# THE GREAT BARRIER REEF ENVIRONMENT: A PILOT'S FUNCTION

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Pilotage must be considered a preventative safety operation and this paper is intended to give an overview of the manner in which we go about our task. When I joined the Pilot Service in 1980 the main emphasis for the pilot could be said to centre on the vessel; a quick safe passage was required. Today, as the result of the area being placed on the World Heritage list, the formation of the Marine Park and, in 1991, the introduction of compulsory pilotage, the main emphasis has changed to protection of the environment.

Pilotage, unlike navigation, is a judgemental activity. Pilots when piloting absorb information from a number of sources and are required to make decisions in real time. In areas of confined waters, such as the Inner Route of the Barrier Reef, the Pilot has to be totally aware of his location at all times and the various influences that will effect the progress of the vessel under his control. He has to posses an abundance of local knowledge.

A vessel proceeding from Asian Ports to East Coast Australia or New Zealand Ports has the choice of two routes.

a) Torres Strait and across the Coral Sea (Chart 1).
b) The Inner Route of the Great Barrier Reef (Chart 2).

If proceeding to North Queensland Ports the Inner Route is the more logical.

The comparisons between the two routes are:

| | INNER ROUTE. | CORAL SEA ROUTE. |
|---|---|---|
| 1. | Calm sea conditions. | Possible rough Sea conditions. |
| 2. | Good navigation aids. | Few navigation aids. |
| 3. | Anchorage depth water. | To deep to anchor. |
| 4. | In pilotage waters or pilot service available. | Vessel can transit Torres Strait without a pilot. |
| 5. | Possible Australian Government control on vessel's movements. | No control over route taken. |

Pilotage in the Reef is basically divided into four main sections:-
1. The Great North East Channel.
2. Inner Route from Torres Strait south.
3. The coastal Inner Route south of Cairns.
4. Hydrographers Passage.

I will concentrate on the Torres Strait to Cairns section which covers the main compulsory pilotage area

There are many factors that a Pilot will consider when he boards a vessel to commence a pilotage.

1. The vessel's draught.
2. The speed of the vessel.
3. The operational state of the radars.
4. The operational condition of the compasses and associated equipment.
5. The quantity and condition of the navigational charts.
6. The competency of the bridge watch keepers.
7. Prevailing and forecast weather conditions
8. Possible traffic in the area.

How do these factors influence a Pilot?

A vessel's draught will dictate the basic route to be followed and, if it is to transit the area of the Torres Strait between Booby Island and Twin Isles, will set the transit times (Chart 3).

The Booby Island to Twin Island section is where we encounter the shallowest water, the strongest currents, the narrowest section of the reef and also the most complicated tidal system.

As an example today (14th April) the tides are at their maximum and are uniform in ebb and flood (Chart 4). However, a week ago there were minimum tides and contrary tides at either end of the Strait (Chart 5).

The current rate varies between to 2.3 knots today from 6.8 knots last week.

In instances where a deep draught vessel is to transit, Pilots consult the Torres Strait Tide Tables (chart 6), published by AMSA, which give hourly predictions of the tides at Booby Island, Goods Island, Turtle Head and Ince Point. These four tide stations also have VHF radio tide gauges which can be monitored by a transiting vessel and when out of VHF range can be monitored by telephone.

The area Booby to Twin is common to the Inner Route south and the Great North East Channel (Chart 3a) and at present is not a compulsory pilotage area, so we occasionally have the added problem of unpiloted vessels transiting.

The Great North East Channel is, of course, not in the Great Barrier Reef Marine Park but it is a region considered by the Torres Strait Islanders to be environmentally sensitive.

The GNEC is a relatively short passage (average 9 hours) however it is an area where hydrographic surveys are relatively old and strong tidal influences (Chart 7) are to be met along the route. It, thus, requires extra concentration by a Pilot, particularly in the Vigilant Channel and between Bet Reef and Rennel Island.

In the future when the hydrographic surveys have been completed, these two areas could be replaced by an alternative more direct route, with wider channels and deeper water.

The Inner Route south from Torres Strait to Cairns is marked by the Two Way Route (Chart 8). This indicates the best route for vessels of moderate draught. It is not, however, mandatory. Pilots deviate from the Two Way Route in a number of sections to keep the vessel in the deepest water. These deviations are Wyborn Reef east of Cairncross Is to Hannibal Island and Fife/Hay Island to Eden Reef (chart 9).

After the Howick Islands there are three alternate routes, the deepest draught vessels proceed, via Lizard Island, medium draught via Mid Decapolis Channel and light draught via Pethebridge Islets. Loaded panamax size vessels, proceeding south ex Cape Flattery, have an alternate deep water route to the east of Hope Islands.

South of Hope Islands/Gubbins Reef draught is not such a problem as there is greater sea room and deeper water, the main concerns are isolated reefs, shoals and submerged rocks. For vessels proceeding to or from Mackay/Hay Point the vessels draught can determine if the Whitsunday Passage can be used.

In all instances the Pilot considers the chart datum, the state of tide and draught and squat of the vessel to determine if it is safe to transit a particular area.

The speed of the vessel is an important factor for calculating squat and a formulae, worked out by Dr. Barrass of Liverpool, is used to compute it.
For open water conditions the formulae is:

Squat = (Speed*Speed*Block Coeff)/100

An alteration in speed can vary the vessel's squat (Charts 4 and 5). The speed of the vessel will also dictate the times and length of rest periods the Pilot will get.

Pilots would consider the most important item of navigation equipment to be the compass, be it Gyro or Magnetic.

Providing the compass error is known and steady then a successful transit of the Inner Route can be achieved. In general terms the reliability and performance of gyro compasses are good, we do nevertheless meet ones that have large and variable errors. Fortunately there are an abundance of transits which can be used to constantly check the compass error.

Radars on a majority of vessels perform well, but it never fails to amaze me how badly set up the displays can be and the strange ways ships' crews attempt to eliminate the errors.

Among the questions Pilots ask on boarding are; What is the compass error?, What errors are there on the radar?, usually to be told everything is in good working order. A prudent Pilot will ascertain what errors there are and obtain calibrations.

The navigational charts on the vessel can vary from new, corrected and up to date to old, obsolete and uncorrected, also a full set of the largest scale to a bare minimum small scale set. The standard of chart corrections carried out by the designated navigation watchkeeper is also an education!

For the information of the watchkeepers a pilot will put the courses he intends to follow on the ship's charts, it does some times occur that traffic conditions or weather might require deviations from the intended courses.

Pilots carry with them a composite set of charts but its scope is determined by the fact that these are part of his travelling luggage. There are other forms of navigation information that a Pilot will carry the type and extent of which is individual in choice.

As the standard of equipment varies so does the standard of watchkeepers. The reliance on the output from electronic navigation equipment and the manner it is used raises serious questions on the standards of training some crews receive. It appears that the IMO STCW has become a maximum standard instead of the intended minimum. The competency of the watchkeepers has to be assessed so that the Pilot can feel he can leave the bridge for a rest in the more open water areas.
When leaving the bridge the following information would be passed on to the watchkeeper:

- Ships course, error being allowed and allowances for set and leeway.
- Tidal set that should be experienced.
- Known shipping that could be met.
- Movements of any vessels in sight.

the added obstacle of passing Dayman Rk, Ballerina Sh, Simpson Rk, Iris Rf and Beaby Patches.

During the fishing season there is the problem of trawlers that operate between Cape Direction and Eden Reef.

The Howick North Channel provides a deep water route it is, however, a narrow twisting channel but is provided with good navigation aids. The Inner Route provides a safe calm water route between Torres Strait and East Coast Australia. Now that the North Section has been declared a Compulsory Pilotage region there is every reason that it can be made safer. There are areas where improvements in knowledge can be made. I would like to see better tidal information between Cairns and Torres Strait, the RAN Hydrographic Office is, I understand, gathering the data but it then requires to be processed and published, the question is who benefits, who pays. The charting is very good and when the LADS system is fully operational wider and deeper channels might be located.

As with any profession as Pilots we never stop gaining knowledge of the equipment being fitted to ships, of the area in which we operate, but what does concern me personally is the apparent lowering of standards of crews which places an extra responsibility on Pilots. There are many new and sophisticated navigation systems and equipment being introduced. From my experience it can not be assumed that ships will have this fitted, even on new tonnage, that I have piloted, I have found only very basic aids to navigation. In many instances where good equipment is fitted the crews are often ignorant in its correct operation and use.

On a final note a vessel carrying a Pilot has a representative of this nation on board who can keep the vessel advised on Australian regulations and requirements and if required could observe any problems that might be evident.

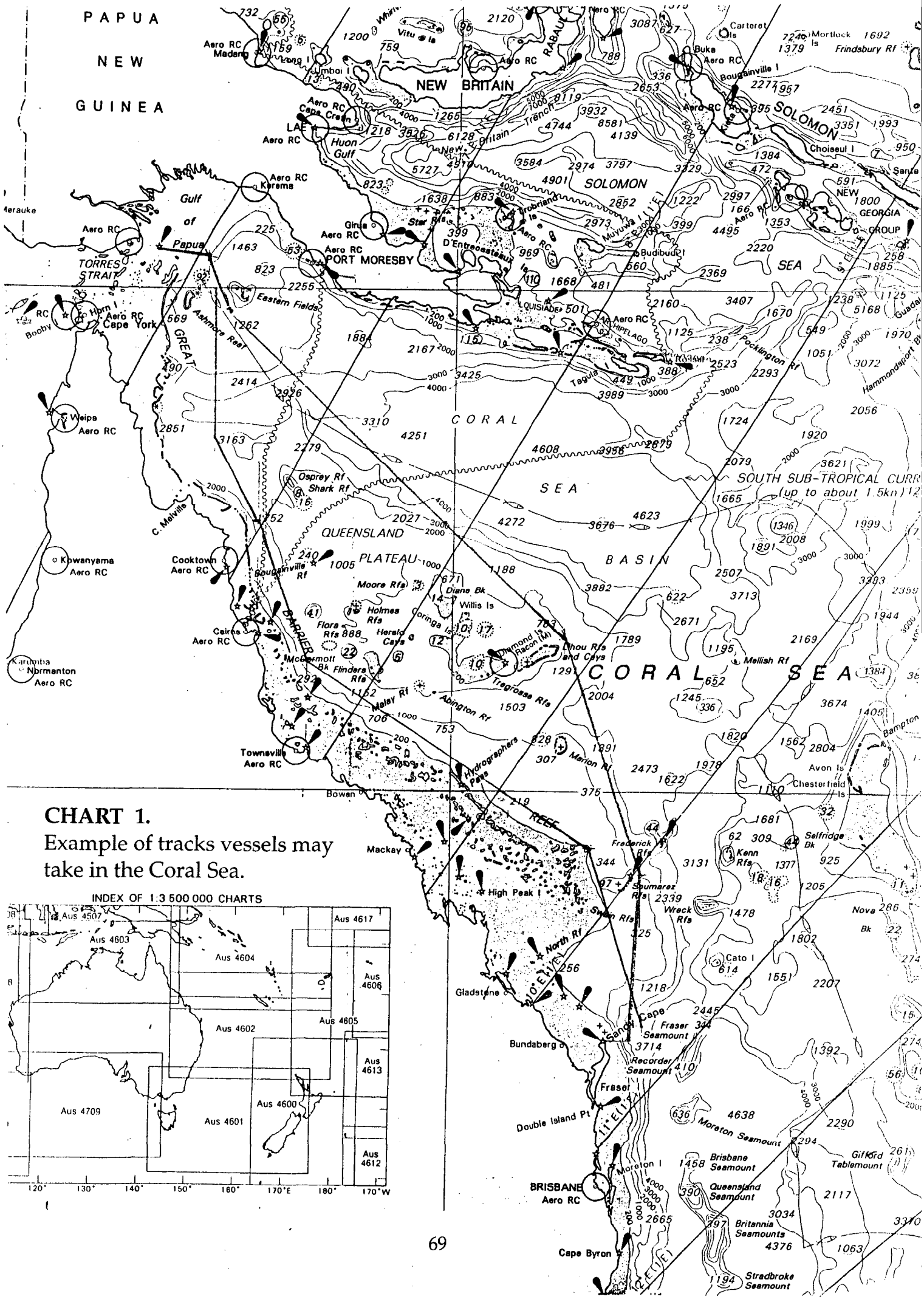



**CHART 1.**
Example of tracks vessels may take in the Coral Sea.

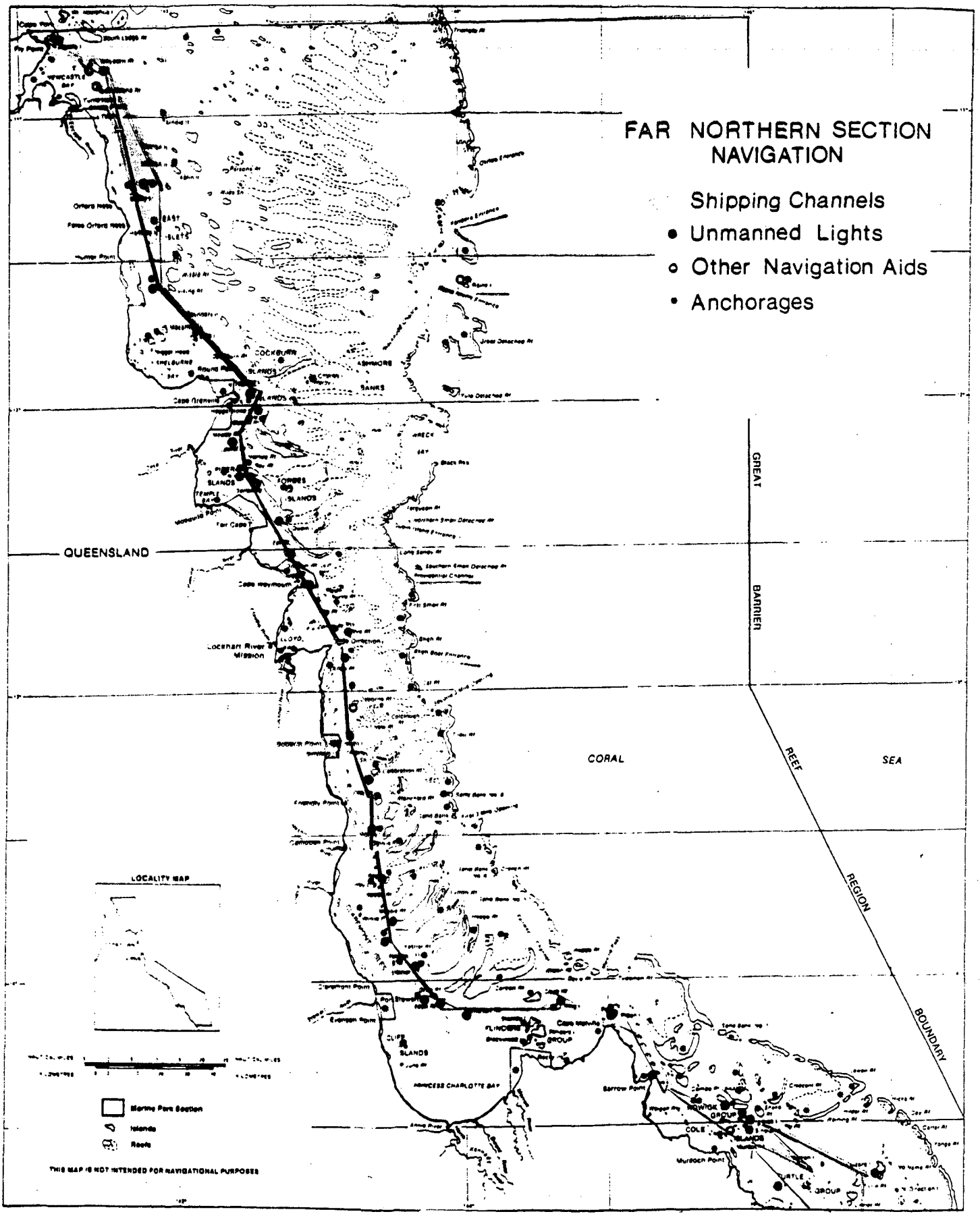



**CHART 2.**
Inner Route to Lizard Island.

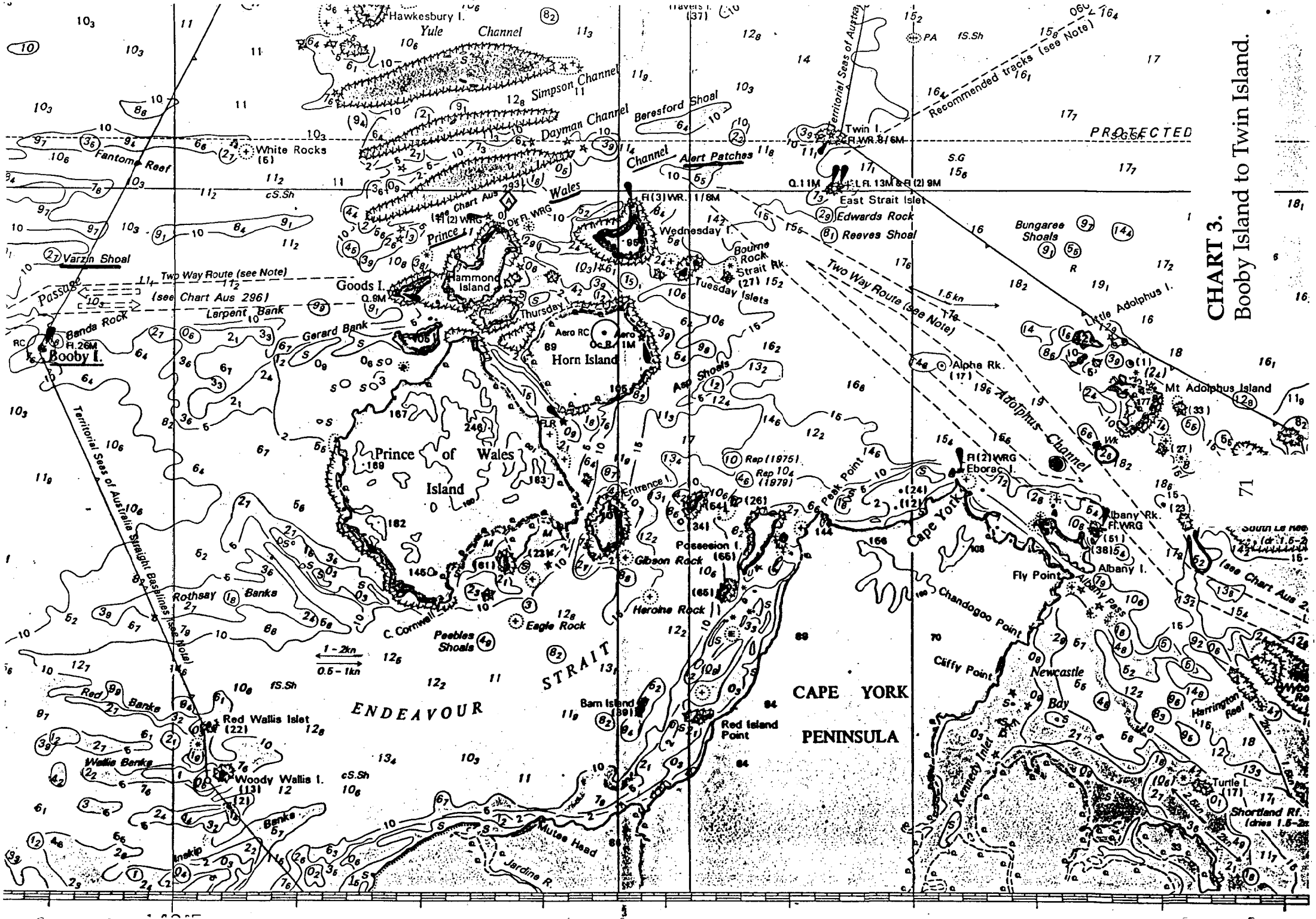
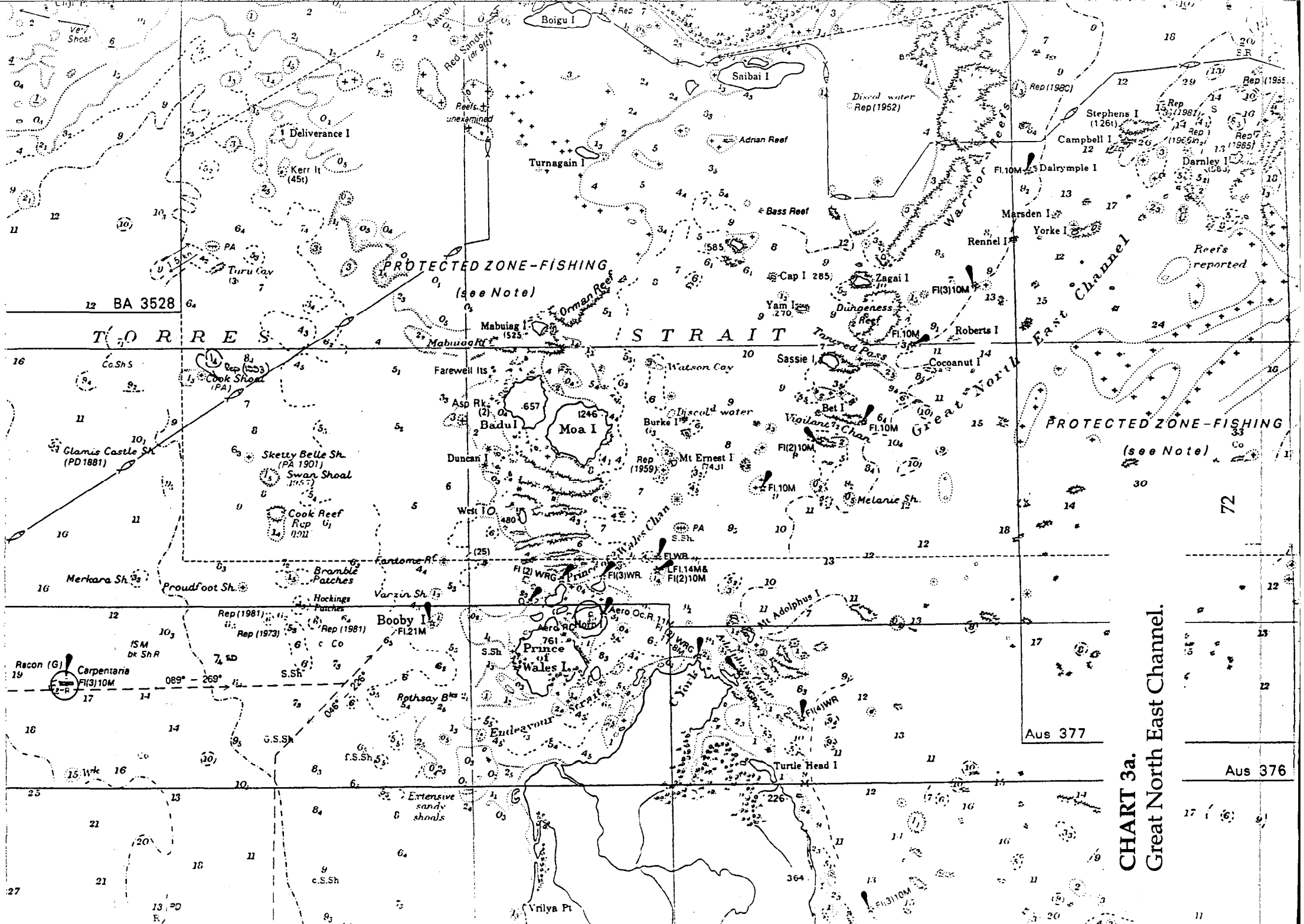


CHART 3.
Booby Island to Twin Island.
71
Hawkesbury I.
Yule Channel
Simpson Channel
Dayman Channel
Beresford Shoal
Fantome Reef
White Rocks (6)
Varzin Shoal
Two Way Route (see Note)
Passage
(see Chart Aus 296)
Larpent Bank
Banda Rock
Fl.26M
Booby I.
Territorial Seas of Australia
Straight Baselines (see Note)
Gerard Bank
Goods I.
Q.9M
Hammond Island
Prince
Wales
Channel
Alert Patches
(see Chart Aus 293)
Fl(2)WRG
Dir Fl.WRG
Fl(3)WR. 1/8M
Wednesday I.
Thursday I.
Aero RC
Aero Oc.R. 1M
Horn Island
Tuesday Islets
Bourne Rock
Strait Rk.
(27) 15.2
Prince of Wales Island
Entrance I.
Rep (1975)
Rep 10.4 (1979)
Possession I.
Gibson Rock (65)
Heroine Rock
Eagle Rock
C. Cornwell
Peebles Shoals
Rothsay Banks
Red Banks
Wallis Banks
Red Wallis Islet
Woody Wallis I.
Inskip Banks
Mutee Head
Jardine R.
1 - 2kn
0.5 - 1kn
STRAIT
ENDEAVOUR
Barn Island
Red Island Point
CAPE YORK PENINSULA
Territorial Seas of Australia
Recommended tracks (see Note)
PROTECTED
Twin I.
Fl.WR.8/6M
Q.11M
L.Fl.13M & Fl(2)9M
East Strait Islet
Edwards Rock
Reeves Shoal
Bungaree Shoals
Two Way Route (see Note)
1.6kn
Alpha Rk.
(17)
Adolphus Channel
Little Adolphus I.
Mt Adolphus Island
Fl(2)WRG
Eborac I.
Peak Point
Cape York
Albany Rk.
Fl.WRG
Albany I.
Fly Point
Albany Pass
Chandogoo Point
Cliffy Point
Newcastle Bay
Harrington Reef
Kennedy Inlet
Turtle I.
Shortland Rf.
(see Chart Aus 2


TORRES STRAIT
PROTECTED ZONE-FISHING
(see Note)
BA 3528
Boigu I
Saibai I
Deliverance I
Kerr It (45t)
Turnagain I
Adnan Reef
Bass Reef
Orman Reef
Mabuiag I
Yam I
Dungeness Reef
Cap I
Zagai I
Rennel I
Marsden I
Yorke I
Stephens I (126t)
Campbell I
Darnley I
Dalrymple I
Roberts I
Sassie I
Cocoanut I
Bet I
Melanie Sh.
Farewell Its
Watson Cay
Asp Rk
Badu I
Moa I
Burke I
Mt Ernest I (743)
Duncan I
Glanis Castle Sh (PD 1881)
Skelly Belle Sh (PA 1901)
Swan Shoal
Cook Reef
Cook Shoal (PA)
Turu Cay
Merkara Sh
Proudfoot Sh
Bramble Patches
Hockings Patches
Booby I
Prince of Wales I
Aero Rad
Aero Rad North
Endeavour Strait
Turtle Head I
Vrilya Pt
Extensive sandy shoals
Rothsay Bk
Varzin Sh
Farnome Rf
Red Sands (dr 9ft)
Reefs unexamined
Diseol water Rep (1962)
Warrior Reefs
East Channel
Great North East Channel
Prince of Wales Chan
Vigilance Chan
Mt Adolphus I
Recon (G)
Carpentaria
089° – 269°
046°
CHART 3a.
Great North East Channel.
Aus 377
Aus 376
72