengths up to 192m and a beam of 28m, can be accommodated at the moorings.

The phosphate mine has closed and bulk exports have been discontinued.

Aspect.—Three prominent oil tanks are situated about 0.2 mile SW of the flagstaff close SE of Smith Point.

Pilotage.—Pilotage is compulsory for merchant vessels. The pilot boards 1 mile W of Smith Point.

Vessels should not approach the moorings nearer than 1 mile until the pilot has embarked.

There is a port radio station at Christmas Island. The vessel's ETA should be sent 48 hours and 24 hours prior to arrival.

Flying Fish—Port Contact Information	
Port Control	
VHF	VHF channels 12 and 16
Telephone	618-916-48434
Facsimile	618-916-48435
E-mail	westernci@pulau.cx
Web site	http://www.christmas.net.au

Regulations.—Trading between ship and shore personnel is forbidden, as is the consumption of alcohol.

Vessels must not approach the moorings in Flying Fish Cove closer than 1 mile without instructions.

Caution.—Some protection from the Southeast Monsoon (Southeast Trade Winds) is provided by the island. Apart from this, the open nature of Flying Fish Cove provides no shelter. Vessels in imminent danger are unberthed without delay and instructed to lie adrift off the island.

A small craft anchorage lies in the SW part of the cove. There are no anchorages for merchant vessels. From November to May, the wet season is experienced; N and W winds are frequent during this period. Vessels may be called to lie off the island when conditions are unsafe.

Heard Island

9.10 Heard Island (53°06'S., 73°31'E.) lies 2,120 miles SW of Cape Leeuwin, Western Australia, and is under the sovereignty of the Government of Australia. The island is of recent volcanic origin and is about 23 miles long in a NW and SE direction, and about 10 miles wide across its broadest part. The central and main part of the island forms the impressive

and almost circular mountain known as Big Ben. From the crater top of this volcano rises Mawson Peak, 2,745m high. Anzac Peak, 715m high, occupies the center of the Laurens Peninsula, which is connected to the main island by a low and narrow sandy isthmus.

The Spit, a narrow strip of flat ground, extends 3.5 miles E from the island, beyond which breakers can be seen another 5 miles seaward. In 1983, a shoal depth of 20m was reported to lie 8 miles NE of Spit Point, the E extremity of The Spit.

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The Laurens Peninsula and Anzac Peak from SE

Permanent ice covers nearly all of this treeless island; in most places, except where diverted by large outcrops of rock, this ice flows down to the sea, terminating in ice cliffs from 15 to 30m high.

Winds—Weather.—In winter the whole island is under snow, but in summer the lowest slopes of the Laurens Peninsula, the immediate environs of Atlas Cove, Rogers Head, and The Spit are ice-free. On various occasions, smoke has been seen issuing from the summit of Mawson Peak, and in 1950 and 1985, molten lava was observed on the side of the cone. Snow has been observed in every month.

Gales are frequent in all seasons and can arise very quickly; they are generally from the W, but gales from E and N are not uncommon.

The strongest winds blow from NW, with a heavy overcast sky and a falling barometer. They are followed by SW winds, as the barometer rises and the sky clears.

The E winds are accompanied by dull gloomy weather. The best month is December, during which about 15 days of excellent weather may be expected.

In the vicinity of Heard Island and the McDonald Islands (see paragraph 9.13), fog is frequent, especially with N and NW winds, but with W winds visibility is often good.

Visibility drops below 6 miles about 45 to 55 per cent of the time year round and below 1.3 miles about 10 to 18 per cent of the time from May through September.

Skies are cloudy (7/10 cloud cover) on 20 to 30 days per month all year. Clear skies (3/10 cloud cover) can be observed on 1 to 6 days per month.

Tides—Currents.—Spring and neap tides rise about 1m.

9.11 Red Islet (52°58'S., 73°18'E.), 94m high, is the N extremity of the Laurens Peninsula, to which it is attached by a narrow neck, and lies 2 miles N of Anzac Peak; shoal water extends 0.5 mile NNW.

Rogers Head (53°00'S., 73°24'E.), 4.5 miles SE of Red Islet, is the E entrance point of Atlas Cove and the W entrance point of Corinthian Bay; it is a double-peaked promontory, 145m high, off which submerged rocks extend for a considerable distance.

Saddle Point (53°01'S., 73°29'E.), on the N shore of Heard Island, the E entrance point of Corinthian Bay, is located 3.5 miles ESE of Rogers Head. There are a number of above-water rocks off Saddle Point.

Cape Bidlingmaier (53°01'S., 73°32'E.) lies 1.5 miles E of Saddle Point. From this cape, the N shore of Heard Island trends ESE of **Spit Point** (53°07'S., 73°51'E.), the E extremity of the island.

Caution.—In W winds, there is a strong set towards the spit from both sides.

9.12 Cape Labuan (53°12'S., 73°30'E.), about 13.5 miles WSW of Spit Point, is the S extremity of Heard Island. From this cape, the shore trends 10 miles NNW to Cape Gazert, then 4 miles farther NNW to West Cape, the S extremity of the Laurens Peninsula.

Shag Islet (52°55'S., 73°35'E.), lying 6 miles NNE of Cape Bidlingmaier, is 92m high. It is the largest of three islets in this area.

Sail Rock, 17m high, lies 1 mile NW of Shag Islet and Drury Rock, 37m high, lies 0.5 mile S of the islet.

Morgan Island and Black Rock, together with other submerged rocks, lie up to 0.15 mile offshore, 1.5 miles E of Cape Bidlingmaier.

Off Spit Point, a bank of black mud and sand is reported to extend 20 miles or more.

A shoal, the position of which is doubtful, lies on the N side of the island, 3 miles W of Spit Point.

Wakefield Reef (53°11'S., 73°21'E.), on which the sea breaks heavily in rough weather, lies 5 miles WNW of Cape Labuan. Other rocks lie 2 miles ENE of Wakefield Reef and a rock, whose position is doubtful, lies 2 miles NE of the reef.

Pulpit Rock, 55m high, lies close S of Cape Gazert and a rock, whose position is doubtful, lies 3 miles farther S.

Norwegian Rock, with a depth of less than 1.8m and whose position is doubtful, lies 1.25 miles SE of West Cape and a shoal, the existence of which is doubtful, is charted 2 miles SW of West Cape.

Anchorages.—Anchorage may be obtained 1 mile NW of the head of Atlas Cove, in a depth of 18m, good holding ground. The anchorage should be approached by steering 203° with a peak 124m high, close W of Atlas Cove, ahead on that bearing. The anchorage will be found when the spit sheltering the boat harbor in the cove bears 130°.

This anchorage is exposed to the prevailing W swell rolling in from NNW, and in W gales, fierce squalls and gusts of hurricane force, but of short duration, come down from the passes between the mountains of the Laurens Peninsula.

Landing on Heard Island is generally difficult, but there is a fine sheltered beach in Atlas Cove on the E side where boats can land near the site of the research station.

There is a food depot in Atlas Cove.

Anchorage can be taken in Corinthian Bay, in a depth of 18m, with Saddle Point bearing about 082° and Church Rock, at the head of the bay, bearing about 147°.

Squalls are usually violent off Rogers Head and until the bay is well-opened. The anchorage, in general, is more secure than that off Atlas Cove, except with winds from the NE quadrant. In W gales, the wind is much steadier and without the extreme turbulence of that in Atlas Cove.

Vessels entering Corinthian Bay should give Rogers Head a wide berth and steer for the center of the bay, with the 210m hill located 2.5 miles S of Rogers Head ahead bearing 225°, on which course there is a depth of 18m when the two peaks of Rogers Head are almost in line. Landing may usually be made on a sandy beach in the SW corner of the bay.

Anchorage, in SW winds, may be found in Spit Bay under the lee of Stephenson Glacier, at the W end of the bay, in depths of 14 to 22m, black sand. Anchorage is judged to be unsafe E of a line drawn 000° from the E extremity of the Stephenson Glacier.

Landing may be made during SW winds on the S side of Spit Bay.

A small hut containing emergency provisions is situated at the top of the beach W of Spit Bay and 9 miles SE of Cape Bidlingmaier; the hut is 75m from the edge of Stephenson Glacier, and between a remarkable square boulder and a water course through a moraine.

The McDonald Islands

9.13 The McDonald Islands lie about 23 miles W of Heard Island. The group consists of two small islands and Meyer Rock. The shores of these barren uninhabited islets are formed by precipitous cliffs. The islands are under the sovereignty of the Government of Australia.

McDonald Island (53°03'S., 72°35'E.), the largest of the group, is 0.75 mile long and 0.5 mile wide. It consists of two distinct parts, each about equal in area, joined by a narrow central isthmus. The N half is a sloping plateau, rising from 30m in the SE to 120m in the NW; the S half is a steep-sided hill, 230m high. Each is bound by vertical cliffs, which fall to the sea around most of the hill and around the W and NW side of the plateau.

A promontory extends from the NE side of the island. Access to the island appears to be practicable in good weather conditions, on the beach at the S end of the island, and on the N promontory.

Flat Island (53°02'S., 72°35'E.), 55m high, consists of a plateau from which sheer cliffs fall to the sea, except in the SE corner. The island lies about 90m N of McDonald Island.

Meyer Rock, which lies about 1 mile NW of McDonald Island, rises steeply to 170m and is barren.

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					
ABBOT PATCHES	12	28 S	130	48 E	2.67
ABBOTT ISLET	12	02 S	135	30 E	2.9
ABBOTT SHOAL	11	50 S	131	31 E	2.39
ADAM BAY	12	09 S	131	12 E	2.46
ADELE ISLAND	15	31 S	123	09 E	3.62
ADELE ISLAND SHOAL	15	42 S	123	14 E	3.62
ADIEU POINT	15	15 S	124	35 E	3.44
AFGHAN SHOAL	11	54 S	130	08 E	2.61
AFRICAN REEF	28	58 S	114	37 E	5.27
AIRLIE ISLAND	21	19 S	115	10 E	4.48
AIRLIE ISLAND TERMINAL	21	18 S	115	10 E	4.49
ALAGNA SHOAL	14	06 S	136	03 E	1.31
ALARM SHOAL	16	20 S	122	59 E	3.85
ALBANY	35	02 S	117	54 E	6.17
ALBATROSS BAY	12	40 S	141	40 E	1.4
ALBATROSS ISLET	35	04 S	136	11 E	7.54
ALBERT ISLETS	14	32 S	124	55 E	3.38
ALBERT REEF	14	15 S	125	10 E	3.34
ALBERT REEF	15	37 S	123	20 E	3.63
ALBERT RIVER	17	34 S	139	45 E	1.11
ALGER ISLAND	11	53 S	135	58 E	2.6
ALLEN ISLAND	17	02 S	139	14 E	1.19
AMERICAN RIVER	35	47 S	137	47 E	8.15
AMUR REEF	16	28 S	123	16 E	3.92
ANCHOR ISLET	21	31 S	114	46 E	4.57
ANCHOR SHOAL	16	21 S	123	09 E	3.85
ANDERDON ISLETS	14	56 S	125	09 E	3.40
ANGURUGU CREEK	13	58 S	136	25 E	1.33
ANJO POINT	13	57 S	126	35 E	3.12
ANN POINT	34	10 S	119	34 E	6.22
ANN SHOALS	11	42 S	132	12 E	2.40
ANSON BAY	13	20 S	130	03 E	2.71
ANT CLIFF	11	47 S	131	11 E	2.38
ANTECHAMBER BAY	35	48 S	138	06 E	8.12
ANXIOUS BAY	33	24 S	134	34 E	7.27
APSLEY STRAIT	11	30 S	130	25 E	2.56
ARCHDEACON LEDGE	28	14 S	114	16 E	5.19
ARDROSSAN	34	26 S	137	55 E	8.42
ARNHEM BAY	12	19 S	136	11 E	1.59
ARNO BAY	33	55 S	136	35 E	7.80
ASHBURTON ROAD	21	39 S	115	02 E	4.55
ASHMORE REEF	12	15 S	123	03 E	3.4
ATALUMA POINT	15	45 S	136	49 E	1.25
ATTACK SHOAL	11	43 S	136	43 E	1.51
AUGUSTA	34	20 S	115	10 E	6.2
AUGUSTUS ISLAND	15	21 S	124	33 E	3.48
AVOID BAY	34	37 S	135	14 E	7.45
AVOID POINT	34	40 S	135	19 E	7.45
B					
BACKSTAIRS PASSAGE	35	44 S	138	10 E	8.19
BACKY POINT	32	55 S	137	47 E	7.115
BAIRD BAY	33	07 S	134	19 E	7.27
BALD HEAD	35	06 S	118	01 E	6.10
BALD ISLAND	34	55 S	118	27 E	6.19
BALDWIN BANK	12	51 S	126	06 E	3.21
BALEINE BANK	16	47 S	122	00 E	4.8
BALGOWAN POINT	34	19 S	137	29 E	7.102
BALLA BALLA	20	40 S	117	47 E	4.22
BALLAST HEAD	35	45 S	137	48 E	8.15
BARBARA SHOAL	11	53 S	131	45 E	2.43
BARCLAY POINT	11	44 S	133	24 E	2.14
BARCOO SHOAL	15	39 S	122	55 E	3.62
BARN HILL	33	35 S	138	08 E	7.109
BARRETT ROCK	16	04 S	123	20 E	3.67
BARRICADE SHOAL	11	43 S	136	49 E	1.51
BARRIER ISLANDS	33	59 S	123	09 E	6.39
BARRON BANKS	15	46 S	124	18 E	3.56
BARROW BAY	11	20 S	132	12 E	2.31
BARROW ISLAND	20	47 S	115	24 E	4.43
BARROW ISLAND OFFSHORE TERM.	20	48 S	115	33 E	4.45
BARROW ISLAND SHOALS	21	05 S	115	24 E	4.44
BARTALUMBA BAY	13	48 S	136	30 E	1.33
BASS SHOAL	34	41 S	135	53 E	7.65
BASSETT-SMITH SHOAL	13	18 S	125	45 E	3.19
BATHURST ISLAND	16	02 S	123	31 E	3.74
BATHURST POINT	31	59 S	115	32 E	5.36
BAUDIN ISLAND	14	08 S	125	37 E	3.28
BAY OF REST	22	17 S	114	08 E	4.59
BAYLEY POINT	16	55 S	139	02 E	1.12
BAYLISS ISLANDS	16	09 S	123	32 E	3.70
BAYU-UNDAN GAS FIELD	11	04 S	126	39 E	3.2
BEACH POINT	34	52 S	137	49 E	8.38
BEACHPORT	37	30 S	140	01 E	8.68
BEADON POINT	21	38 S	115	06 E	4.47
BEAGLE BAY	16	52 S	122	30 E	4.5
BEAGLE GULF	12	10 S	130	19 E	2.60
BEAGLE ISLET	21	12 S	115	38 E	4.37
BEAGLE ISLETS	29	49 S	114	52 E	5.28
BEAGLE REEF	15	20 S	123	31 E	3.63
BEAGLE REEF	20	23 S	117	50 E	4.21
BEAGLE ROCKS	32	04 S	115	44 E	5.40
BEARD BAY	33	07 S	134	19 E	7.27
BEATRICE REEF	11	53 S	132	12 E	2.42
BEDOUT ISLET	19	35 S	119	06 E	4.16
BEEJALING SHOALS	24	39 S	113	28 E	5.5
BELCHES FOUL GROUND	35	06 S	118	03 E	6.16
BELLEFIN FLATS	25	58 S	113	17 E	5.13
BENNETT SHOAL	12	28 S	130	50 E	2.67
BENTINCK ISLAND	17	04 S	139	30 E	1.17
BERLIN ROCK	34	36 S	136	04 E	7.68
BERNIER ISLAND	24	52 S	113	08 E	5.6
BERNOUILLI ISLAND	15	02 S	124	45 E	3.45
BESSIERES ISLAND	21	31 S	114	46 E	4.57
BEZOUT ISLET	20	33 S	117	10 E	4.23
BICKERTON ISLAND	13	45 S	136	14 E	1.35
BIGGE ISLAND	14	34 S	125	10 E	3.37
BIGGE POINT	14	17 S	125	44 E	3.29
BISHOP ROCKS	13	44 S	126	07 E	3.20
BLACK CLIFF POINT	15	02 S	128	06 E	2.83

	Position °	'	°	'	Sec. Para
BLACK HILL	31	33 S	131	33 E	6.51
BLACK LEDGE	21	34 S	114	42 E	4.58
BLACK PEAK	32	06 S	133	04 E	7.7
BLACK POINT	32	59 S	137	43 E	7.86
BLACK POINT	34	27 S	119	25 E	6.21
BLACK POINT	34	37 S	137	54 E	8.40
BLACK ROCK	16	05 S	123	35 E	3.77
BLACK ROCK	34	55 S	136	06 E	7.59
BLACK ROCKS	34	03 S	122	13 E	6.34
BLACK ROCKS	34	37 S	135	17 E	7.45
BLANCHE HARBOR	32	42 S	137	46 E	7.118
BLANCHE PORT	32	47 S	134	13 E	7.23
BLIND STRAIT	26	07 S	113	13 E	5.13
BLOWFISH BANKS	24	48 S	113	34 E	5.5
BLUE MUD BAY	11	12 S	131	51 E	2.34
BLUE MUD BAY	13	30 S	136	15 E	1.42
BLUFF POINT	14	04 S	126	39 E	3.12
BLUFF REACH	32	39 S	137	46 E	7.119
BLUNDER BAY	15	12 S	129	44 E	2.77
BLYTH ISLET	34	34 S	136	18 E	7.72
BOLINGBROKE POINT	34	33 S	136	05 E	7.68
BOMBARD SHOAL	14	04 S	136	59 E	1.41
BONAPARTE ARCHIPELAGO	15	00 S	125	00 E	3.32
BORDA ISLAND	14	14 S	126	01 E	3.31
BOSANQUET BAY	32	10 S	133	40 E	7.15
BOSTON BAY	34	41 S	135	53 E	7.65
BOSTON ISLAND	34	42 S	135	56 E	7.61
BOSTON POINT	34	39 S	135	56 E	7.61
BOUCAUT BAY	12	00 S	134	29 E	2.11
BOULLANGER ISLAND	30	19 S	115	00 E	5.30
BOUNTIFUL ISLANDS	16	40 S	139	52 E	1.16
BOUVARD REEFS	32	50 S	115	35 E	5.44
BOWEN STRAIT	11	15 S	132	31 E	2.25
BOYD POINT	12	55 S	141	38 E	1.6
BRACE POINT	11	19 S	130	20 E	2.58
BRADY ROCK	13	41 S	136	27 E	1.34
BRAITHWAITE POINT	11	46 S	133	56 E	2.13
BRAMBLE ROCKS	10	53 S	132	46 E	2.19
BRAMFIELD HILL	33	35 S	134	58 E	7.33
BRANCH BANKS	13	38 S	126	12 E	3.19
BREADING PATCH	16	05 S	123	02 E	3.65
BREAKSEA ISLAND	35	04 S	118	03 E	6.16
BREMER ISLAND	12	07 S	136	49 E	1.50
BREWIS REEF	21	30 S	114	55 E	4.51
BRIDGET SHOAL	34	43 S	136	18 E	7.71
BRITOMART SHOAL	10	54 S	132	33 E	2.23
BROGDEN POINT	11	31 S	133	05 E	2.15
BROMBY ISLAND	11	50 S	136	40 E	1.53
BROOK SHOAL	35	19 S	136	48 E	7.89
BROOME	17	58 S	122	14 E	4.13
BROWE ISLET	14	06 S	123	33 E	2.1
BROWN POINT	32	33 S	133	51 E	7.20
BROWN POINT	34	43 S	137	29 E	7.97
BROWN STRAIT	11	40 S	136	05 E	2.7
BROWSE ISLET	14	06 S	123	33 E	3.61
BRUE REEF	15	56 S	123	02 E	3.65
BRUNSWICK BAY	15	10 S	124	40 E	3.44
BUCHANAN BAY	15	40 S	136	43 E	1.26
BUCKINGHAM BAY	12	05 S	135	55 E	1.60
BUCKLE HEAD	14	26 S	127	53 E	2.87
BUFFALO REEF	34	43 S	136	28 E	7.70
BUNBURY	33	19 S	115	39 E	5.45
BUNGALA RIVER	35	27 S	138	18 E	8.47
BUNKER BAY	33	33 S	115	02 E	5.48
BURFORD ISLAND	11	29 S	131	57 E	2.40
BURGUNNGURA ISLAND	11	36 S	136	05 E	2.6
BURKETOWN	17	44 S	139	32 E	1.11
BURNEY ISLAND	13	36 S	136	14 E	1.44
BURRA-BURRA HEAD	11	22 S	130	42 E	2.52
BUSSELTON	33	38 S	115	20 E	5.47
BUSTARD ISLAND	13	42 S	136	24 E	1.34
BUTTY HEAD	33	54 S	121	39 E	6.26
BYAM MARTIN ISLAND	15	24 S	124	21 E	3.50
BYNOE HARBOR	12	39 S	130	32 E	2.69
BYRON ISLAND	16	10 S	123	27 E	3.69

C

	Position °	'	°	'	Sec. Para
CADELL STRAIT	12	00 S	135	45 E	2.9
CAESER ISLAND	16	04 S	123	56 E	3.57
CAFFARELLI ISLAND	16	02 S	123	17 E	3.64
CALDER SHOAL	10	51 S	129	04 E	2.54
CALEDON BAY	12	51 S	136	35 E	1.46
CALVERT RIVER	16	16 S	137	45 E	1.20
CAMDEN SOUND	15	26 S	124	24 E	3.51
CAMP HILL	21	48 S	114	10 E	4.59
CANNAN REEFS	32	39 S	133	15 E	7.10
CAP ISLAND	33	57 S	135	07 E	7.34
CAPE ADIEU	32	01 S	132	09 E	6.51
CAPE ARID	34	01 S	123	10 E	6.38
CAPE ARNHEM	12	21 S	136	59 E	1.48
CAPE BANKS	37	55 S	140	23 E	8.71
CAPE BARROW	13	40 S	136	04 E	1.32
CAPE BASKERVILLE	17	08 S	122	15 E	4.7
CAPE BAUER	32	44 S	134	04 E	7.23
CAPE BEATRICE	14	18 S	136	58 E	1.32
CAPE BEAUFORT	34	25 S	115	32 E	6.3
CAPE BEDOUT	35	57 S	136	36 E	8.2
CAPE BELLEFIN	26	01 S	113	16 E	5.13
CAPE BERTHOLET	17	15 S	122	11 E	4.10
CAPE BIDLINGMAIER	53	01 S	73	32 E	9.11
CAPE BLANCHE	33	02 S	134	07 E	7.25
CAPE BOILEAU	17	40 S	122	11 E	4.11
CAPE BOUGAINVILLE	13	53 S	126	06 E	3.15
CAPE BOUGUER	36	02 S	136	55 E	8.4
CAPE BOUVARD	32	41 S	115	36 E	5.43
CAPE BREWSTER	15	06 S	124	54 E	3.44
CAPE BUFFON	37	35 S	140	07 E	8.69
CAPE BURR	34	07 S	136	21 E	7.78
CAPE CARNOT	34	56 S	135	37 E	7.46
CAPE CASSINI	35	35 S	137	20 E	8.24
CAPE CATASTROPHE	34	59 S	136	00 E	7.48
CAPE CLAIRAULT	33	42 S	114	58 E	5.51
CAPE COCKBURN	11	20 S	132	52 E	2.15
CAPE COSSIGNY	20	29 S	117	56 E	4.20
CAPE COUTTS	35	46 S	138	04 E	8.13
CAPE CROKER	10	58 S	132	36 E	2.23
CAPE CUVIER	24	13 S	113	24 E	5.3
CAPE D'ESTREE	32	16 S	133	46 E	7.17
CAPE D'ESTAING	35	35 S	137	30 E	8.25
CAPE DOMBEY	13	54 S	129	42 E	2.72
CAPE DOMBEY	37	10 S	139	44 E	8.64
CAPE DOMETT	14	49 S	128	23 E	2.80
CAPE DON	11	19 S	131	46 E	2.34
CAPE DONINGTON	34	44 S	136	00 E	7.60
CAPE DRIVER	33	57 S	136	35 E	7.79
CAPE DU COUEDIC	36	06 S	136	42 E	8.3
CAPE DUSSEJOUR	14	45 S	128	13 E	2.81
CAPE DUTTON	35	38 S	137	09 E	8.23
CAPE ELIZABETH	34	08 S	137	27 E	7.103
CAPE FARQUHAR	23	38 S	113	37 E	5.3
CAPE FINNIS	33	38 S	134	49 E	7.29
CAPE FORD	13	26 S	129	52 E	2.72
CAPE FOURCROY	11	47 S	130	01 E	2.59
CAPE GAMBIER	11	56 S	130	58 E	2.47
CAPE GANTHEAUME	36	04 S	137	27 E	8.8
CAPE GREY	13	00 S	136	40 E	1.45
CAPE HAMELIN	34	15 S	115	02 E	5.55
CAPE HARDY	34	11 S	136	20 E	7.78
CAPE HART	35	54 S	138	03 E	8.10
CAPE HAY	14	03 S	129	29 E	2.73
CAPE HEIRISSON	26	01 S	113	20 E	5.13
CAPE HOTHAM	12	03 S	131	18 E	2.45
CAPE JAFFA	36	58 S	139	40 E	8.62
CAPE JAUBERT	18	56 S	121	33 E	4.14
CAPE JERVIS	35	37 S	138	06 E	8.44
CAPE KEERWEER	13	55 S	141	28 E	1.7
CAPE KEITH	11	36 S	131	27 E	2.38
CAPE KERSAINT	36	02 S	137	07 E	8.5
CAPE KNOB	34	32 S	119	14 E	6.21
CAPE LABUAN	53	12 S	73	30 E	9.12
CAPE LAMBERT	20	36 S	117	11 E	4.23
CAPE LANNES	37	12 S	139	44 E	8.65
CAPE LAVERY	11	20 S	130	39 E	2.52
CAPE LE GRAND	34	01 S	122	07 E	6.27
CAPE LEEUWIN	34	22 S	115	08 E	5.56
CAPE LEGENDRE	20	21 S	116	50 E	4.24
CAPE LESCHENAULT	31	17 S	115	27 E	5.33
CAPE LESUEUR	25	44 S	113	23 E	5.12
CAPE LEVEQUE	16	23 S	122	56 E	3.106
CAPE LINOIS	36	01 S	137	35 E	8.9
CAPE LONDONDERRY	13	44 S	126	58 E	3.9
CAPE MARTIN	37	30 S	140	01 E	8.66

	Position °	'	°	'	Sec. Para
CAPE MISSIESSY	32	24 S	133	52 E	7.19
CAPE NATURALISTE	33	32 S	115	01 E	5.49
CAPE NORTHUNBERLAND	38	03 S	140	38 E	8.72
CAPE NUYTS	32	02 S	132	21 E	7.3
CAPE PERON FLATS	25	25 S	113	31 E	5.11
CAPE POIVRE	20	49 S	115	19 E	4.44
CAPE POND	14	45 S	125	08 E	3.39
CAPE PRESTON	20	50 S	116	13 E	4.32
CAPE RADSTOCK	33	12 S	134	19 E	7.26
CAPE RANSONNET	26	10 S	113	13 E	5.10
CAPE ROCK	34	55 S	135	32 E	7.45
CAPE RULHIERES	13	56 S	127	22 E	2.87
CAPE SHIELD	13	20 S	136	21 E	1.45
CAPE SPENCER	35	18 S	136	53 E	7.90
CAPE ST. ALBAN	35	48 S	138	08 E	8.12
CAPE STEWART	11	56 S	134	44 E	2.10
CAPE STEWART	11	56 S	134	45 E	2.11
CAPE TALBOT	13	48 S	126	45 E	3.10
CAPE THEVENARD	32	09 S	133	39 E	7.15
CAPE THOMAS	37	05 S	139	45 E	8.63
CAPE THOUIN	20	20 S	118	11 E	4.20
CAPE TORRENS	15	00 S	125	06 E	3.40
CAPE TORRENS	35	43 S	136	43 E	8.22
CAPE TOURNEFORT	34	55 S	135	51 E	7.48
CAPE VAN DIEMEN	11	10 S	130	23 E	2.53
CAPE VAN DIEMEN	16	32 S	139	43 E	1.14
CAPE VANCOUVER	35	02 S	118	11 E	6.18
CAPE VLAMING	32	02 S	115	27 E	5.35
CAPE VOLTAIRE	14	15 S	125	34 E	3.23
CAPE WELLINGTON	15	10 S	124	50 E	3.44
CAPE WESSEL	11	00 S	136	45 E	2.2
CAPE WILBERFORCE	11	55 S	136	35 E	1.53
CAPE WILLOUGHBY	35	51 S	138	08 E	8.11
CAPE WIRAWAWOI	12	10 S	136	47 E	1.49
CAPSTAN ISLET	14	35 S	125	16 E	3.36
CAREENING BAY	15	06 S	125	00 E	3.42
CAREENING BAY	32	14 S	115	42 E	5.39
CARLISLE HEAD	16	45 S	123	08 E	3.100
CARNAC ISLAND	32	07 S	115	40 E	5.38
CARNARVON	24	53 S	113	39 E	5.7
CARRINGTON POINT	34	58 S	136	05 E	7.55
CARTER KNOLL	36	09 S	138	10 E	8.11
CARTIER ISLET	12	32 S	123	33 E	3.5
CASCADE BAY	16	34 S	123	26 E	3.94
CASSINI ISLAND	13	57 S	125	38 E	3.24
CASTLE HILL	11	48 S	130	11 E	2.59
CASTLEREAGH BAY	12	07 S	135	09 E	2.9
CASUARINA ISLETS	36	04 S	136	43 E	8.3
CASUARINA POINT	32	19 S	115	38 E	5.44
CAUSEWAY CHANNEL	34	00 S	121	50 E	6.30
CAVE POINT	35	08 S	117	54 E	6.10
CENTRAL HILL	13	58 S	136	39 E	1.39
CENTRE ISLAND	15	42 S	136	46 E	1.25
CERVANTES ISLETS	30	32 S	115	02 E	5.32
CHAMBERS BAY	12	12 S	131	36 E	2.43
CHAMBERS ISLAND	16	16 S	123	32 E	3.71
CHAMPAGNY ISLANDS	15	09 S	124	14 E	3.49
CHAMPION BAY	28	44 S	114	36 E	5.20
CHAMPION ROCK	32	02 S	115	36 E	5.38
CHANNEL POINT	13	10 S	130	07 E	2.71
CHANNEL ROCK	12	25 S	130	47 E	2.67
CHANNEL ROCK	16	26 S	123	23 E	3.90
CHARLES POINT	12	23 S	130	37 E	2.63
CHARLES POINT	15	41 S	136	55 E	1.23
CHARLES POINT PATCHES	12	21 S	130	40 E	2.66
CHASM ISLAND	13	40 S	136	35 E	1.37
CHATHAM ISLAND	35	02 S	116	30 E	6.6
CHESTER REEF	34	27 S	123	37 E	6.44
CHRISTINE POINT	17	12 S	123	17 E	3.102
CHRISTMAS ISLAND	10	30 S	105	40 E	9.8
CHURCHILL REEF	15	28 S	123	15 E	3.63
CLAN MACDOUGALL SHOAL	33	53 S	137	13 E	7.83
CLARKSON POINT	15	50 S	137	02 E	1.23
CLEFT ISLET	16	02 S	123	21 E	3.66
CLERKE REEF	17	19 S	119	21 E	4.2
CLIFF ISLAND	34	01 S	122	05 E	6.34
CLIFFY POINT	12	22 S	136	18 E	1.59
COATES REEF	33	59 S	121	58 E	6.30
COBHAM BAY	11	37 S	131	24 E	2.38
COCKATOO ISLAND	16	06 S	123	37 E	3.76
COCKATOO ISLANS	16	06 S	123	37 E	3.81
COCKELL REEFS	15	45 S	124	05 E	3.56
COCKLE SPIT	33	04 S	137	56 E	7.111
COCOS ISLANDS	12	08 S	96	50 E	9.2
COFFIN BAY	34	30 S	135	20 E	7.38
COLBERT ISLET	14	52 S	124	43 E	3.43
COLLIER BAY	16	12 S	124	15 E	3.58
COLLINSON POINT	32	33 S	133	53 E	7.21
COMBE ROCK	13	25 S	125	55 E	3.19
CONDER POINT	11	44 S	131	17 E	2.38
CONDILLAC ISLET	14	06 S	125	33 E	3.25
CONNEXION ISLAND	13	50 S	136	21 E	1.35
COOKE POINT	20	18 S	118	38 E	4.18
COOTAMUNDRA SHOAL	10	51 S	129	13 E	2.54
COOTES HILL	35	06 S	137	28 E	8.31
COPELAND ISLAND	11	29 S	132	44 E	2.22
CORNEILLE ISLAND	14	11 S	125	44 E	3.27
CORNELISSE SHOAL	20	02 S	118	22 E	4.19
CORNY POINT	34	54 S	137	01 E	7.93
CORONATION ISLANDS	15	00 S	124	56 E	3.44
CORVISART BAY	32	49 S	134	05 E	7.25
COTTON ISLAND	11	51 S	136	29 E	1.55
COURTENAY HEAD	20	31 S	116	41 E	4.30
COVENTRY REEF	32	20 S	115	38 E	5.39
COW AND CALF ROCKS	35	01 S	116	13 E	6.5
COW ROCK	33	58 S	114	58 E	5.51
COWAN PATCHES	14	50 S	128	16 E	2.82
COWARAMUP POINT	33	52 S	114	59 E	5.51
COWARAMUP REEF	33	50 S	114	57 E	5.51
COWELL	33	41 S	136	56 E	7.82
COXON SHOAL	20	04 S	118	28 E	4.19
CRAGGY ISLETS	15	36 S	136	41 E	1.26
CROCODILE ISLANDS	11	44 S	135	11 E	2.9
CROKER ISLAND	11	10 S	132	33 E	2.23
CRYSTAL HEAD	14	27 S	125	51 E	3.30
CULL ISLAND	33	55 S	121	54 E	6.29
CULLEN POINT	11	57 S	141	54 E	1.2
CUMBERLEGE REEF	14	28 S	136	53 E	1.32
CUNNINGHAM ISLANDS	11	45 S	136	06 E	2.6
CUNNINGHAM POINT	16	41 S	123	08 E	3.99
CURLEW POINT	32	32 S	137	46 E	7.120
CYGNET BAY	16	34 S	123	01 E	3.98

D

	Position °	'	°	'	Sec. Para
D'ARCOLE ISLANDS	15	08 S	124	35 E	3.45
D'ENTRECASTEAUX REEF	31	59 S	131	56 E	7.2
D'ESTREE BAY	35	55 S	137	39 E	8.9
DALBY ISLET	34	34 S	136	15 E	7.74
DALUMBA BAY	14	07 S	136	49 E	1.41
DALY HEAD	35	02 S	136	56 E	7.92
DALY RIVER	13	19 S	130	17 E	2.71
DAMPIER	20	40 S	116	43 E	4.31
DAMPIER ARCHIPELAGO	20	27 S	116	47 E	4.24
DANCE HEAD	32	10 S	115	40 E	5.41
DANGER POINT	11	07 S	132	21 E	2.26
DANGEROUS REEF	34	49 S	136	13 E	7.59
DART SHOAL	28	40 S	113	54 E	5.24
DARWIN	12	28 S	130	51 E	2.68
DARWIN REEFS	24	36 S	113	26 E	5.5
DASHWOOD BAY	35	35 S	137	24 E	8.24
DASHWOOD CHANNEL	32	36 S	134	08 E	7.22
DASHWOOD ROCK	32	38 S	134	04 E	7.20
DE FREYCINET ISLET	15	00 S	124	32 E	3.43
DE MOLE POINT	32	31 S	133	59 E	7.21
DECEPTION BAY	15	38 S	124	25 E	3.53
DECLARATION ROCK	17	55 S	122	09 E	4.11
DECRES BAY	32	14 S	133	44 E	7.17
DEEP BAY	14	07 S	126	38 E	3.13
DEGERANDO LIGHT	15	20 S	124	11 E	3.49
DELAMBRE ISLAND	20	26 S	117	05 E	4.24
DELAMBRE REEF	20	26 S	117	15 E	4.23
DELISSER SANDS	31	42 S	128	57 E	6.49
DEMSTER HEAD	33	53 S	121	54 E	6.31
DENHAM CHANNEL	25	57 S	113	12 E	5.13
DENHAM ISLAND	16	43 S	139	10 E	1.15
DENHAM SOUND	25	41 S	113	15 E	5.11
DENIAL BAY	32	15 S	133	30 E	7.15
DENMAN SHOAL	15	43 S	123	56 E	3.57
DEPUCH ISLAND	20	38 S	117	43 E	4.22
DERBY	17	18 S	123	36 E	3.105
DESFONTAINES ISLAND	15	02 S	124	50 E	3.45
DILLON SHOAL	11	00 S	125	35 E	3.3

	Position °	'	°	'	Sec. Para
DILLON SHOAL	33	49 S	137	08 E	7.83
DINGO REEF	15	19 S	123	37 E	3.63
DIRECTION ISLAND	12	05 S	96	53 E	9.3
DIRECTION ISLAND	21	32 S	115	08 E	4.48
DIRECTION ISLET	32	01 S	115	33 E	5.37
DIRK HARTOG HOMESTEAD	26	00 S	113	09 E	5.12
DIRK HARTOG ISLAND	25	51 S	113	07 E	5.10
DISAPPOINTMENT REACH	25	45 S	113	55 E	5.9
DISASTER BAY	16	54 S	123	11 E	3.100
DIXON ISLAND	20	38 S	117	04 E	4.24
DOG ISLAND	32	29 S	133	20 E	7.11
DOME ISLAND	34	10 S	123	21 E	6.43
DONGARA	29	16 S	114	55 E	5.28
DONINGTON REEF	34	43 S	136	00 E	7.60
DORRE ISLAND	25	08 S	113	06 E	5.6
DOUBLE ISLET	20	44 S	115	30 E	4.43
DOUBTFUL BAY	16	03 S	124	02 E	3.54
DOUGLAS BANK	32	48 S	137	50 E	7.116
DOUGLAS ISLAND	34	10 S	123	09 E	6.43
DOUGLAS POINT	32	51 S	137	49 E	7.116
DOUGLAS POINT	38	02 S	140	35 E	8.71
DOUGLAS ROCK	36	03 S	136	51 E	8.4
DOWCER BLUFF	34	45 S	137	52 E	8.39
DRAPER ISLAND	34	12 S	122	30 E	6.37
DRUMMOND POINT	34	09 S	135	14 E	7.35
DRYSDALE ISLAND	11	41 S	136	00 E	2.7
DUFFIELD ISLET	34	39 S	136	20 E	7.71
DUFFIELD RIDGE	32	02 S	115	28 E	5.37
DUKE OF ORLEANS BAY	33	55 S	122	36 E	6.38
DUNDAS POINT	15	10 S	128	06 E	2.83
DUNDAS STRAIT	11	20 S	131	40 E	2.36
DUTTON BAY	34	05 S	136	24 E	7.78
DUYFKEN POINT	12	34 S	141	36 E	1.3
DYER ISLET	32	01 S	115	33 E	5.37

E

EAGLE POINT	16	11 S	124	25 E	3.58
EAST ALLIGATOR RIVER	12	06 S	128	15 E	2.42
EAST BANKS	14	56 S	128	16 E	2.82
EAST HOLOTHURIA REEF	13	35 S	126	00 E	3.19
EAST POINT	12	25 S	130	49 E	2.65
EAST ROE ISLAND	16	22 S	123	47 E	3.91
EAST SANDS	32	40 S	137	48 E	7.119
EASTER GROUP	28	43 S	113	47 E	5.24
EASTERN COVE	35	46 S	137	51 E	8.14
EASTERN GROUP	33	47 S	124	05 E	6.47
EASTERN SHOAL	33	08 S	137	46 E	7.110
EBA ISLAND	32	41 S	134	16 E	7.22
ECLIPSE ISLAND	35	11 S	117	53 E	6.12
ECLIPSE ISLANDS	13	54 S	126	19 E	3.16
ECLIPSE ROCK	34	30 S	137	28 E	7.99
EDITHBURGH	35	05 S	137	45 E	8.35
EDWARD ISLET	14	30 S	135	37 E	1.31
EDWARDS POINT	11	11 S	132	16 E	2.27
EGG ISLAND	32	28 S	133	19 E	7.11
EGLINTON ROCKS	31	38 S	115	39 E	5.33
EIGHTY MILES BEACH	18	56 S	121	33 E	4.15
ELANG TERMINAL	10	52 S	126	34 E	3.2
ELBOW HILL	33	43 S	136	48 E	7.79
ELCHO ISLAND	11	55 S	135	45 E	2.8
ELLEN POINT	36	00 S	137	09 E	8.7
ELLIOTT POINT	12	28 S	130	49 E	2.65
ELLISTON	33	38 S	134	52 E	7.34
EMERY POINT	12	27 S	130	49 E	2.65
EMMES REEF	35	18 S	136	49 E	7.89
EMU BAY	35	35 S	137	32 E	8.25
ENDERBY ISLAND	20	36 S	116	32 E	4.33
ENDERBY REEF	20	36 S	116	32 E	4.34
ENDYALGOUT ISLAND	11	41 S	132	34 E	2.41
ENFIELD OIL FIELD	21	29 S	113	59 E	4.63
ENTRANCE ISLAND	15	17 S	124	37 E	3.47
EPINEUX BAY	26	20 S	113	17 E	5.16
ESCAPE CLIFF	12	08 S	131	15 E	2.46
ESCAPE ISLAND	30	20 S	115	00 E	5.31
ESKDALE OIL FIELD	21	23 S	113	49 E	4.63
ESPERANCE	33	52 S	121	54 E	6.31
ESPERANCE BAY	33	54 S	121	58 E	6.27
EUCLA	31	43 S	128	46 E	6.50
EUCLA ROADS	31	45 S	129	00 E	6.49
EVANS ISLAND	32	23 S	133	29 E	7.12
EVERETT ISLAND	12	15 S	136	04 E	1.59
EXMOUTH GULF	22	10 S	114	19 E	4.59
EYRE	32	16 S	126	17 E	6.49
EYRE BLUFF	31	58 S	132	44 E	7.6
EYRE ISLAND	32	23 S	133	50 E	7.19

F

FAIRWAY LIGHT BEACON	12	42 S	141	41 E	1.4
FAIRWAY ROCK	32	45 S	134	13 E	7.23
FAIRWAY ROCKS	16	35 S	123	19 E	3.92
FALSE BAY	33	00 S	137	40 E	7.86
FALSE ENTRANCE	26	20 S	113	17 E	5.16
FALSE ISLAND POINT	21	51 S	114	01 E	5.2
FALSE PERA HEAD	13	05 S	141	37 E	1.6
FANNY COVE	33	52 S	121	07 E	6.26
FANNY POINT	34	44 S	135	56 E	7.62
FANTOME BANK	11	38 S	123	57 E	3.3
FATHOM ROCK	14	43 S	128	14 E	2.81
FAURE ISLAND	25	51 S	113	53 E	5.9
FAVELL BANK	12	42 S	126	09 E	3.21
FENELON ISLAND	14	08 S	125	42 E	3.26
FENELON ISLAND	32	35 S	133	17 E	7.11
FENTON PATCHES	12	12 S	130	43 E	2.62
FIELD ISLAND	12	05 S	132	23 E	2.42
FIGURE OF EIGHT ISLAND	34	02 S	121	36 E	6.28
FINKE BAY	12	13 S	132	04 E	2.43
FISH REEF	12	26 S	130	26 E	2.69
FISHERMAN ISLETS	30	08 S	114	57 E	5.29
FITZROY REEFS	24	33 S	113	24 E	5.5
FITZROY RIVER	16	15 S	123	53 E	3.102
FLAT ISLAND	53	02 S	72	35 E	9.13
FLETCHER ISLAND	16	21 S	124	21 E	3.59
FLINDERS BAY	34	20 S	115	12 E	6.2
FLINDERS CHANNEL	32	43 S	137	48 E	7.118
FLINDERS ISLAND	33	43 S	134	29 E	7.31
FLINDERS POINT	12	04 S	136	03 E	1.57
FLINDERS REEF	32	13 S	133	12 E	7.13
FLINDERS ROCK	32	13 S	133	13 E	7.8
FLYING FISH COVE	10	25 S	105	40 E	9.9
FOAM ROCKS	34	08 S	122	51 E	6.40
FONTANES ISLET	14	54 S	124	55 E	3.41
FORESTIER ISLANDS	20	32 S	117	51 E	4.21
FORSYTH ISLAND	16	50 S	139	07 E	1.19
FORT POINT	12	28 S	130	51 E	2.65
FORTESCUE ISLAND	20	55 S	116	02 E	4.36
FORTESCUE ROAD	20	53 S	116	07 E	4.35
FOSSIL POINT	35	02 S	136	09 E	7.55
FOUL BAY	35	11 S	137	15 E	8.30
FOUL POINT	16	48 S	123	09 E	3.100
FOUR HUMMOCKS ISLANDS	34	46 S	135	01 E	7.42
FOWLER ISLAND	17	07 S	139	33 E	1.17
FRANKLIN HARBOR	33	44 S	136	57 E	7.82
FRANKLIN ISLANDS	32	28 S	133	38 E	7.13
FRASER ROCK	16	07 S	123	04 E	3.66
FRAZER ISLET	22	39 S	113	38 E	5.3
FREELING ISLAND	32	29 S	133	20 E	7.11
FREEMAN NOB	35	33 S	138	41 E	8.59
FREMANTLE	32	03 S	115	44 E	5.41
FRENCHMAN BAY	35	05 S	117	57 E	6.14
FRENCHMAN ROCK	35	43 S	137	43 E	8.16
FREYCINET ESTUARY	26	25 S	113	43 E	5.15
FREYCINET POINT	34	06 S	114	59 E	5.52
FROST SHOAL	15	47 S	123	21 E	3.62

G

GAGE ROADS	32	02 S	115	41 E	5.40
GALAH CHANNEL	16	05 S	123	34 E	3.80
GALE BANK	12	37 S	126	05 E	3.21
GALES BAY	22	25 S	114	11 E	4.59
GAMBIER ISLANDS	35	10 S	136	27 E	7.52
GANTHEAUME BAY	27	40 S	114	10 E	5.17
GARDEN ISLAND	32	12 S	115	41 E	5.39
GASCOIGNE BAY	32	31 S	133	56 E	7.21
GASCOYNE FLATS	25	00 S	113	38 E	5.8
GAWLER POINT	34	30 S	137	28 E	7.99
GEDGE POINT	11	12 S	136	38 E	2.4
GEE WEE POINT	16	38 S	139	09 E	1.15
GEELVINK CHANNEL	28	45 S	114	15 E	5.26

	Position °	'	°	'	Sec. Para
GEOGRAPHE BAY	33	31 S	115	21 E	5.46
GEOGRAPHE CHANNEL	24	40 S	113	16 E	5.5
GEOGRAPHE REEF	34	19 S	114	59 E	5.57
GEOGRAPHE SHOALS	20	16 S	117	54 E	4.21
GEORGE WATER	15	52 S	124	35 E	3.55
GERALDTON	28	47 S	114	36 E	5.20
GERANIUM HARBOR	13	55 S	126	34 E	3.12
GERMAIN POINT	33	45 S	136	58 E	7.82
GERMEIN	33	02 S	138	00 E	7.112
GERMEIN BAY	33	05 S	137	55 E	7.111
GERMEIN ISLAND	33	13 S	134	40 E	7.28
GERMEIN POINT	33	45 S	136	58 E	7.82
GIANT ROCKS	34	11 S	121	40 E	6.30
GIBBINGS ISLAND	16	09 S	123	31 E	3.70
GIBBINGS REEFS	15	56 S	123	45 E	3.73
GIBBON POINT	33	50 S	136	47 E	7.81
GIBSON POINT	14	00 S	125	58 E	3.31
GILBERT ROCK	16	29 S	123	03 E	3.98
GILES POINT	35	03 S	137	45 E	8.35
GILES SHOAL	11	42 S	131	45 E	2.39
GLIDDON REEF	32	20 S	133	34 E	7.14
GLOMAR SHOAL	19	31 S	116	47 E	4.24
GLYDE POINT	12	10 S	131	07 E	2.46
GOALEN ROCKS	32	24 S	133	43 E	7.19
GOAT ISLAND	32	19 S	133	31 E	7.14
GOAT POINT	15	51 S	137	04 E	1.23
GODFREY ISLANDS	37	05 S	139	43 E	8.63
GOODRICH BANK	10	42 S	130	19 E	2.54
GOOLWA	35	30 S	138	47 E	8.60
GOOSE ISLAND	34	05 S	123	11 E	6.42
GOOSE ISLET	34	27 S	137	22 E	7.100
GOOSE ISLET	35	04 S	116	44 E	6.7
GORDON BAY	11	39 S	130	07 E	2.58
GORE POINT	17	38 S	139	56 E	1.11
GOULET BLUFF	26	13 S	113	40 E	5.12
GOURDON BAY	18	27 S	121	55 E	4.14
GOVE HARBOR	12	12 S	136	40 E	1.54
GOVERNOR ISLETS	13	56 S	126	42 E	3.14
GRACE SHOAL	34	03 S	124	12 E	6.43
GRANITE ISLET	15	29 S	124	36 E	3.52
GRANITE ROCKS	36	40 S	139	51 E	8.60
GRANT ISLAND	11	09 S	132	55 E	2.20
GRANTHAM ISLAND	34	47 S	135	52 E	7.64
GREAT SANDY ISLET	21	12 S	115	38 E	4.37
GREEN ISLET	34	26 S	137	25 E	7.101
GREEN ISLETS	30	41 S	115	06 E	5.32
GREENLY ISLAND	34	39 S	134	47 E	7.42
GRIFFIN MARINE TERMINAL	21	13 S	114	39 E	4.52
GRINDAL ISLAND	34	55 S	136	02 E	7.58
GRINDALL POINT	13	19 S	136	03 E	1.43
GROPER POINT	34	30 S	118	54 E	6.21
GUICHEN BAY	37	09 S	139	46 E	8.63
GUION POINT	11	46 S	133	40 E	2.14
GULF ST. VINCENT	35	00 S	138	10 E	8.34
GULUWURU ISLAND	11	31 S	136	26 E	2.5
GUNN POINT	12	10 S	131	00 E	2.46
GUTHRIE BANKS	14	55 S	128	10 E	2.82

H

	Position °	'	°	'	Sec. Para
HADLEY PASS	16	25 S	123	09 E	3.93
HALL BANK	32	02 S	115	43 E	5.40
HALL POINT	15	40 S	124	22 E	3.53
HALLETS COVE	35	05 S	138	30 E	8.50
HALLS POINT	16	28 S	139	19 E	1.14
HAMELIN BAY	34	11 S	115	01 E	5.52
HAMELIN INNER HARBOR	34	12 S	115	01 E	5.54
HAMILTON LAGOONS	33	35 S	137	55 E	7.108
HAMMER HEAD	33	58 S	122	35 E	6.36
HANOVER BAY	15	17 S	124	46 E	3.47
HANSON BAY	36	02 S	136	52 E	8.4
HARDSTAFF SHOALS	35	42 S	137	53 E	8.13
HARDWICKE BAY	34	40 S	137	20 E	7.94
HARDY POINT	14	59 S	125	01 E	3.41
HARE CHANNEL	15	19 S	128	04 E	2.84
HAREBY ISLET	34	35 S	136	18 E	7.72
HARRIS ISLET	11	26 S	130	24 E	2.57
HART ISLAND	32	39 S	133	08 E	7.10
HAT POINT	13	56 S	126	01 E	3.22
HAUL-OFF ROCK	34	42 S	118	39 E	6.20
HAWKERS DEVIL	34	38 S	135	57 E	7.68
HAWKNEST ISLAND	13	38 S	136	25 E	1.34
HAYSTACK ISLAND	35	19 S	136	54 E	7.88
HEARD ISLAND	53	06 S	73	31 E	9.10
HEIRISSON FLATS	25	57 S	113	18 E	5.13
HELBY BANK	21	48 S	114	01 E	5.2
HELPMAN ISLETS	16	44 S	123	38 E	3.96
HENRI FREYCINET HARBOR	26	25 S	113	43 E	5.15
HENRY ELLIS REEF	12	05 S	131	01 E	2.49
HERALD BAY	25	53 S	113	09 E	5.12
HERALD BIGHT	25	34 S	113	33 E	5.9
HERALD GUT	25	47 S	113	45 E	5.9
HERALD HEIGHTS	25	57 S	113	06 E	5.10
HERALD POINT	35	01 S	118	02 E	6.15
HERALD ROCKS	35	02 S	118	02 E	6.15
HERON POINT	22	16 S	114	08 E	4.59
HEYWOOD ISLANDS	15	20 S	124	23 E	3.50
HIBERNIA REEF	11	59 S	123	21 E	3.4
HIDDEN ISLAND	16	15 S	123	30 E	3.70
HIGH BLUFF	15	16 S	124	41 E	3.44
HIGH BLUFF	16	17 S	124	23 E	3.58
HIGH ISLAND	16	21 S	123	21 E	3.88
HIGH POINT	11	13 S	132	26 E	2.26
HOG BAY	35	44 S	137	56 E	8.13
HOGMANAY SHOAL	10	59 S	133	09 E	2.19
HOLDFAST BAY	34	59 S	138	30 E	8.50
HOLOTHURIA BANKS	13	51 S	126	00 E	3.18
HOME ISLAND	12	07 S	96	54 E	9.4
HOOD POINT	34	22 S	119	33 E	6.22
HOPE ISLAND	34	05 S	122	10 E	6.35
HOPE POINT	15	37 S	124	24 E	3.53
HOPELESS REACH	25	40 S	113	42 E	5.9
HOPETOUN	33	57 S	120	07 E	6.23
HOPKINS ISLAND	34	58 S	136	03 E	7.57
HORSBURGH ISLAND	12	05 S	96	50 E	9.5
HORSE ROCK	34	48 S	135	51 E	7.64
HOUTMAN ABROLHOS	28	39 S	113	47 E	5.22
HOWARD CHANNEL	12	05 S	131	05 E	2.48
HOWARD ISLAND	12	08 S	135	24 E	2.9
HOWARD ROCK	33	15 S	134	37 E	7.28
HOWARD ROCK	34	50 S	136	09 E	7.59
HUGHES POINT	33	56 S	137	36 E	7.106
HUMMOCK HILL	33	02 S	137	36 E	7.84
HUMMOCK ISLET	28	48 S	114	03 E	5.25
HUMMOCKY ISLET	12	05 S	136	06 E	1.57
HUNTER CREEK	16	23 S	122	59 E	3.106
HUTT RIVER	28	13 S	114	18 E	5.19
HYLAND BAY	13	58 S	129	39 E	2.72

I

	Position °	'	°	'	Sec. Para
ILE AMSTERDAM	37	51 S	77	33 E	9.0
ILE SAINT PAUL	38	43 S	77	33 E	9.0
ILES KERGUELEN	49	16 S	69	34 E	9.0
IMPERIEUSE REEF	17	35 S	118	55 E	4.2
INGLIS ISLAND	12	02 S	136	14 E	1.56
INGRAM REEF	14	07 S	125	17 E	3.34
INVESTIGATOR GROUP	33	44 S	134	21 E	7.30
INVESTIGATOR ROAD	17	07 S	139	35 E	1.18
INVESTIGATOR STRAIT	35	30 S	137	00 E	8.21
IRON WHYALLA SHOAL	35	18 S	136	47 E	7.89
IRVINE ISLAND	16	05 S	123	32 E	3.74
ISLAND POINT	34	27 S	137	25 E	7.101
ISRAELITE BAY	33	37 S	123	48 E	6.48

J

	Position °	'	°	'	Sec. Para
JABIRU OIL TERMINAL	11	55 S	125	00 E	3.8
JAGGED HEAD	13	42 S	136	45 E	1.37
JAMES POINT	32	12 S	133	25 E	7.9
JAMES PRICE POINT	17	30 S	122	09 E	4.10
JAMIESON REEF	14	04 S	125	21 E	3.34
JANSSEN SHOAL	12	35 S	141	34 E	1.4
JENSEN BAY	11	08 S	136	42 E	2.4
JOHNSON BANK	12	23 S	123	17 E	3.5
JONES ISLET	13	45 S	126	21 E	3.16
JUDITH SHOAL	34	28 S	136	21 E	7.73
JUNCTION BAY	11	50 S	133	57 E	2.13
JURIEN BAY	30	17 S	115	01 E	5.30
JUSSIEU BAY	34	57 S	135	54 E	7.48

	Position °	'	°	'	Sec. Para
K					
KANGAROO HEAD	35	43 S	137	54 E	8.13
KANGAROO ISLAND	35	49 S	137	15 E	8.2
KANGAROO REEF	34	40 S	135	55 E	7.62
KARUMBA	17	40 S	141	05 E	1.9
KATERS ISLAND	14	28 S	125	32 E	3.36
KELLIDIE BAY	34	36 S	135	28 E	7.41
KERR REEF	11	48 S	141	50 E	1.2
KEYS INLET	14	46 S	129	37 E	2.76
KILLIDIE BAY	34	36 S	135	28 E	7.41
KING GEORGE SOUND	35	03 S	117	58 E	6.13
KING ISLETS	15	52 S	123	38 E	3.72
KINGSCOTE	35	39 S	137	38 E	8.18
KINGSCOTE HARBOR	35	39 S	137	39 E	8.17
KIRKBY ISLET	34	33 S	136	13 E	7.74
KIRKPATRICK POINT	36	03 S	136	46 E	8.4
KIRTON POINT	34	43 S	135	53 E	7.65
KLEIN POINT JETTY	34	58 S	137	46 E	8.37
KNAPP HEAD	35	05 S	117	29 E	6.9
KNIGHT REEF	12	01 S	131	06 E	2.47
KNOBBY HEAD	29	40 S	114	58 E	5.29
KNOBBY HEAD	34	14 S	115	02 E	5.55
KNOCKER BAY	11	18 S	132	07 E	2.30
KOOJARA SHOAL	13	47 S	126	35 E	3.11
KOOLAN ISLAND	16	08 S	123	45 E	3.78
KOOLEY WURTIE	34	37 S	137	54 E	8.40
KOOMBANA PAPS	33	21 S	115	37 E	5.46
KRAUSE ROCK	34	14 S	135	05 E	7.35
L					
LABYRINTHIAN SHOALS	15	12 S	136	07 E	1.28
LACEPEDE BAY	36	50 S	139	44 E	8.61
LACEPEDE CHANNEL	17	00 S	122	15 E	4.9
LACEPEDE ISLANDS	16	53 S	122	09 E	4.8
LACROSSE ISLAND	14	45 S	128	19 E	2.80
LACY ISLANDS	32	24 S	133	22 E	7.12
LAGRANGE BAY	18	38 S	121	41 E	4.14
LAKE MACQUARIE BANK	35	19 S	136	39 E	7.52
LAMARCK ISLET	14	47 S	125	02 E	3.39
LAMINARIA TERMINAL	10	37 S	126	00 E	3.2
LANCELIN ISLET	31	00 S	115	19 E	5.32
LANDING SHOAL	35	39 S	137	59 E	8.20
LANGTON ISLET	34	36 S	136	15 E	7.72
LATITUDE POINT	20	47 S	115	28 E	4.43
LAWRY SHOAL	35	15 S	136	46 E	7.90
LAWSON ISLETS	11	04 S	132	52 E	2.20
LE HUNTE SHOAL	34	42 S	135	52 E	7.65
LEANDER POINT	29	17 S	114	55 E	5.27
LEANDER REEF	29	23 S	114	50 E	5.28
LEARMONTH	22	13 S	114	05 E	4.61
LEDGE POINT	31	07 S	115	22 E	5.33
LEE POINT	12	20 S	130	54 E	2.64
LESCHENAULT REEF	31	17 S	115	20 E	5.33
LESUEUR ISLET	13	50 S	127	16 E	2.88
LEVILLAIN SHOAL	25	31 S	113	01 E	5.12
LEWIS ISLAND	34	57 S	136	02 E	7.57
LIGUANEA ISLAND	35	00 S	135	37 E	7.46
LIMMEN BIGHT	14	45 S	135	40 E	1.28
LIMMEN BIGHT RIVER	15	06 S	135	43 E	1.28
LINDSAY POINT	32	29 S	134	05 E	7.21
LINGI POINT	11	16 S	131	49 E	2.34
LIPSON COVE	34	16 S	136	16 E	7.77
LIPSON REEF	36	10 S	136	50 E	8.3
LITTLE ISLET	34	57 S	136	02 E	7.57
LIVERPOOL RIVER	12	00 S	134	12 E	2.11
LONG ISLAND	16	34 S	123	22 E	3.94
LONG ISLAND	21	37 S	114	40 E	4.58
LONG ISLAND	30	19 S	115	00 E	5.30
LONG REEF	13	55 S	125	45 E	3.24
LOOKOUT POINT	34	53 S	118	26 E	6.20
LOOSLI SHOAL	12	02 S	135	16 E	2.9
LORD MAYOR SHOAL	16	31 S	122	37 E	4.4
LORNA SHOAL	12	21 S	130	19 E	2.61
LOUIS ISLETS	14	01 S	126	34 E	3.12
LOUISE SHOAL	35	13 S	136	32 E	7.52
LOUNDS ISLAND	32	16 S	133	22 E	7.9
LOUNDS REEF	32	14 S	133	22 E	7.9
LOUTH BAY	34	34 S	136	00 E	7.67
LOUTH ISLAND	34	34 S	135	57 E	7.69
LOW ISLET	12	23 S	136	10 E	1.60
LOW POINT	32	01 S	128	15 E	6.49
LOW ROCKS	14	04 S	125	52 E	3.24
LOW ROCKS	35	10 S	136	27 E	7.51
LOW SANDY POINT	32	18 S	126	16 E	6.49
LOWENDAL ISLETS	20	29 S	115	35 E	4.41
LOWLY POINT SHOAL	32	59 S	137	48 E	7.115
LOWRIE CHANNEL	13	45 S	136	05 E	1.42
LOXTON SHOAL	9	36 S	128	43 E	2.55
LUGGER COVE	16	28 S	123	02 E	3.98
LUSBY ISLET	34	32 S	136	15 E	7.74
LYNEDOCH BANK	10	02 S	130	49 E	2.55
M					
MACDONELL SOUND	35	03 S	137	50 E	8.35
MACKENZIE ANCHORAGE	14	01 S	126	32 E	3.12
MACLAREN POINT	34	48 S	136	01 E	7.60
MACLEAY ISLAND	15	57 S	123	42 E	3.73
MACLEAY ISLANDS	15	15 S	123	41 E	3.72
MACQUARIE STRAIT	11	42 S	133	25 E	2.17
MALAY BAY	11	23 S	132	53 E	2.21
MALAY ROAD	11	50 S	136	25 E	1.56
MALLISON ISLAND	12	11 S	136	07 E	1.58
MAMALIMANDJA POINT	13	55 S	136	52 E	1.41
MANGLES BAY	32	16 S	115	43 E	5.41
MANGOLA SHOAL	11	40 S	125	07 E	3.3
MANGROVE BLUFF	12	05 S	134	12 E	2.12
MANGROVE ISLETS	28	52 S	113	59 E	5.25
MANGROVE POINT	24	54 S	113	38 E	5.8
MANGROVE POINT	34	16 S	138	01 E	8.43
MANOWAR ISLET	16	17 S	139	16 E	1.13
MARCHINBAR ISLAND	11	14 S	136	38 E	2.3
MARET ISLETS	14	25 S	124	59 E	3.38
MARGARET ISLAND	16	09 S	123	35 E	3.79
MARGARET SHOAL	11	46 S	132	17 E	2.40
MARIA ISLAND	14	52 S	135	44 E	1.29
MARIA POINT	34	40 S	135	55 E	7.62
MARIE SHOAL	10	55 S	130	06 E	2.54
MARINO ROCKS	35	02 S	138	30 E	8.50
MARION BAY	35	14 S	137	00 E	8.29
MARSDEN POINT	35	34 S	137	37 E	8.26
MARSH SHOAL	12	06 S	130	57 E	2.49
MARTS ISLANDS	34	00 S	122	39 E	6.40
MARUM ISLET	34	31 S	136	15 E	7.73
MARY ANN HAVEN	33	57 S	120	07 E	6.23
MARY ANN POINT	33	57 S	120	08 E	6.22
MARY ANNE PASSAGE	21	12 S	115	30 E	4.53
MARY ANNE REEF	21	16 S	115	28 E	4.47
MARY ISLAND	13	59 S	126	23 E	3.16
MASILLON ISLAND	32	34 S	133	17 E	7.11
MATARAM SHOAL	11	35 S	131	52 E	2.40
MATTHEW ROCK	34	12 S	123	00 E	6.40
MAUDE REEF	35	12 S	117	58 E	6.12
MAVIS REEF	15	31 S	123	36 E	3.63
MCARTHUR RIVER	15	50 S	136	47 E	1.21
MCCLUER ISLAND	11	04 S	133	00 E	2.19
MCDONALD ISLAND	53	03 S	72	35 E	9.13
MCINTYRE ISLET	15	59 S	123	32 E	3.74
MCLENNAN BANK	20	46 S	116	05 E	4.35
MEANARRA HILL	27	42 S	114	13 E	5.17
MEDA PASS	16	22 S	123	10 E	3.93
MEDA REEF	21	03 S	115	46 E	4.37
MEDA SHOAL	16	35 S	123	07 E	3.99
MEDINA INLET	11	51 S	130	35 E	2.57
MEDUSA BANKS	14	30 S	128	19 E	2.80
MELVILLE BAY	12	05 S	136	40 E	1.52
MELVILLE ISLAND	11	30 S	131	00 E	2.51
MEMORY COVE	34	58 S	135	59 E	7.60
MENMUIR ROCK	16	22 S	123	15 E	3.92
MERMAID BANK	14	30 S	129	20 E	2.76
MERMAID ISLAND	16	26 S	123	21 E	3.89
MERMAID PASSAGE	16	25 S	123	20 E	3.89
MERMAID REEF	17	06 S	119	37 E	4.2
MERMAID SHOAL	11	09 S	130	13 E	2.53
MERMAID SOUND	20	30 S	116	45 E	4.29
MERMAID STRAIT	20	39 S	116	32 E	4.34
MESQUITE SHOAL	11	13 S	130	01 E	2.55
MICHAELMAS ISLAND	35	03 S	118	03 E	6.16
MICHAELMAS REEF	35	03 S	118	01 E	6.16
MIDDLE BANK	32	43 S	137	49 E	7.118

	Position °	'	°	'	Sec. Para
MIDDLE BANK	33	38 S	137	34 E	7.109
MIDDLE GROUND	12	22 S	130	46 E	2.66
MIDDLE HEAD	11	21 S	132	12 E	2.31
MIDDLE ISLAND	34	06 S	123	12 E	6.42
MIDDLE POINT	34	05 S	137	33 E	7.104
MIDDLE POINT	38	02 S	140	37 E	8.72
MIDDLE REEF	12	28 S	130	31 E	2.69
MIDDLE ROCK	34	18 S	121	50 E	6.33
MIDDLE ROCK	35	06 S	136	29 E	7.53
MILES ISLAND	34	04 S	123	14 E	6.42
MILNER BAY	13	52 S	136	25 E	1.36
MINDEN REEFS	32	03 S	115	43 E	5.40
MINILYA BANK	20	11 S	118	38 E	4.17
MINSTREL SHOAL	17	19 S	119	21 E	4.2
MISSION BAY	11	10 S	132	37 E	2.24
MISSION BAY	14	06 S	126	42 E	3.13
MITCHELL POINT	11	49 S	130	03 E	2.61
MITCHELL RIVER	15	13 S	141	35 E	1.8
MJRUNGGA ISLAND	11	57 S	135	05 E	2.10
MONDRAIN ISLAND	34	08 S	122	15 E	6.35
MONEY SHOAL	10	21 S	132	44 E	2.20
MONTALIVET GROUP	14	18 S	125	16 E	3.33
MONTE BELLO ISLANDS	20	27 S	115	33 E	4.38
MONTGOMERY ISLANDS	15	57 S	124	12 E	3.56
MOONTA SHOAL	33	54 S	137	36 E	7.107
MORNINGTON ISLAND	16	35 S	139	25 E	1.14
MOSS SHOAL	11	08 S	129	55 E	2.55
MOTTLED COVE	34	06 S	136	21 E	7.78
MOUNT ALEXANDER	12	42 S	136	41 E	1.47
MOUNT BLAZE	20	00 S	119	41 E	4.15
MOUNT BLOOMFIELD	35	58 S	137	14 E	8.7
MOUNT BONNER	12	06 S	136	34 E	1.52
MOUNT BORRADAILE	12	03 S	132	54 E	2.41
MOUNT BROWN	32	30 S	138	00 E	7.117
MOUNT CAMEL	33	17 S	134	45 E	7.27
MOUNT CASUARINA	14	24 S	127	42 E	2.87
MOUNT CONNOR	14	32 S	126	08 E	3.31
MOUNT DORRIGO	26	26 S	113	20 E	5.16
MOUNT DUNDAS	12	13 S	136	52 E	1.49
MOUNT DUTTON BAY	34	34 S	135	25 E	7.41
MOUNT FERGUSON	33	06 S	138	02 E	7.111
MOUNT GORE	35	00 S	137	16 E	7.95
MOUNT GREENLY	34	21 S	135	22 E	7.36
MOUNT HALL	33	04 S	134	28 E	7.27
MOUNT HILL	34	04 S	136	11 E	7.78
MOUNT LAURA	33	00 S	137	31 E	7.84
MOUNT LEOPOLD	20	59 S	116	37 E	4.32
MOUNT LOFTY	34	59 S	138	43 E	8.51
MOUNT MACDONNELL	35	38 S	137	19 E	8.24
MOUNT MAMBRAY	32	52 S	137	56 E	7.114
MOUNT MARSDEN	35	35 S	137	35 E	8.26
MOUNT MARY	32	31 S	133	51 E	7.19
MOUNT PASLEY	33	55 S	123	33 E	6.41
MOUNT PERON	30	07 S	115	09 E	5.30
MOUNT SAUNDERS	12	11 S	136	47 E	1.49
MOUNT WESTALL	32	54 S	134	08 E	7.20
MOUNT YOUNG	33	06 S	137	29 E	7.84
MOUNTNORRIS BAY	11	22 S	132	43 E	2.21
MUDGE BAY	14	33 S	125	23 E	3.36
MUIRON ISLANDS	21	40 S	114	20 E	4.58
MULLALOO POINT	31	48 S	115	43 E	5.34
MURAT BAY	32	09 S	133	37 E	7.15
MURDEYERRAH SANDS	31	39 S	129	07 E	6.49
MURRAY POINT	34	46 S	135	52 E	7.64
MURRAY REEFS	32	23 S	115	41 E	5.43
MURRAY RIVER	35	35 S	138	53 E	8.60
MUSGRAVE SHOAL	33	15 S	137	39 E	7.110
MYAOOLA BAY	13	08 S	136	20 E	1.43

N

NAPIER BROOME BAY	14	00 S	126	47 E	3.11
NAPIER POINT	11	57 S	135	55 E	2.2
NARES ISLAND	33	56 S	122	36 E	6.39
NARES POINT	16	08 S	123	42 E	3.79
NARES ROCK	21	26 S	115	18 E	4.47
NASSAU RIVER	15	55 S	141	23 E	1.6
NATIVE POINT	12	43 S	130	21 E	2.70
NATURALISTE CHANNEL	25	22 S	113	00 E	5.6
NATURALISTE REEFS	33	14 S	115	02 E	5.44
NELSON ROCKS	20	27 S	116	41 E	4.30
NEPEAN BAY	35	40 S	137	45 E	8.14
NEPTUNE ISLANDS	35	16 S	136	06 E	7.50
NEW ISLET	15	28 S	124	30 E	3.52
NEW MOON INLET	14	36 S	129	37 E	2.76
NEW SELMA ISLAND	12	07 S	96	54 E	9.4
NEW YEAR ISLAND	10	54 S	133	02 E	2.18
NEWBY SHOAL	11	52 S	129	11 E	2.60
NEWLAND HEAD	35	39 S	138	31 E	8.56
NIBLOCK ROCKS	15	49 S	123	59 E	3.57
NICHOLLS POINT	15	03 S	128	07 E	2.82
NICKOL BAY	20	35 S	116	55 E	4.24
NIGHT CLIFF	12	23 S	130	51 E	2.64
NOB HILLOCK	17	16 S	123	37 E	3.103
NOBBY ISLET	36	00 S	137	16 E	8.7
NORMAN RIVER	17	30 S	140	50 E	1.9
NORTH BANK	29	12 S	114	52 E	5.27
NORTH BANK	32	33 S	134	10 E	7.22
NORTH BLOCK	34	22 S	135	32 E	7.36
NORTH CHANNEL	12	00 S	131	05 E	2.50
NORTH CROCODILE REEF	11	36 S	135	10 E	2.10
NORTH EAST ISLET	13	38 S	136	57 E	1.40
NORTH EAST REEF	28	25 S	113	49 E	5.23
NORTH GOULBURN ISLAND	11	30 S	133	26 E	2.16
NORTH HEAD	16	50 S	122	32 E	4.5
NORTH HEAD	30	14 S	115	00 E	5.29
NORTH ISLAND	15	35 S	136	52 E	1.24
NORTH ISLET	35	07 S	136	28 E	7.52
NORTH KEELING ISLAND	11	50 S	96	50 E	9.7
NORTH MARY ISLET	17	16 S	123	33 E	3.104
NORTH NEPTUNES	35	14 S	136	04 E	7.51
NORTH PAGE ISLAND	35	45 S	138	18 E	8.19
NORTH POINT	34	57 S	118	13 E	6.19
NORTH POINT ISLAND	13	38 S	136	43 E	1.37
NORTH ROCK	31	58 S	115	44 E	5.40
NORTH ROCK	36	18 S	137	15 E	8.6
NORTH SAHUL PASSAGE	10	10 S	126	50 E	3.2
NORTH SANDY ISLET	21	06 S	115	39 E	4.37
NORTH TURTLE ISLET	19	53 S	118	54 E	4.17
NORTH WEST BLUFF	13	50 S	136	25 E	1.33
NORTH WEST CAPE	21	47 S	114	10 E	4.62
NORTH WEST ISLAND	20	22 S	115	31 E	4.39
NORTHERN ENDEAVOR TERMINAL	10	38 S	125	59 E	3.2
NORTHWEST POINT	10	26 S	105	35 E	9.8
NORTHWEST SNARE	36	02 S	137	11 E	8.5
NORTHWEST TWIN ISLET	16	17 S	123	04 E	3.85
NORWEGIAN BAY	22	37 S	113	39 E	5.3
NOSE POINT	34	57 S	136	05 E	7.55
NOTCH POINT	25	57 S	113	08 E	5.12
NUYTS ARCHIPELAGO	32	15 S	133	40 E	7.10
NUYTS REEFS	32	08 S	132	09 E	7.2

O

O'LOUGHLIN BAY	35	01 S	136	09 E	7.55
OBSERVATION ISLAND	15	37 S	136	54 E	1.24
OBSERVATORY ISLAND	33	56 S	121	48 E	6.29
OBSERVATORY POINT	34	56 S	136	06 E	7.55
OBSTRUCTION HILL	14	40 S	128	08 E	2.86
OLD MAN ROCK	34	12 S	115	00 E	5.53
OLIVE ISLAND	32	44 S	133	58 E	7.20
OLIVER ROCK	13	58 S	125	33 E	3.24
ONKAPARINGA HEAD	35	10 S	138	28 E	8.48
ONSLOW	21	38 S	115	06 E	4.54
ORONTES BANK	34	44 S	138	00 E	8.39
ORONTES REEF	11	04 S	132	05 E	2.28
OSBORN REEFS	15	09 S	124	12 E	3.48
OSMANLI REEF	35	58 S	137	38 E	8.9
OTWAY BANK	13	40 S	126	04 E	3.19
OUTER RIP SHOAL	17	06 S	123	31 E	3.104
OYSTER BAY	34	53 S	137	49 E	8.38
OYSTER POINT	34	55 S	137	48 E	8.37
OYSTER SPIT	32	46 S	134	13 E	7.23

P

PACKMAN SHOAL	35	19 S	136	53 E	7.90
PALM BAY	11	08 S	132	29 E	2.25
PARA HEAD	12	57 S	141	36 E	1.6
PARADICE BAY	15	32 S	136	51 E	1.25
PARAKEET CHANNEL	16	07 S	123	40 E	3.80

	Position °	'	°	'	Sec. Para
PARKER POINT	32	02 S	115	32 E	5.37
PAROO SHOAL	21	34 S	115	00 E	4.56
PARRY HARBOR	13	58 S	126	03 E	3.22
PARRY ISLET	14	19 S	125	46 E	3.28
PARRY SHOAL	11	12 S	129	42 E	2.54
PARTNEY ISLAND	34	31 S	136	16 E	7.74
PASCAL ISLET	14	04 S	125	39 E	3.26
PASCO PASSAGE	12	28 S	123	32 E	3.6
PASSAGE ISLANDS	21	03 S	115	48 E	4.37
PASSAGE REEFS	35	08 S	117	49 E	6.11
PASSAGE ROCK	32	20 S	115	41 E	5.42
PAXIE SHOAL	11	26 S	134	09 E	2.13
PEAK ISLET	34	12 S	115	01 E	5.53
PEAKE BAY	34	30 S	136	03 E	7.69
PEAKED ROCKS	35	11 S	136	30 E	7.52
PEARCE POINT	14	26 S	129	21 E	2.75
PEARCE POINT	34	28 S	137	26 E	7.101
PEARSON ISLANDS	33	57 S	134	15 E	7.32
PEE SHOAL	11	45 S	124	50 E	3.3
PELICAN ISLET	14	46 S	128	47 E	2.78
PELICAN POINT	37	56 S	140	25 E	8.72
PELORUS ISLET	36	07 S	137	31 E	8.8
PELSAERT BANK	29	27 S	114	14 E	5.26
PELSAERT GROUP	28	55 S	113	55 E	5.25
PELSART GROUP	28	55 S	113	55 E	5.25
PENDER BAY	16	44 S	122	41 E	4.4
PENDER POINT	15	17 S	128	06 E	2.83
PENGUIN BANK	21	12 S	115	04 E	4.50
PENGUIN ISLET	37	31 S	140	01 E	8.67
PENGUIN POINT	35	15 S	136	58 E	8.29
PENGUIN ROCK	34	13 S	123	15 E	6.43
PENGUIN SHOAL	13	05 S	125	58 E	3.18
PENQUIN SHOAL	13	05 S	125	58 E	2.1
PERA CHANNEL	12	00 S	136	04 E	1.57
PERA HEAD	12	57 S	141	36 E	1.6
PERFORATED ISLAND	34	43 S	135	09 E	7.43
PERFORATED ROCKS	32	45 S	134	14 E	7.23
PERLUBIE HILL	32	38 S	134	16 E	7.22
PERON PENINSULA	25	53 S	113	35 E	5.11
PETER POINT	32	12 S	133	29 E	7.9
PETREL BAY	32	30 S	133	16 E	7.12
PHIL POINT	15	39 S	136	51 E	1.25
PHILLIP POINT	32	00 S	115	34 E	5.37
PICARD ISLET	20	11 S	117	16 E	4.22
PILOT REEF	32	00 S	115	35 E	5.38
PINCOMBE REEF	16	05 S	123	10 E	3.66
PISONIA ISLET	16	30 S	139	48 E	1.14
PITT SHOALS	16	15 S	122	53 E	3.85
PLANK POINT	33	27 S	137	21 E	7.83
POINT ARROWSMITH	13	15 S	136	28 E	1.45
POINT BELL	32	12 S	133	08 E	7.8
POINT BLANE	13	17 S	136	10 E	1.43
POINT BLAZE	12	56 S	130	08 E	2.70
POINT BURROWES	16	58 S	140	58 E	1.8
POINT CLOATES	22	43 S	113	40 E	5.2
POINT CULVER	32	54 S	124	42 E	6.48
POINT D'ENTRECASTEAUX	34	50 S	116	00 E	6.4
POINT DAVENPORT	35	10 S	137	20 E	8.31
POINT DAVENPORT SHOAL	35	11 S	137	22 E	8.31
POINT DAVID	11	22 S	132	35 E	2.25
POINT DOVER	32	21 S	125	31 E	6.48
POINT FOWLER	32	02 S	132	29 E	7.4
POINT GIBSON	32	45 S	134	13 E	7.23
POINT HILLIER	35	04 S	117	09 E	6.8
POINT IRWIN	35	04 S	116	55 E	6.8
POINT JAHEEL	11	11 S	131	17 E	2.51
POINT JAHLEEL	11	11 S	131	17 E	2.51
POINT JARROLD	33	16 S	137	49 E	7.110
POINT LEFROY	22	18 S	114	11 E	4.59
POINT MALCOLM	33	48 S	123	42 E	6.46
POINT MAUD	23	07 S	113	46 E	5.3
POINT MURAT	21	49 S	114	11 E	4.60
POINT NUYTS	35	04 S	116	38 E	6.6
POINT PARKER	17	02 S	139	09 E	1.12
POINT QUOBBA	24	29 S	113	24 E	5.4
POINT RILEY	33	53 S	137	36 E	7.106
POINT TORMENT	17	00 S	123	36 E	3.97
POINT WARRENNE	34	19 S	137	29 E	7.102
POLLOCK REEF	34	34 S	123	34 E	6.44
PONDALOWIE BAY	35	14 S	136	50 E	7.91
PORT ADELAIDE	34	50 S	138	30 E	8.51
PORT AUGUSTA	32	30 S	137	46 E	7.121
PORT BONYTHON	33	00 S	137	46 E	7.87
PORT BRADSHAW	12	33 S	136	43 E	1.47
PORT BREMER	11	08 S	132	15 E	2.27
PORT BROUGHTON	33	36 S	137	55 E	7.109
PORT CAROLINE	36	49 S	139	48 E	8.61
PORT COCKBURN	11	22 S	130	23 E	2.56
PORT DENISON	29	16 S	114	55 E	5.28
PORT DOUGLAS	34	32 S	135	23 E	7.40
PORT EXMOUTH	21	49 S	114	11 E	4.60
PORT EYRE	32	00 S	132	27 E	7.5
PORT GEORGE IV	15	22 S	124	39 E	3.47
PORT GIBBON	33	49 S	136	49 E	7.81
PORT GILES	35	02 S	137	46 E	8.36
PORT GREGORY	28	11 S	114	15 E	5.18
PORT HEDLAND	20	19 S	118	34 E	4.19
PORT HUGHES	34	05 S	137	33 E	7.105
PORT KEATS	14	04 S	129	33 E	2.73
PORT KENNY	33	14 S	134	41 E	7.29
PORT LANGDON	13	48 S	136	46 E	1.38
PORT LE HUNTE	32	06 S	133	00 E	7.7
PORT LINCOLN	34	43 S	135	52 E	7.66
PORT LINCOLN BAY	34	43 S	135	52 E	7.61
PORT LINCOLN PROPER	34	46 S	135	54 E	7.64
PORT MINLACOWIE	34	51 S	137	28 E	7.97
PORT MOONTA	34	04 S	137	33 E	7.105
PORT MOOROWIE	35	07 S	137	31 E	8.32
PORT MUSGRAVE	12	00 S	141	55 E	1.2
PORT NELSON	15	04 S	125	00 E	3.42
PORT NOARLUNGA	35	09 S	138	28 E	8.48
PORT OF CAPE CUVIER	24	13 S	113	24 E	5.4
PORT PATERSON	32	35 S	137	48 E	7.120
PORT PATTERSON	12	37 S	130	28 E	2.70
PORT PIRIE	33	11 S	138	01 E	7.113
PORT PRICE	34	17 S	138	00 E	8.43
PORT REFUGE	12	06 S	96	52 E	9.6
PORT RICKABY	34	40 S	137	30 E	7.98
PORT STANVAC	35	07 S	138	28 E	8.49
PORT THEVENARD	32	08 S	133	39 E	7.16
PORT TURTON	34	57 S	137	21 E	7.95
PORT USBORNE	16	39 S	123	30 E	3.95
PORT VICTORIA	34	27 S	137	28 E	7.99
PORT VINCENT	34	46 S	137	53 E	8.40
PORT WAKEFIELD	34	12 S	138	06 E	8.43
PORT WALCOTT	20	38 S	117	13 E	4.23
PORT WARRENDER	14	31 S	125	52 E	3.30
PORT WHYALLA	33	02 S	137	36 E	7.85
PORT WILLUNGA	35	16 S	138	27 E	8.47
PORTER BAY	34	44 S	135	53 E	7.65
PORTER ROCK	34	53 S	136	09 E	7.59
POWELL POINT	33	56 S	120	33 E	6.25
POWERFUL ISLAND	16	06 S	123	26 E	3.68
PRICE ISLAND	34	43 S	135	17 E	7.44
PRINCE FREDERICK HARBOR	15	05 S	125	16 E	3.40
PRINCE REGENT RIVER	15	16 S	124	51 E	3.46
PRINCESS ROYAL HARBOR	35	03 S	117	53 E	6.16
PRIOR POINT	15	43 S	124	23 E	3.53
PROBABLE ISLAND	12	08 S	136	02 E	1.58
PROPER BAY	34	46 S	135	54 E	7.64
PRUDHOE ISLETS	14	25 S	125	15 E	3.35
PUDDING ROCK	32	07 S	133	00 E	7.7
PULAU LUAR	12	05 S	96	50 E	9.5
PURDIE ISLETS	32	16 S	133	14 E	7.9

Q

	°	'	°	'	Para
QUEENS CHANNEL	14	41 S	129	21 E	2.77
QUIN ROCK	36	05 S	137	24 E	8.8
QUOIN BLUFF NORTH	25	03 S	113	06 E	5.7
QUOIN ISLAND	14	51 S	129	33 E	2.76

R

	°	'	°	'	Para
RABBIT ISLAND	34	36 S	135	59 E	7.68
RADAR HILL	11	50 S	130	05 E	2.59
RADFORD POINT	11	18 S	130	54 E	2.52
RAFFLES BAY	11	10 S	132	23 E	2.26
RAFT POINT	16	04 S	124	27 E	3.54
RAME HEAD	35	03 S	116	52 E	6.7
RANKIN BANK	19	44 S	115	35 E	4.46
RANTYIRRITY POINT	14	11 S	135	54 E	1.31

	Position °	'	°	'	Sec. Para
RAPID BAY	35	31 S	138	11 E	8.45
RAPID HEAD	35	31 S	138	10 E	8.44
RARAGALA ISLAND	11	35 S	136	17 E	2.5
RAT ISLAND	28	43 S	113	47 E	5.24
RAT ISLET	28	43 S	113	47 E	5.24
RECHERCHE ROCK	34	18 S	122	55 E	6.40
RECORD POINT	11	19 S	132	11 E	2.30
RED BLUFF	17	03 S	122	19 E	4.7
RED BLUFF	24	02 S	113	25 E	5.3
RED BLUFF	27	44 S	114	09 E	5.17
RED CLIFF POINT	32	42 S	137	50 E	7.117
RED ISLAND	15	13 S	124	15 E	3.48
RED ISLET	52	58 S	73	18 E	9.11
REEF HEAD	35	17 S	136	51 E	7.90
REEF POINT	34	24 S	137	27 E	7.102
REES ISLET	16	23 S	123	06 E	3.93
REEVESBY ISLAND	34	32 S	136	17 E	7.73
REYNE SHOAL	15	42 S	124	10 E	3.56
RILEY SHOAL	33	54 S	137	35 E	7.107
RIPPLE SHOALS	21	11 S	115	20 E	4.48
RIPPLING SHOAL	12	18 S	136	07 E	1.60
RIVOLI BAY	37	33 S	140	05 E	8.66
ROBE	37	10 S	139	45 E	8.64
ROBE POINT	21	20 S	115	38 E	4.35
ROBERTS ISLET	16	07 S	123	46 E	3.78
ROBINSON RIVER	16	02 S	137	16 E	1.20
ROBROY REEFS	14	27 S	124	52 E	3.38
ROCK DUNDER	35	02 S	118	10 E	6.18
ROCKY ISLAND	34	16 S	135	15 E	7.35
ROCKY ISLAND	34	39 S	134	42 E	7.42
ROCKY ISLET	14	44 S	128	38 E	2.78
ROCKY ISLET	16	19 S	139	17 E	1.13
ROCKY ISLET	34	29 S	137	26 E	7.101
ROCKY ISLETS	34	04 S	120	54 E	6.26
ROCKY POINT	11	29 S	130	09 E	2.58
ROCKY POINT	21	44 S	114	51 E	4.57
ROCKY POINT	32	12 S	133	15 E	7.8
ROE ISLANDS	16	18 S	123	12 E	3.91
ROEBUCK BAY	18	05 S	122	12 E	4.12
ROGERS HEAD	53	00 S	73	24 E	9.11
ROLLER SHOAL	21	39 S	114	56 E	4.56
ROLLING BAY	11	54 S	134	06 E	2.13
ROOPER ROCK	12	04 S	131	11 E	2.48
ROPER RIVER	14	45 S	135	25 E	1.30
ROSALIND SHOAL	34	48 S	136	33 E	7.70
ROSELLA SHOAL	15	35 S	123	50 E	3.63
ROSEMARY ISLAND	20	29 S	116	36 E	4.33
ROSEMARY SHOAL	34	42 S	136	22 E	7.71
ROSILY ISLETS	21	16 S	115	01 E	4.50
ROSS POINT	11	41 S	133	21 E	2.15
ROTTNEST ISLAND	32	00 S	115	30 E	5.35
ROUND ISLAND	34	05 S	123	53 E	6.47
ROWLEY SHOALS	17	20 S	119	20 E	4.2
ROXBY ISLET	34	36 S	136	19 E	7.72
ROYSTON HEAD	35	11 S	136	51 E	7.91
RUTLAND SHOAL	14	00 S	136	21 E	1.33

S

	Position °	'	°	'	Sec. Para
SABLE ISLET	20	35 S	117	45 E	4.21
SADDLE HILL	11	18 S	132	15 E	2.30
SADDLE POINT	53	01 S	73	29 E	9.11
SALADIN MARINE TERMINAL	21	27 S	115	03 E	4.51
SALIER ISLANDS	16	19 S	123	16 E	3.88
SALISBURY ISLAND	34	22 S	123	33 E	6.43
SALT CREEK COVE	33	55 S	136	35 E	7.80
SAMPSON INLET	15	31 S	124	28 E	3.52
SANDERS BANK	36	03 S	138	20 E	8.11
SANDERSON BAY	36	02 S	136	48 E	8.4
SANDY ISLET	12	02 S	135	30 E	2.9
SANDY ISLET	14	03 S	121	46 E	3.7
SANDY ISLET	14	26 S	135	53 E	1.31
SANDY POINT	16	54 S	122	28 E	4.6
SANDY POINT	28	41 S	114	36 E	5.20
SANDY POINT	34	16 S	138	09 E	8.54
SCEALE BAY	32	58 S	134	10 E	7.25
SCOTT BAY	32	01 S	132	24 E	7.4
SCOTT POINT	13	45 S	136	51 E	1.40
SCOTT POINT	32	01 S	132	23 E	7.4
SCOTT REEFS	14	00 S	121	53 E	3.7
SCOTT STRAIT	14	30 S	125	07 E	3.37
SEARCY BAY	33	05 S	134	12 E	7.25
SECOND VALLEY	35	31 S	138	13 E	8.46
SECRET ROCK	34	31 S	136	07 E	7.75
SECURE BAY	16	27 S	124	23 E	3.59
SERINGAPATAM REEF	13	40 S	122	05 E	3.7
SERRURIER ISLAND	21	37 S	114	40 E	4.58
SHAG ISLET	52	55 S	73	35 E	9.12
SHARK BAY	25	35 S	113	32 E	5.5
SHARP POINT	35	07 S	117	52 E	6.10
SHEEP HILL	34	14 S	136	15 E	7.78
SHELL BANK	16	30 S	123	06 E	3.99
SHENTON BLUFF	16	28 S	123	03 E	3.98
SHEPARDS PATCH	16	01 S	122	55 E	3.65
SHEPPARTON SHOAL	12	06 S	129	53 E	2.60
SHERLOCK RIVER	20	43 S	117	33 E	4.20
SHOAL BAY	16	25 S	124	16 E	3.60
SHOAL CAPE	33	53 S	121	07 E	6.25
SHOAL POINT	28	07 S	114	10 E	5.17
SHOAL POINT	34	47 S	135	29 E	7.45
SHOALWATER POINT	33	40 S	137	12 E	7.83
SHOULDER HILL	31	40 S	131	40 E	6.51
SIBSEY ISLET	34	39 S	136	11 E	7.71
SIMMS ROCK	34	52 S	136	08 E	7.59
SINCLAIR ISLAND	32	09 S	132	59 E	7.7
SINCLAIR POINT	32	07 S	132	59 E	7.7
SIR GRAHAM MOORE ISLANDS	13	52 S	126	36 E	3.11
SIR ISAAC POINT	34	26 S	135	13 E	7.37
SIR JOSEPH BANKS GROUP	34	35 S	136	18 E	7.70
SKARDON RIVER	11	45 S	142	00 E	1.2
SKELETON POINT	16	32 S	123	01 E	3.99
SLADE POINT	10	59 S	142	08 E	1.2
SLEAFORD BAY	34	54 S	135	46 E	7.47
SMALL ROCK	32	45 S	124	58 E	6.48
SMITH ISLAND	34	59 S	136	01 E	7.57
SMITH POINT	11	07 S	132	08 E	2.29
SMITH ROCK	34	35 S	136	16 E	7.72
SMITH'S BAY	35	36 S	137	27 E	8.24
SMOKEY POINT	11	15 S	131	09 E	2.51
SMOKY BAY	32	18 S	133	49 E	7.18
SMOOTH ISLAND	32	30 S	133	18 E	7.11
SNAPPER BANK	28	41 S	114	00 E	5.24
SNAPPER POINT	32	34 S	137	47 E	7.120
SNAPPER REACH	32	35 S	137	47 E	7.120
SNELLING'S BEACH	35	41 S	137	04 E	8.23
SNUG COVE	35	42 S	136	50 E	8.22
SOLDIER POINT	11	28 S	131	32 E	2.37
SOMMERVILLE BAY	11	01 S	132	30 E	2.25
SOUTH ALLIGATOR RIVER	12	09 S	132	26 E	2.42
SOUTH CHANNEL	12	08 S	131	02 E	2.50
SOUTH CHANNEL	32	40 S	134	08 E	7.22
SOUTH GOULBURN ISLAND	11	37 S	133	25 E	2.16
SOUTH ISLAND	12	12 S	96	55 E	9.4
SOUTH MEDA SHOAL	16	54 S	123	17 E	3.101
SOUTH NEPTUNE ISLAND	35	20 S	136	07 E	7.1
SOUTH NEPTUNES	35	20 S	136	07 E	7.50
SOUTH PAGE ISLAND	35	47 S	138	18 E	8.19
SOUTH PASSAGE	32	02 S	115	35 E	5.38
SOUTH POINT	14	15 S	136	19 E	1.32
SOUTH ROCK	35	05 S	136	11 E	7.54
SOUTH SAND	32	39 S	134	13 E	7.22
SOUTHERN FLATS	32	15 S	115	42 E	5.39
SOUTHWEST ISLAND	15	44 S	136	40 E	1.26
SOUTHWEST POINT	11	27 S	136	28 E	2.4
SOUTHWEST ROCK	34	14 S	114	59 E	5.55
SOUTHWEST ROCK	35	11 S	136	25 E	7.52
SOUTHWEST ROCK	35	20 S	136	49 E	7.88
SOUTHWEST ROCK	36	23 S	137	13 E	8.6
SOUTTAR POINT	34	54 S	137	17 E	7.95
SPALDING COVE	34	46 S	135	58 E	7.63
SPENCER GULF	34	38 S	136	53 E	7.49
SPILSBY ISLAND	34	40 S	136	21 E	7.70
SPIT POINT	20	02 S	119	00 E	4.16
SPIT POINT	53	07 S	73	51 E	9.11
SPONGE ROCKS	32	47 S	134	12 E	7.23
SPRING CREEK	16	48 S	141	05 E	1.8
ST. ALOUARN ISLET	34	24 S	115	12 E	5.57
ST. ASAPH BAY	11	19 S	130	22 E	2.56
ST. FRANCIS ISLAND	32	31 S	133	18 E	7.12
ST. FRANCIS ISLES	32	34 S	133	18 E	7.10
ST. GEORGE BASIN	15	24 S	125	01 E	3.46
ST. KILDA	34	45 S	138	32 E	8.52
ST. PETER ISLAND	32	17 S	133	35 E	7.14

	Position °	'	°	'	Sec. Para
STAG MARINE TERMINAL	20	17 S	116	16 E	4.28
STANLEY ISLAND	34	01 S	123	17 E	6.43
STANSBURY	34	55 S	137	48 E	8.39
STEAMBOAT ISLAND	20	49 S	116	04 E	4.36
STEEP HEAD	16	18 S	123	31 E	2.83
STEEP POINT	26	09 S	113	09 E	5.11
STENHOUSE BAY	35	16 S	136	57 E	8.28
STEPHENS BANK	12	07 S	131	11 E	2.46
STEVENS ISLAND	11	33 S	136	06 E	2.6
STICKNEY ISLET	34	41 S	136	17 E	7.71
STOKES BANK	34	05 S	122	19 E	6.37
STOKES BAY	16	55 S	123	40 E	3.96
STONY ISLAND	35	06 S	117	47 E	6.11
STRAGGLER REEFS	32	04 S	115	38 E	5.38
STRAGGLER ROCKS	32	04 S	115	38 E	5.38
STRAWBRIDGE POINT	35	47 S	137	47 E	8.15
STREAKY BAY	32	35 S	134	04 E	7.20
STREAKY BAY TOWNSHIP	32	48 S	134	12 E	7.23
STUART POINT	34	47 S	135	29 E	7.45
STUART REEF	34	50 S	135	22 E	7.45
STURT BAY	35	08 S	137	27 E	8.31
STYBARROW OIL FIELD	21	28 S	113	50 E	4.63
SUCCESS STRAIT	15	57 S	124	33 E	3.55
SUGARLOAF ROCK	33	33 S	115	00 E	5.51
SULPHUR REEFS	34	07 S	122	41 E	6.40
SULTAN REEF	21	25 S	115	06 E	4.50
SUNDAY ISLANDS	16	25 S	123	13 E	3.91
SUNDAY STRAIT	16	24 S	123	16 E	3.86
SURFLEET POINT	34	46 S	135	57 E	7.63
SURVEYOR POINT	34	47 S	137	52 E	8.39
SWAN POINT	16	21 S	123	02 E	3.84
SWEENEY PATCHES	16	00 S	123	44 E	3.73
SWEERS ISLAND	17	06 S	139	37 E	1.17
SYDNEY ISLAND	16	41 S	139	28 E	1.16
T					
TAIT BANK	13	45 S	126	15 E	3.16
TALBOT BAY	16	18 S	123	52 E	3.60
TALBOYS ROCK	17	18 S	122	02 E	4.10
TALC HEAD	12	29 S	130	47 E	2.64
TANCRED ISLET	14	20 S	125	20 E	3.35
TAPLEY SHOAL	35	05 S	137	56 E	8.35
TARRANT POINT	17	22 S	139	25 E	1.17
TASMANIAN SHOAL	15	53 S	123	21 E	3.62
TAYLOR ISLAND	34	53 S	136	01 E	7.58
TERMINATION ISLAND	34	28 S	122	00 E	6.32
THE BLUFF	32	37 S	137	44 E	7.120
THE CANAL	16	08 S	123	44 E	3.78
THE NARROWS	11	17 S	130	18 E	2.56
THE ROARERS	32	06 S	115	39 E	5.38
THE WATCHERS	33	36 S	134	42 E	7.30
THEVENARD ISLAND	21	28 S	115	00 E	4.50
THIRSTY POINT	30	31 S	115	03 E	5.31
THISTLE ISLAND	35	00 S	136	09 E	7.54
THOMAS BAY	16	28 S	122	53 E	4.3
THORNY PASSAGE	34	57 S	136	02 E	7.57
THREE HUMMOCKS POINT	15	38 S	138	04 E	1.23
THRESHOLD BANK	35	55 S	138	15 E	8.11
THURBURN BLUFF	14	35 S	128	03 E	2.87
TICKERA BAY	33	46 S	137	42 E	7.108
TIDE RIP ISLANDS	16	19 S	123	18 E	3.87
TINLINE POINT	35	58 S	137	37 E	8.9
TIPARRA BAY	34	04 S	137	30 E	7.103
TIPARRA REEF	34	04 S	137	24 E	7.103
TOBY INLET	33	37 S	115	09 E	5.48
TOPGALLANT ISLES	33	43 S	134	37 E	7.32
TOR	11	56 S	133	08 E	2.14
TORTOISE ISLET	21	35 S	114	52 E	4.56
TORY ISLANDS	34	01 S	122	19 E	6.36
TOURVILLE BAY	32	10 S	133	28 E	7.15
TRAFALGAR BAY	11	07 S	136	42 E	2.4
TREE ISLAND	16	23 S	123	18 E	3.89
TREE ISLAND	16	40 S	123	29 E	3.95
TREE POINT	14	01 S	129	36 E	2.72
TREPANG BAY	11	11 S	131	56 E	2.33
TRIAL BAY	13	02 S	136	34 E	1.45
TRIGG ISLET	31	53 S	115	44 E	5.34
TROUBRIDGE ISLAND	35	07 S	137	50 E	8.35
TROUBRIDGE POINT	35	10 S	137	41 E	8.33
TROUBRIDGE SHOALS	35	08 S	137	48 E	8.35
TROUGHTON ISLET	13	45 S	126	09 E	3.20
TROUGHTON PASSAGE	13	48 S	126	07 E	3.20
TRUANT ISLAND	11	40 S	136	50 E	1.51
TRUANT ISLAND PASSAGE	11	42 S	136	45 E	1.51
TRYAL ROCKS	20	17 S	115	22 E	4.41
TRYON POINT	18	44 S	121	37 E	4.14
TUMBY BAY	34	23 S	136	10 E	7.76
TUMBY ISLAND	34	24 S	136	09 E	7.75
TURNER POINT	11	45 S	133	32 E	2.14
TURTLE BAY	25	29 S	112	58 E	5.12
TURTLE DOVE SHOAL	29	21 S	114	12 E	5.26
TURTLE POINT	14	51 S	129	14 E	2.78
TWILIGHT COVE	32	17 S	126	01 E	6.49
TWIN ROCKS	31	30 S	131	08 E	6.51
TWIN ROCKS	34	22 S	122	13 E	6.33
TWO HUMMOCK POINT	32	45 S	137	48 E	7.116
TWO HUMMOCK SPIT	32	46 S	137	49 E	7.116
TWO ISLAND BAY	11	35 S	136	24 E	2.4
U					
UNGWARIBA POINT	14	08 S	136	55 E	1.41
URANIE BANK	25	10 S	113	10 E	5.6
USELESS LOOP	26	07 S	113	24 E	5.14
V					
VALENTIA ISLET	11	23 S	132	48 E	2.21
VALENTINE ISLET	17	05 S	123	19 E	3.101
VAN CLOON SHOAL	12	39 S	126	25 E	3.21
VAN DIEMEN GULF	11	50 S	132	10 E	2.35
VANCOUVER POINT	14	50 S	128	12 E	2.82
VANDERLIN ISLAND	15	43 S	137	02 E	1.22
VANSITTART BAY	14	04 S	126	18 E	3.15
VARANUS ISLAND	20	39 S	115	34 E	4.42
VARANUS ISLAND TERMINAL	20	37 S	115	35 E	4.42
VASHON HEAD	11	07 S	132	00 E	2.29
VEE SHOAL	11	50 S	123	49 E	3.3
VENUS BAY	33	14 S	134	39 E	7.28
VERNON ISLAND	12	03 S	131	05 E	2.47
VERONICA ISLET	12	03 S	136	47 E	1.50
VICKERY ISLET	16	29 S	123	21 E	3.90
VICTOR HARBOR	35	34 S	138	38 E	8.58
VICTORIA POINT	33	45 S	136	59 E	7.82
VICTORIA RIVER	15	00 S	129	33 E	2.77
VICTORIA SHOAL	11	54 S	132	02 E	2.42
VINEY ISLAND	16	01 S	124	01 E	3.57
VIVONNE BAY	36	00 S	137	12 E	8.7
VLAMING HEAD	21	48 S	114	06 E	5.2
VRILYA POINT	11	14 S	142	07 E	1.2
VULCAN ISLAND	15	14 S	124	23 E	3.47
VULCAN ISLETS	15	14 S	124	23 E	3.50
VULCAN SHOAL	12	48 S	124	17 E	3.6
W					
WAKEFIELD REEF	53	11 S	73	21 E	9.12
WALCOTT INLET	16	22 S	124	22 E	3.59
WALDEGRAVE ISLANDS	33	36 S	134	47 E	7.30
WALKER RIVER	13	35 S	135	50 E	1.42
WALLABI GROUP	28	22 S	113	42 E	5.23
WALLAROO	33	56 S	137	37 E	7.107
WALLAROO BAY	33	55 S	137	35 E	7.106
WALLER SHOAL	35	13 S	136	48 E	7.90
WALMESLY BAY	14	24 S	125	42 E	3.29
WALRUS ROCK	34	00 S	137	30 E	7.106
WANAEA MARINE TERMINAL	19	35 S	116	27 E	4.26
WANARAIJ POINT	11	08 S	131	58 E	2.33
WANARY POINT	11	08 S	131	58 E	2.33
WANDOO MARINE TERMINAL	20	09 S	116	25 E	4.25
WARBURTON CHANNEL	32	33 S	134	06 E	7.22
WARBURTON POINT	34	01 S	137	30 E	7.104
WARBUTO POINT	34	01 S	137	30 E	7.104
WARD ISLANDS	33	45 S	134	15 E	7.32
WARD POINT	33	01 S	137	57 E	7.111
WARD ROCK	35	07 S	136	27 E	7.52
WARDANG ISLAND	34	32 S	137	21 E	7.100
WARGARPUNDA POINT	12	11 S	136	41 E	1.52
WARIGILI POINT	11	33 S	132	07 E	2.40

	Position °	'	°	'	Sec. Para
WARN ROCK	13	09 S	126	06 E	3.18
WARNBRO SOUND	32	20 S	115	43 E	5.42
WARWICK CHANNEL	13	48 S	136	19 E	1.35
WATER ISLET	14	21 S	125	30 E	3.34
WATERHOUSE BAY	35	03 S	136	12 E	7.56
WATERHOUSE POINT	35	04 S	136	12 E	7.54
WATERLOO BAY	33	38 S	134	52 E	7.33
WATERWITCH CHANNEL	32	20 S	133	43 E	7.19
WATERWITCH ROCKS	34	20 S	121	41 E	6.33
WATSON PATCH	16	23 S	139	42 E	1.14
WAURALTEE ISLAND	34	32 S	137	21 E	7.100
WAVE GOVERNOR BANK	12	34 S	123	36 E	3.6
WEALJUGOO HILL	22	33 S	113	43 E	5.2
WEBB ROCK	34	58 S	136	55 E	7.93
WEBLING POINT	33	37 S	137	52 E	7.108
WEDGE ISLAND	35	10 S	136	28 E	7.52
WEDGE ISLET	30	50 S	115	11 E	5.32
WEERDEE ISLAND	20	19 S	118	28 E	4.21
WEIPA	12	40 S	141	52 E	1.5
WEIRS COVE	36	03 S	136	45 E	8.4
WELLS SHOAL	11	47 S	131	39 E	2.39
WEST ALLIGATOR RIVER	12	13 S	132	17 E	2.42
WEST BAY	11	23 S	132	10 E	2.32
WEST BAY	14	05 S	126	29 E	3.12
WEST BAY	35	53 S	136	33 E	8.2
WEST CAPE	35	15 S	136	49 E	7.90
WEST CHANNEL	33	57 S	121	42 E	6.28
WEST CLIFF POINT	34	54 S	116	17 E	6.5
WEST FORESTIER ISLET	20	35 S	117	45 E	4.21
WEST HOLOTHURIA REEF	13	35 S	125	45 E	3.19
WEST ISLAND	12	10 S	96	50 E	9.5
WEST ISLAND	15	35 S	136	33 E	1.26
WEST ISLAND	32	31 S	133	16 E	7.11
WEST ISLAND	35	37 S	138	35 E	8.57
WEST ISLET	34	05 S	120	28 E	6.24
WEST POINT	11	57 S	134	11 E	2.12
WEST POINT	12	26 S	130	46 E	2.63
WEST POINT	35	00 S	135	57 E	7.48
WEST ROCK	35	09 S	136	27 E	7.52
WEST SANDS	32	41 S	137	46 E	7.118
WESTALL POINT	32	55 S	134	03 E	7.25
WESTERN COVE	35	42 S	137	38 E	8.16
WESTERN RIVER	35	41 S	136	59 E	8.23
WESTERN SHOAL	33	09 S	127	32 E	7.84
WEYLAND POINT	33	15 S	134	38 E	7.28
WHALERS BAY	35	00 S	136	11 E	7.55
WHIDBEY ISLANDS	34	44 S	135	08 E	7.42
WHIDBEY POINT	34	35 S	135	06 E	7.37
WHIRLPOOL PASS	16	15 S	123	30 E	3.71
WHITE CLIFF POINT	34	13 S	115	01 E	5.52
WHITE ISLET	15	14 S	124	19 E	3.45
WHITE POINT	11	42 S	133	18 E	2.15
WICKHAM ISLAND	34	01 S	123	17 E	6.43
WICKHAM POINT	12	30 S	130	51 E	2.65
WIGRAM ISLAND	11	47 S	136	34 E	1.55
WILDCAT REEFS	15	17 S	124	08 E	3.48
WILLIAMS ISLAND	35	02 S	135	58 E	7.48
WILSON HEAD	35	03 S	117	20 E	6.9
WILSON POINT	15	33 S	124	24 E	3.51
WINCEBY ISLAND	34	30 S	136	17 E	7.73
WINCHELSEA ISLAND	13	43 S	136	30 E	1.34
WINJEE SAM ROCK	33	40 S	115	00 E	5.51
WITHNELL BAY TERMINAL	16	35 S	116	46 E	4.31
WOKATHERRA HILL	28	39 S	114	39 E	5.19
WOLLASTON ISLAND	14	30 S	125	28 E	3.36
WOMERANGEE HILL	26	54 S	113	47 E	5.16
WONGA SHOAL	34	50 S	138	28 E	8.50
WOODAH ISLAND	13	27 S	136	09 E	1.43
WOODBINE BANK	12	24 S	123	30 E	3.5
WOODHOUSE ROCKS	16	43 S	122	42 E	4.5
WOODING POINT	35	02 S	117	55 E	6.15
WOODMAN POINT LIGHT	32	08 S	115	46 E	5.41
WOODY ISLAND	33	58 S	122	01 E	6.27
WOOL BAY	35	00 S	137	45 E	8.37
WOOLAWAR GULLY	28	30 S	114	32 E	5.19
WOOLEN RIVER	12	14 S	135	10 E	2.9
WOOLLYBUTT	20	52 S	114	55 E	4.44
WRECK POINT	31	30 S	115	35 E	5.33
WRIGHT BANK	33	30 S	115	01 E	5.50
WYBRON ISLETS	16	28 S	123	21 E	3.90
WYNDHAM	15	27 S	128	06 E	2.85

Y

YAMPI SOUND	16	07 S	123	40 E	3.75
YANERBY HILL	32	55 S	134	11 E	7.25
YARRAVILLE SHOALS	33	17 S	137	36 E	7.110
YATALA HARBOR	32	45 S	137	53 E	7.117
YATALA REEF	32	37 S	132	26 E	7.6
YATALA SHOAL	35	44 S	138	11 E	8.20
YORK ISLANDS	34	00 S	122	35 E	6.36
YORK SOUND	14	53 S	125	07 E	3.39
YORKE POINT	35	14 S	137	10 E	8.29
YOUNG ROCKS	36	23 S	137	15 E	8.6