

# Shoreline Vegetation Maps of Some Major Herring Spawning Localities on the West Coast of Vancouver Island: Nuchatlitz, Nootka Sound, Hesquiat Harbour and Barkley Sound

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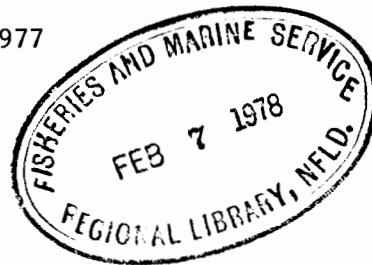
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Manuscript Report 1430

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SHORELINE VEGETATION MAPS OF SOME MAJOR HERRING SPAWNING  
LOCALITIES ON THE WEST COAST OF VANCOUVER ISLAND:  
NUCHATLITZ, NOOTKA SOUND, HESQUIAT HARBOUR,  
AND BARKLEY SOUND

by

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ABSTRACT

Haegele, Carl W., and Mary Jo Hamey. 1977. Shoreline vegetation maps of some major herring spawning localities on the west coast of Vancouver Island: Nuchatlitz, Nootka Sound, Hesquiat Harbour, and Barkley Sound. Fish. Mar. Serv. MS Rep. 1430: 41 p.

Maps of shoreline vegetation for the purpose of recording and assessing herring spawnings were prepared for the Nuchatlitz area including Port Langford, the western portion of the entrance to Nootka Sound, all of Hesquiat Harbour, and the western coastline of Barkley Sound. The vegetation was mapped by five major types as identified from their spectral reflective characteristics on large format vertical aerial colour infrared and colour photographs: sea grasses, rockweed, red algae, brown algae, and green algae. Each of the 15 charts were reduced from photoscales between 1:6000 and 1:3600 to page size at scales between 1:22000-1:9000.

Key words: shoreline vegetation, aerial photography.

RÉSUMÉ

Haegele, Carl W., and Mary Jo Hamey. 1977. Shoreline vegetation maps of some major herring spawning localities on the west coast of Vancouver Island: Nuchatlitz, Nootka Sound, Hesquiat Harbour, and Barkley Sound. Fish. Mar. Serv. MS Rep. 1430: 41 p.

Pour reconnaître les frayères de harengs, les auteurs ont dressé des cartes de la végétation littorale de la zone de Nuchatlitz, qui comprend le port de Langford, la partie ouest de l'entrée de la baie de Nootka, le havre de Hesquiat en son entier et le littoral ouest de la baie de Barkley. La végétation a été classée en cinq grandes catégories caractérisées par leurs spectres d'émission captés sur des photographies aériennes de grand format sensibles à la couleur ou à l'infrarouge. Ce sont: les zostères, les fucus, les algues rouges, les algues brunes et les algues vertes. Chacune des quinze cartes, tirée de photographies à l'échelle du 1:6000 au 1:3600, a été rapportée à la dimension d'une page par une réduction du 1:22 000 au 1:9000.

Mots-clés: végétation littorale, photographie aérienne.

## INTRODUCTION

Pacific herring spawn mostly on rooted algae and sea grasses in the intertidal and upper subtidal zones. The ability to accurately record and assess these spawnings depends to a considerable degree on a knowledge of the spawn substrate. Vegetation maps of herring spawning grounds have been prepared for this purpose from large format aerial photographs. This is a continuing project and charts for some Strait of Georgia localities have been published (Haegeler and Hamey 1976). The charts presented here are for some west coast of Vancouver Island herring spawning localities and while they are primarily intended for herring spawn assessment, they may be of value to others whose studies include consideration of these nearshore habitats.

## METHODS

Mapping of the shoreline vegetation was accomplished from 23 × 23-cm format transparencies. The coastlines were photographed with Kodak Aerochrome Infrared No. 2443 film with a medium yellow (Wratter No. 9) filter and Kodak Ektachrome MS Aerographic No. 2448 film.

Vertical aerial photographs for the west shore of Barkley Sound were obtained on July 21, 1974. The Nuchatlitz area, the west shore of Nootka Sound and Hesquiat Harbour were photographed on May 19, 1976. There was 60% forward overlap between adjacent frames and 20% overlap between parallel flight lines. Other photographic details were as follows:

Locality	Predicted low tide		Film type	Time of photography (PST)		Photo scale	No. of exposures
	Time (PST)	Height (m)		Begin	End		
Nuchatlitz	1050	0.5	Infrared	0957	1013	1:6000	55
			Ektachrome	0935	0950	1:6000	50
Nootka Sd.	1050	0.5	Infrared	1018	1022	1:4800	28
			Ektachrome	0924	0930	1:4800	25
Hesquiat Hbr.	1050	0.5	Infrared	1032	1050	1:4800	78
			Ektachrome	0850	0915	1:4800	70
Barkley Sd.	0745	0.0	Infrared	0750	0835	1:3600	57
			Ektachrome	0700	0740	1:3600	57

Vegetation maps were prepared at the scale of photography using standard photogrammetric techniques. Vegetation was identified from infrared photographs using a colour key previously developed (Haegele 1975). For vegetation submerged at the time of photography, identification was by colour and texture from the colour photographs. The vegetation was charted by five major types;

1. Sea grasses - mainly Zostera marina but also Phyllospadix sp. in exposed areas.
2. Rockweed - mainly Fucus sp. but occasionally Pelvetiopsis sp.
3. Red algae - a large variety of species. In herring spawn samples and vegetation samples obtained in Barkley Sound in 1975 (Humphreys and Haegele 1976), 1976 (Haegele and Humphreys 1976), and 1977 (unpublished), 37 species of red algae were encountered. The more common species, in order of frequency of occurrence in samples were:

Pikea sp.  
Rhodomela larix  
Calliarthron sp.  
Corallina sp.  
Gelidium sp.  
Gracilariaopsis sjoestedtii  
Polysiphonia hendryi  
Neogardhiella baileyi

4. Brown algae - mostly kelps such as Laminaria sp., Agarum sp., Macrocystis integrifolia and the japweed Sargassum muticum.
5. Green algae - mostly Enteromorpha sp. and Ulva sp.

The outer vegetation boundaries were determined from the colour photographs. Fathom contours were included in the charts and were obtained by enlarging marine charts to photo scale on a reflecting projector. These large scale charts were photographically reduced to page size.

## RESULTS

The Nuchatlitz region, including Port Langford, is a very complex, exposed coastline with large areas of very shallow water (Fig. 1). Including land masses, which account for about 40% of the area, 22 km<sup>2</sup> involving 24 km of coastline were mapped on three charts. The scale of the page-size charts (Fig. 2, 3, 4) is 1:21000.

In Nootka Sound, the western portion of the entrance from seaward of Friendly Cove to Marvina Bay, including McKay Passage and Saavedra Islands was mapped (Fig. 5). The vegetation along 16 km of coastline was charted on two charts. The scale of the page-size maps (Fig. 6, 7) is 1:22000.

Hesquiat Harbour was mapped in its entirety on five charts covering 26 km of coastline (Fig. 8). The scale of the page-size maps (Fig. 9-13) is 1:21000. From observations made in 1974 during herring spawn sample collections, it was noted that the sea-grass beds at the eastern entrance are mostly Phyllospadix sp. rather than the more prevalent Zostera marina.

In Barkley Sound, the western coastline from Twin Rivers to Toquart Bay, a distance of 14 km, was mapped on five charts (Fig. 14). The scale of the page-size maps (Fig. 15-19) ranges from 1:9000-1:13000. A diving survey in 1975 (Haegele 1975) in the section seaward of Maggie River (Fig. 17) showed that the aerial map was mostly correct. The exception was a sparse red algae band with percent cover of less than 25% that extended to the 5 fm contour. From the photographs red algae were identified only to the 3 fm contour.

#### DISCUSSION

The vegetation charts for Barkley Sound were used for the first time for the 1976 herring spawn survey by Fisheries and Marine Service personnel. From our observations of spawnings in that area by diving surveys in 1975 and 1977, the general impression is that the accuracy of the spawn reports was markedly improved. While the average widths of spawnings reported for here from 1971-1975 was 40 yd, the 1976 average width was 110 yd, probably a more realistic figure.

#### ACKNOWLEDGEMENT

We wish to thank the personnel of Pacific Survey Corporation for obtaining, under contract, the aerial photographs from which the vegetation charts were drawn.

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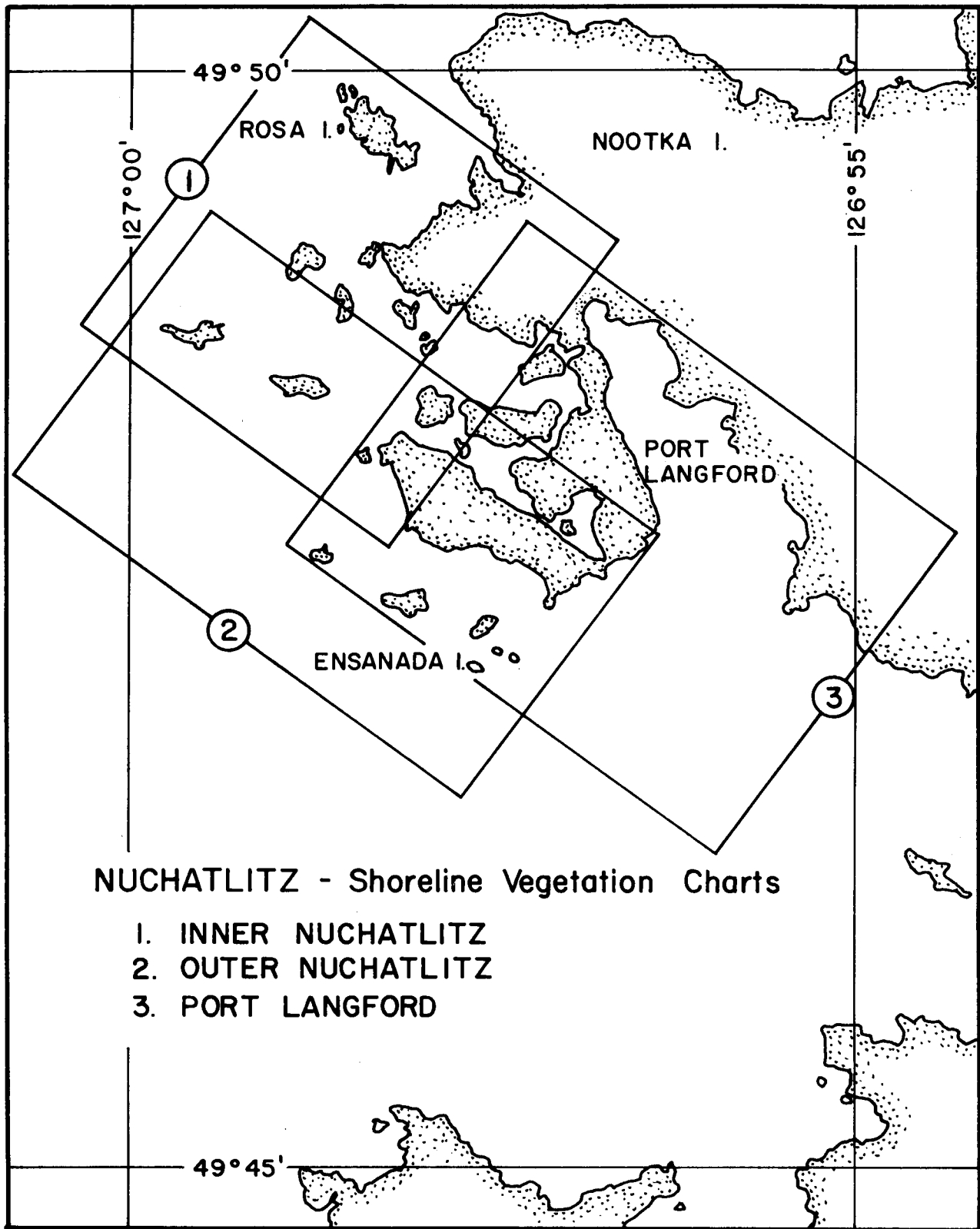


Fig. 1. Shoreline vegetation charts for Nuchatlitz.



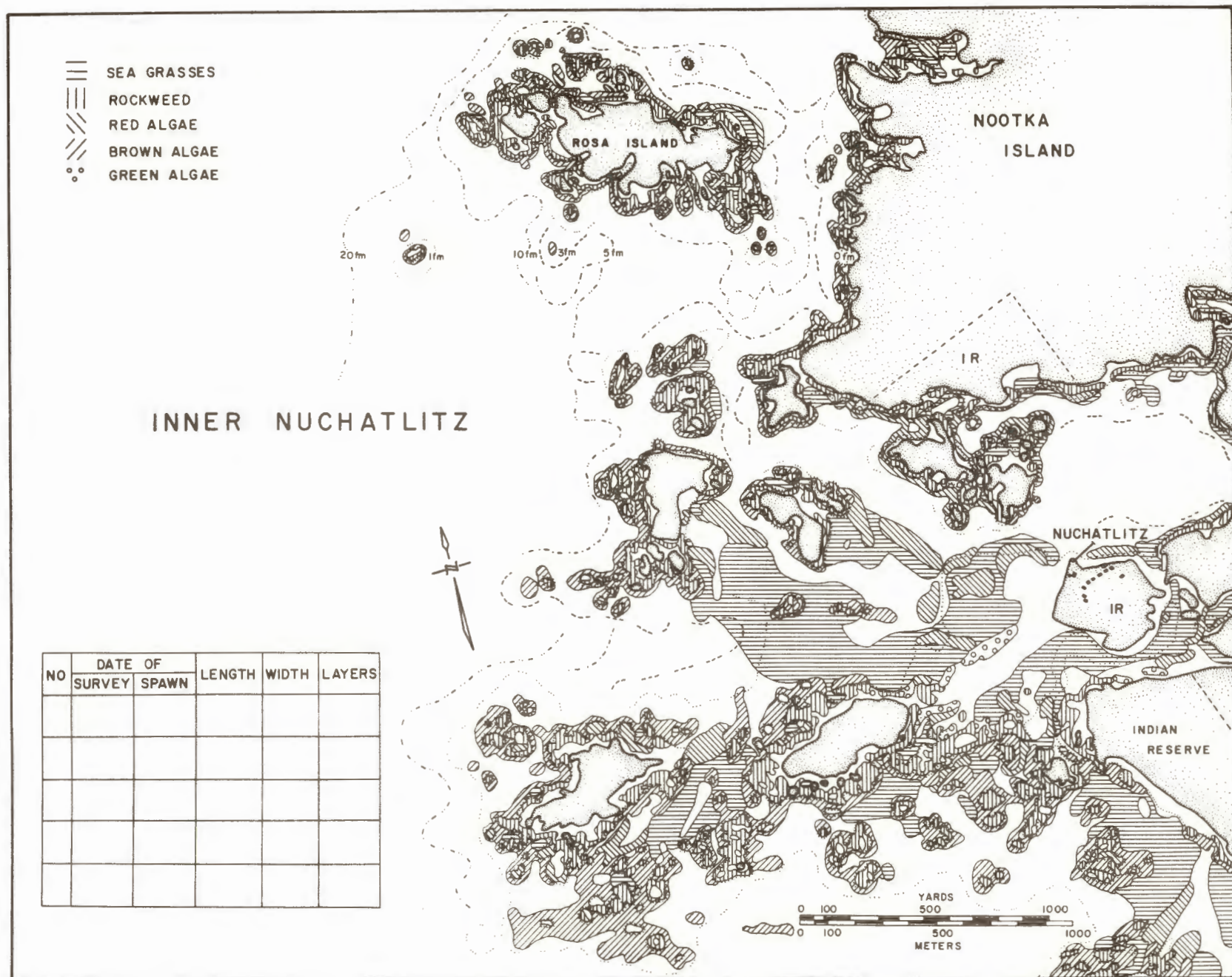


Fig. 2. Inner Nuchatlitz.



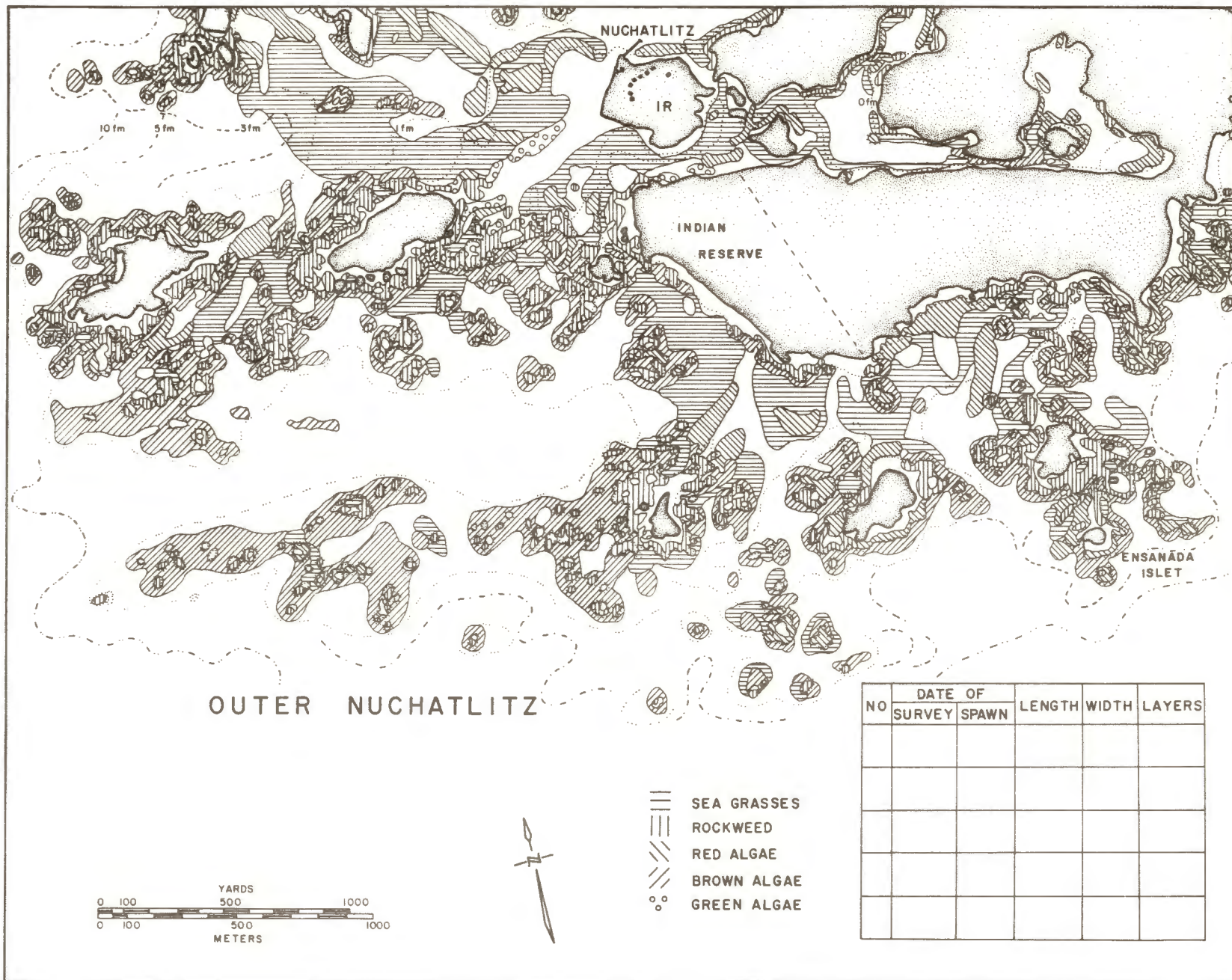


Fig. 3. Outer Nuchatlitz.



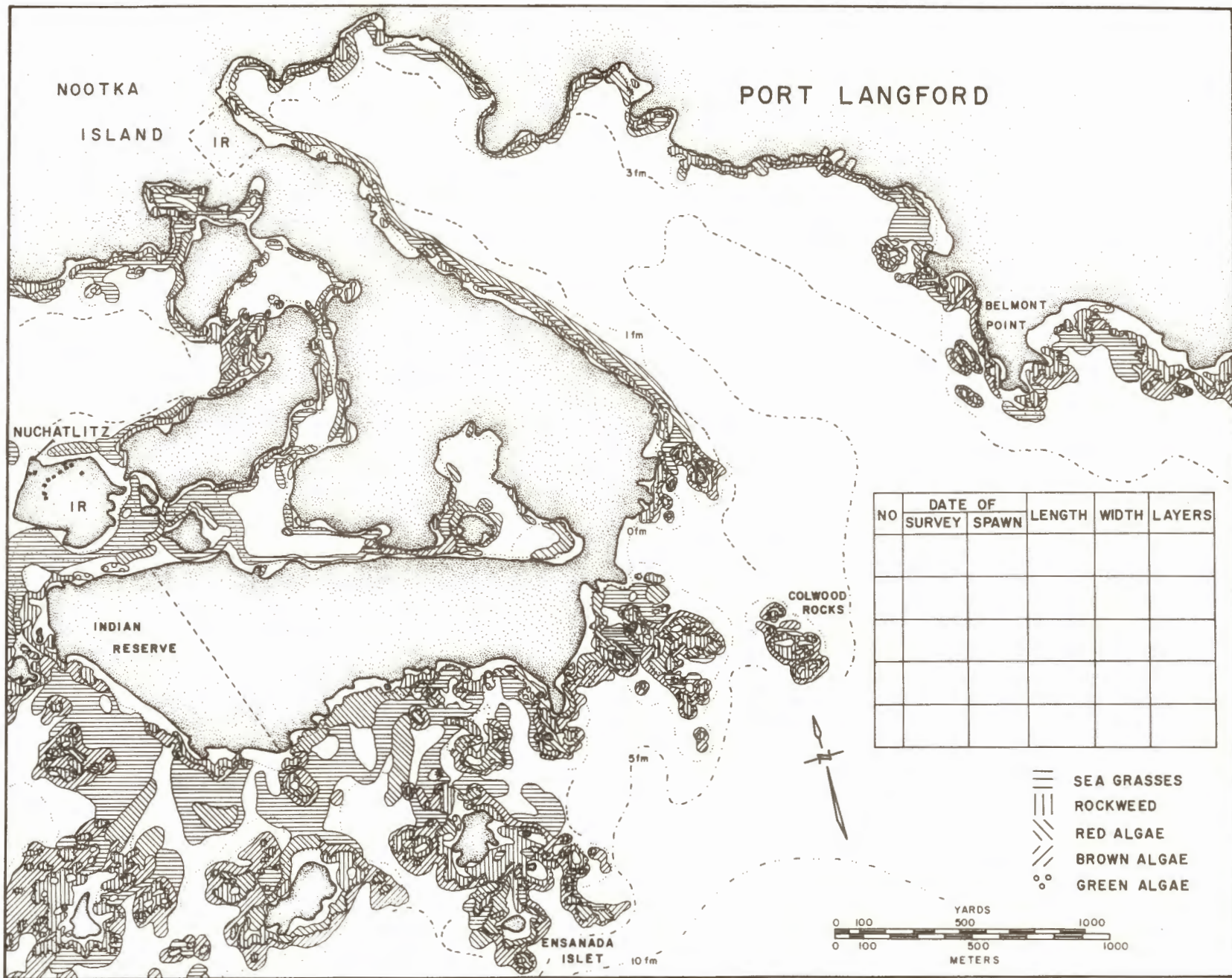


Fig. 4. Port Langford.





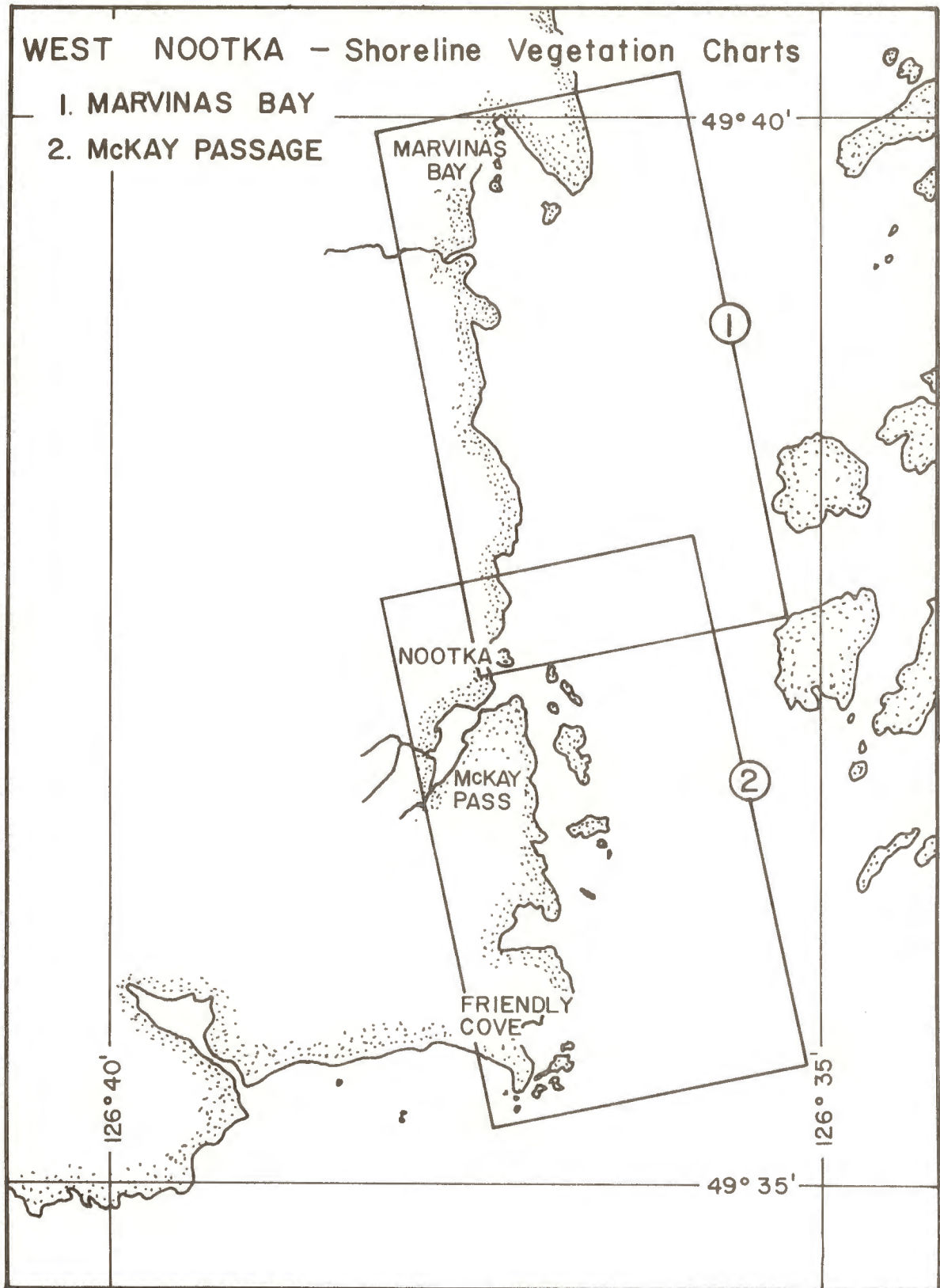


Fig. 5. Shoreline vegetation charts for West Nootka.



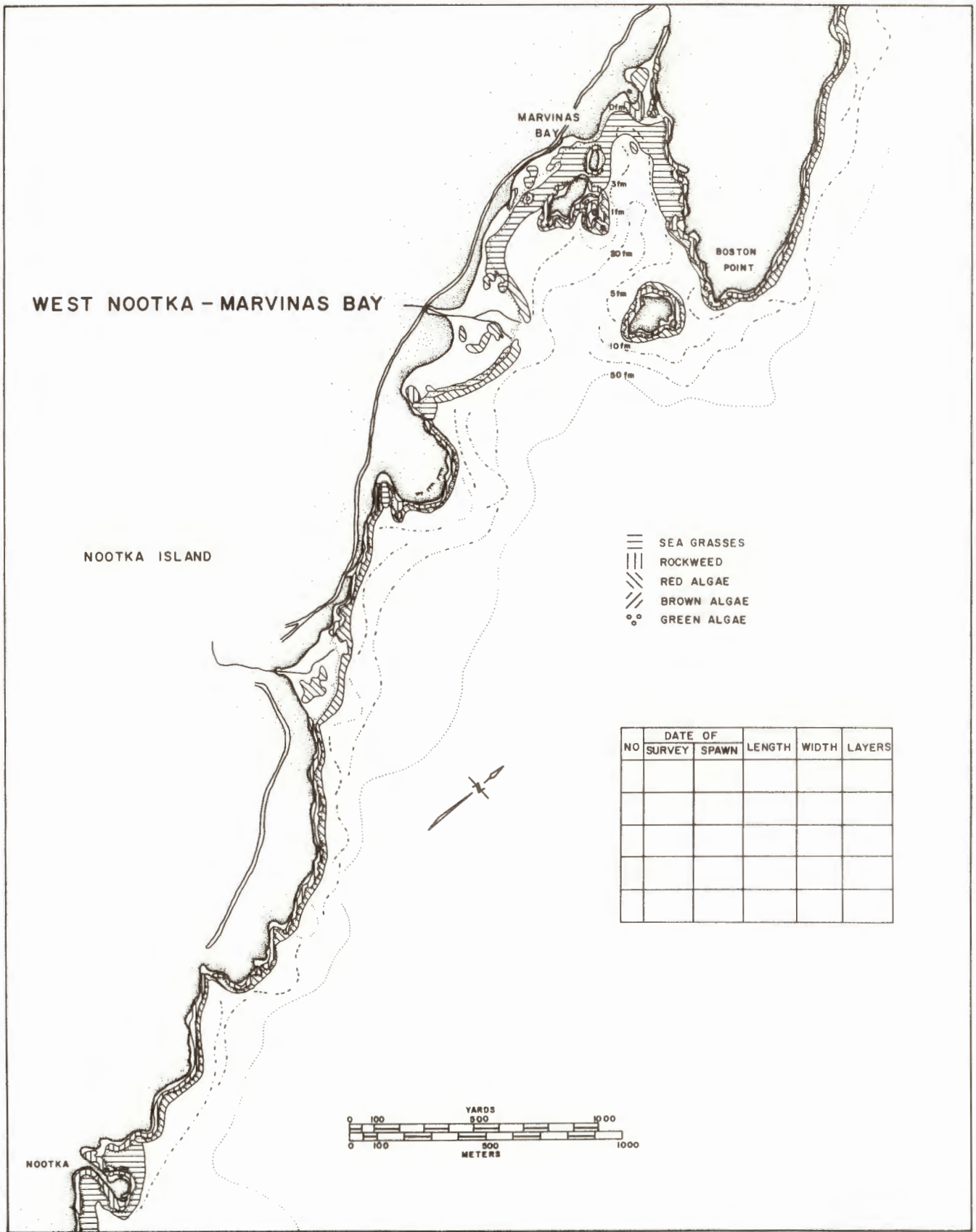


Fig. 6. Marvinas Bay.



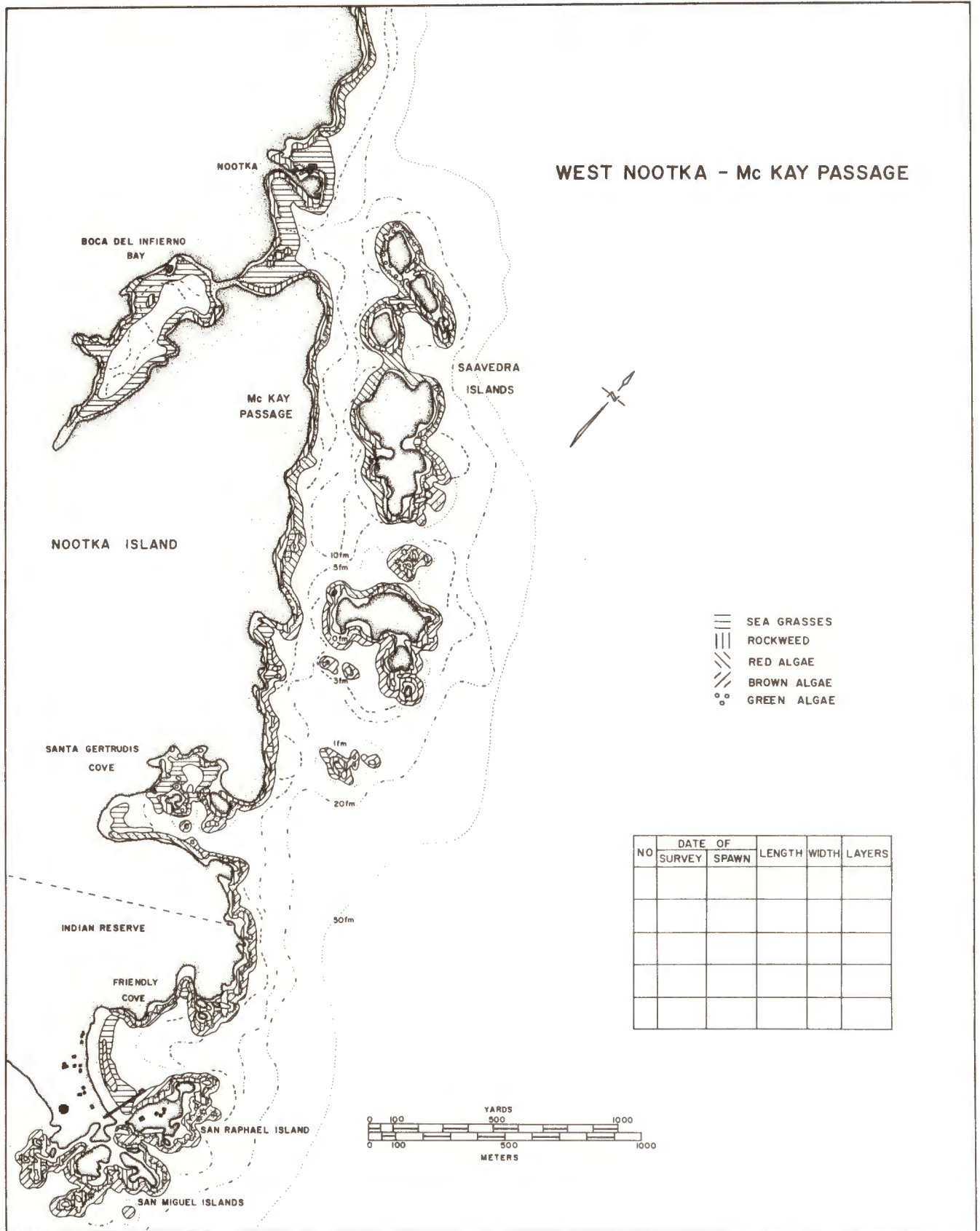


Fig. 7. McKay Passage.



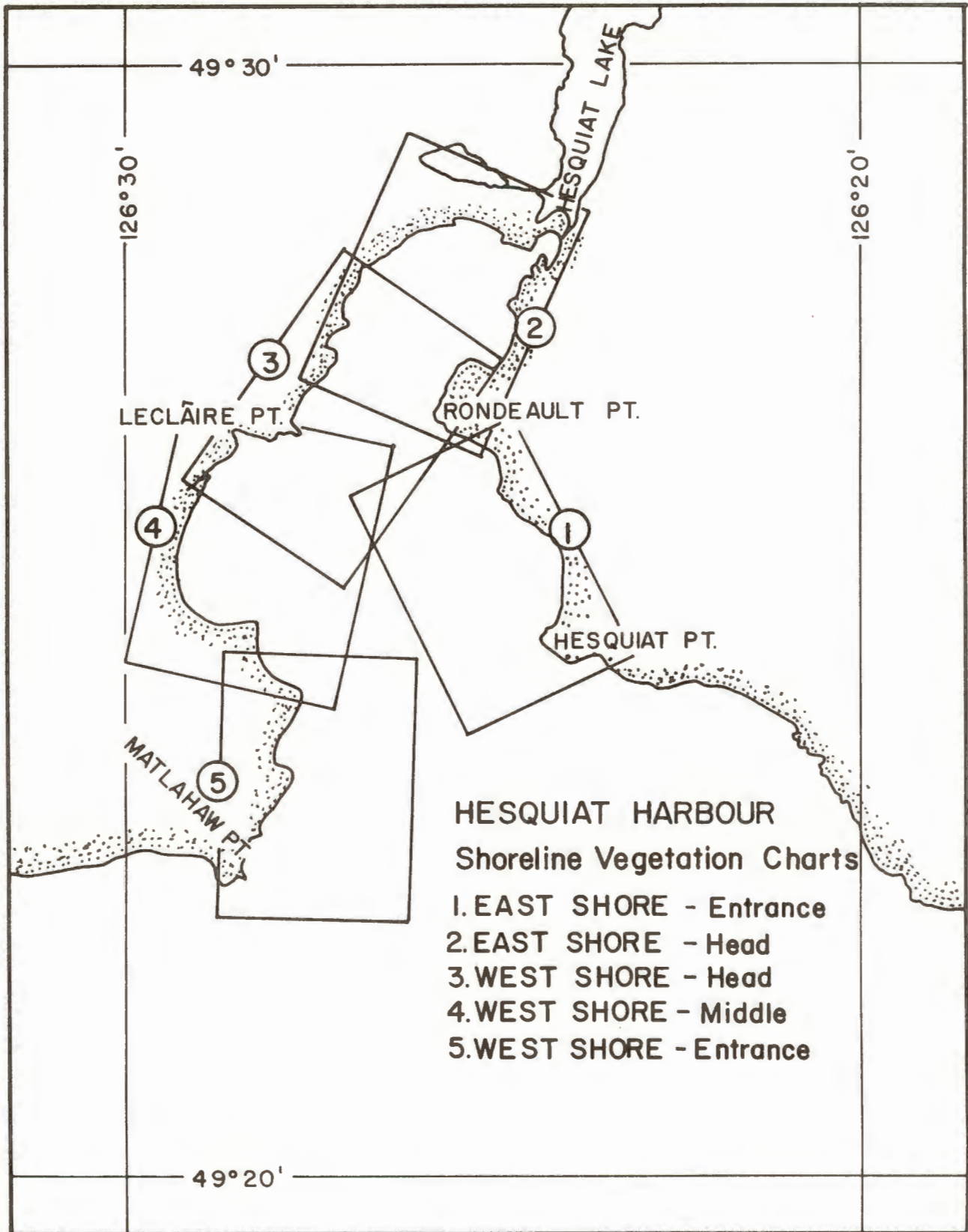


Fig. 8. Shoreline vegetation charts for Hesquiat Harbour.





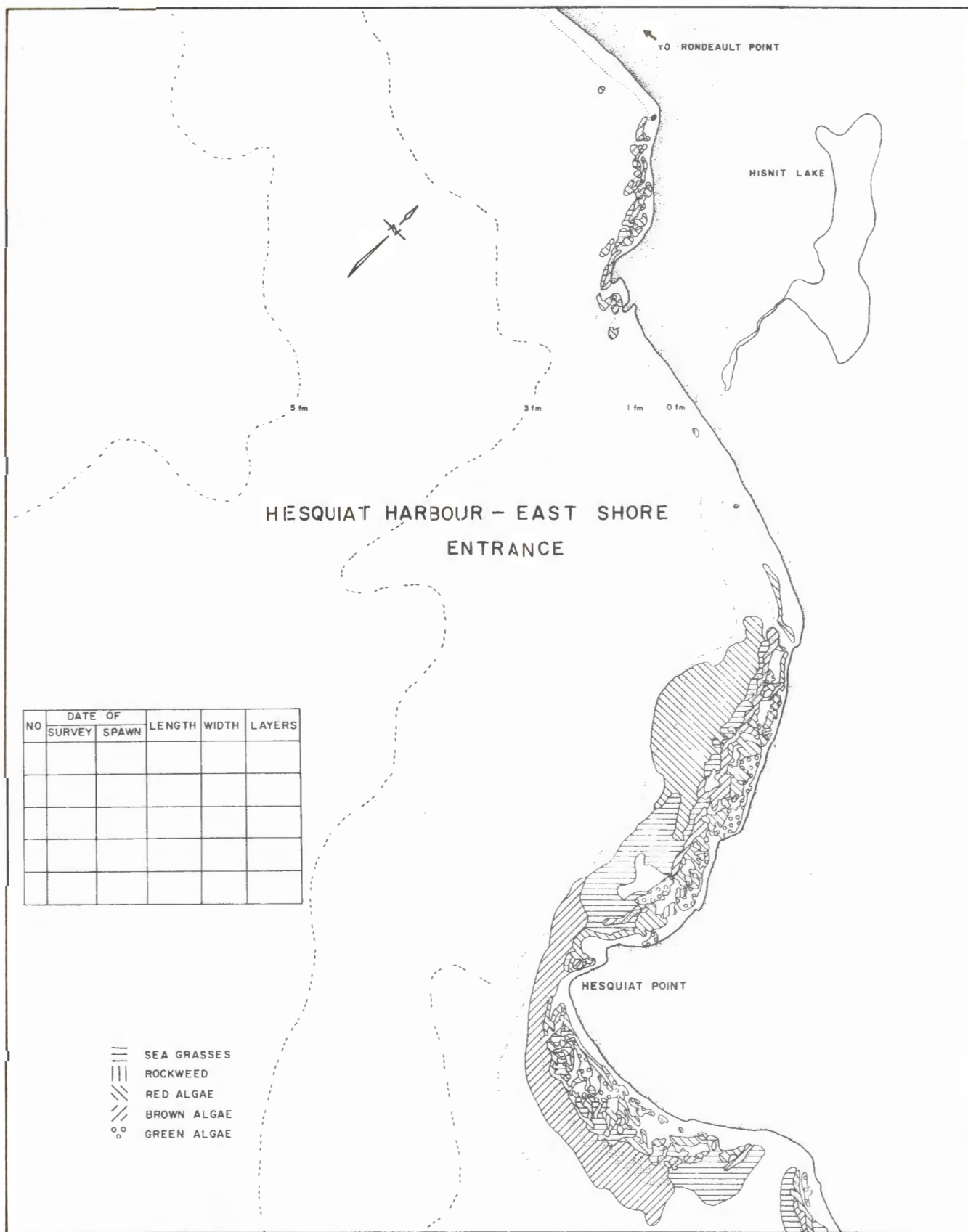


Fig. 9. Hesquiat Harbour - east shore - entrance.



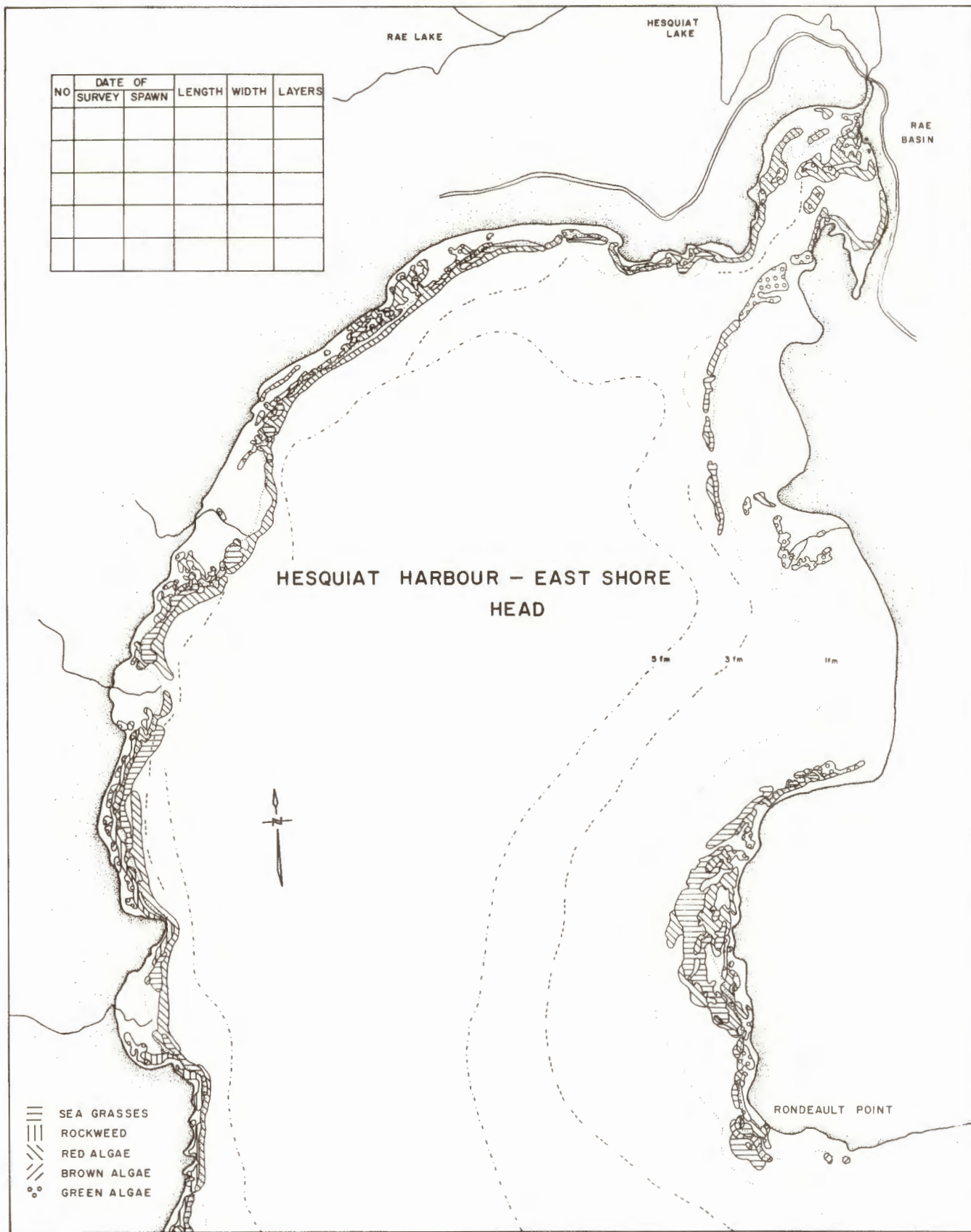


Fig. 10. Hesquiat Harbour - east shore - head.



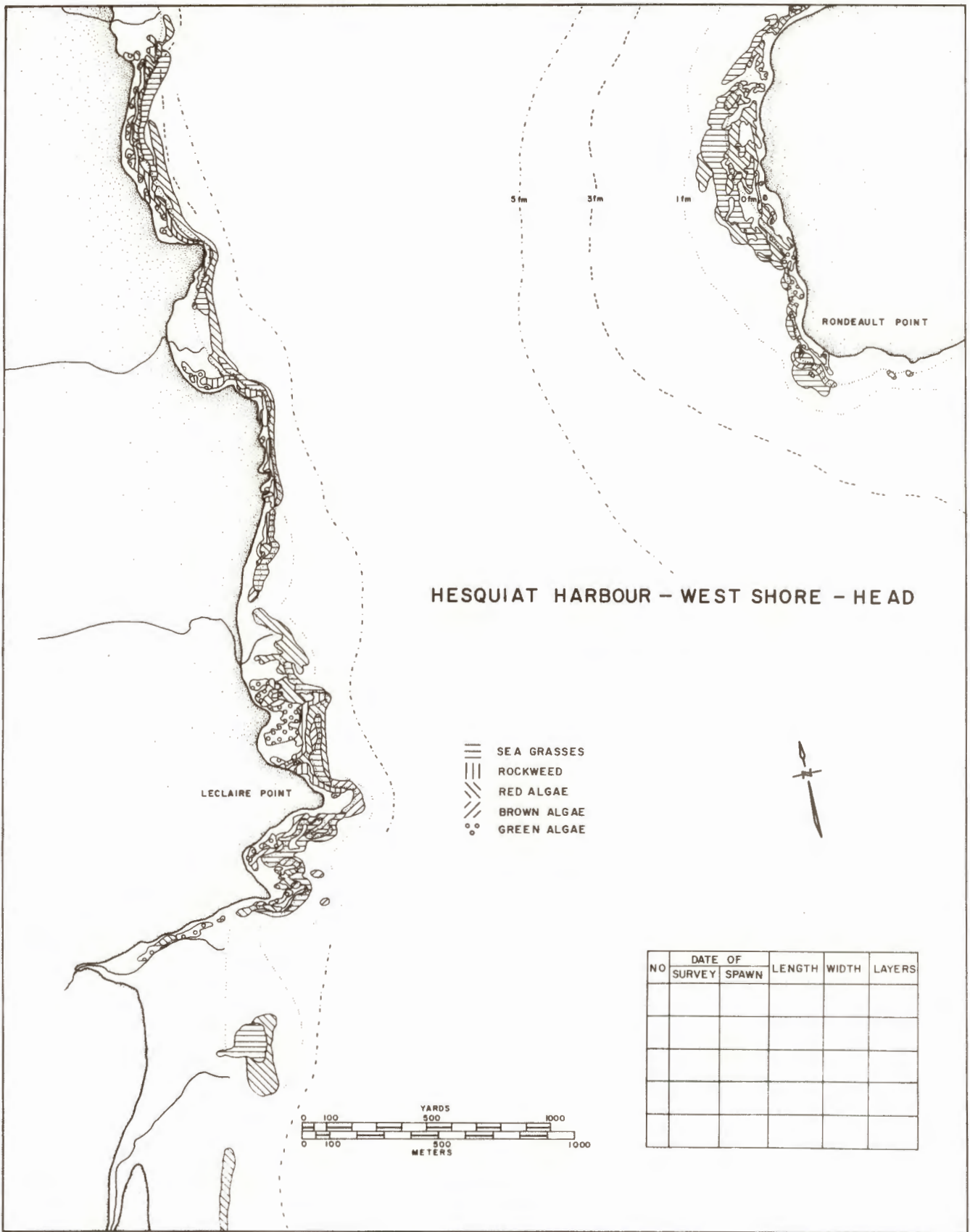
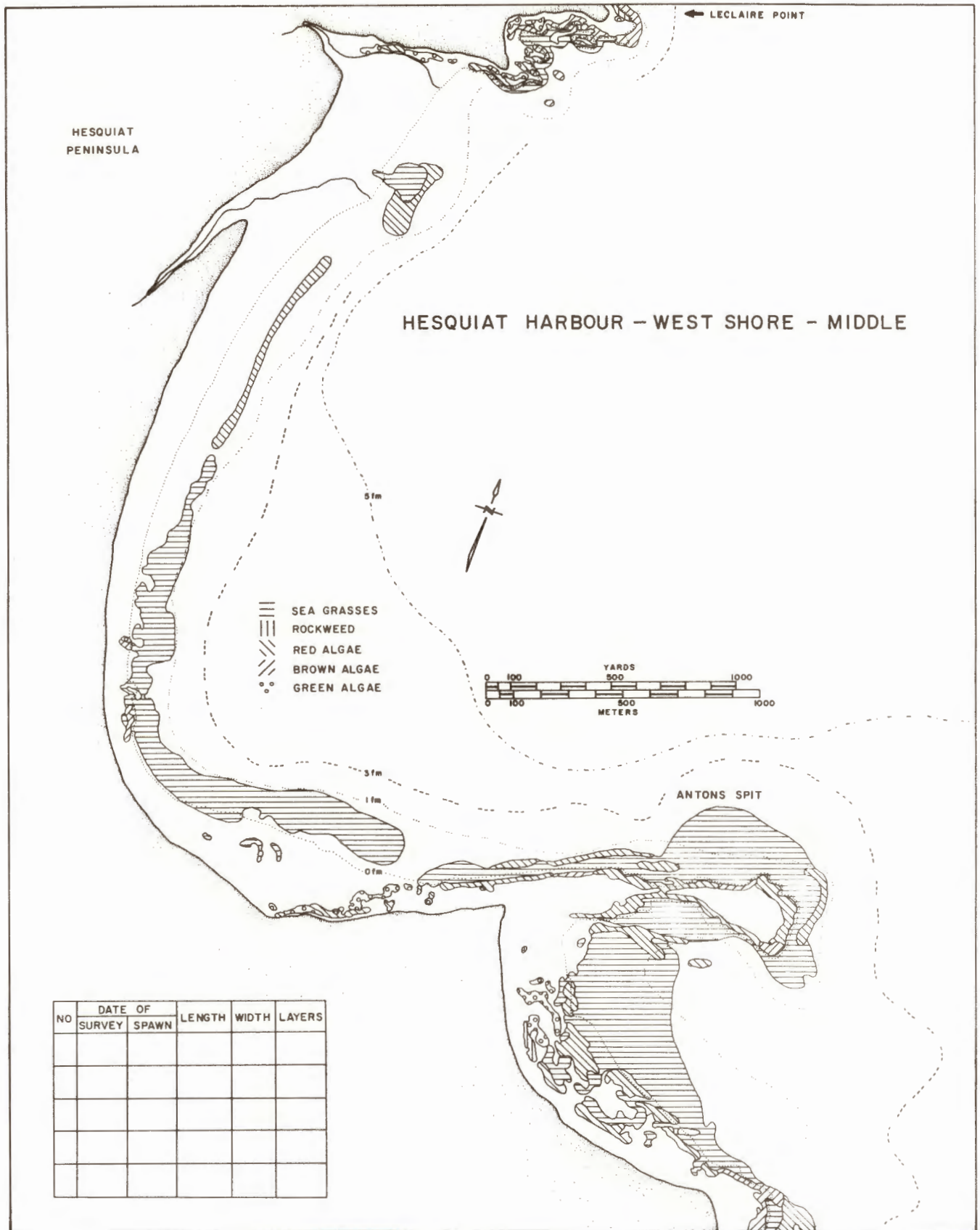


Fig. 11. Hesquiat Harbour - west shore - head.





NO	DATE OF		LENGTH	WIDTH	LAYERS
	SURVEY	SPAWN			

Fig. 12. Hesquiat Harbour - west shore - middle.





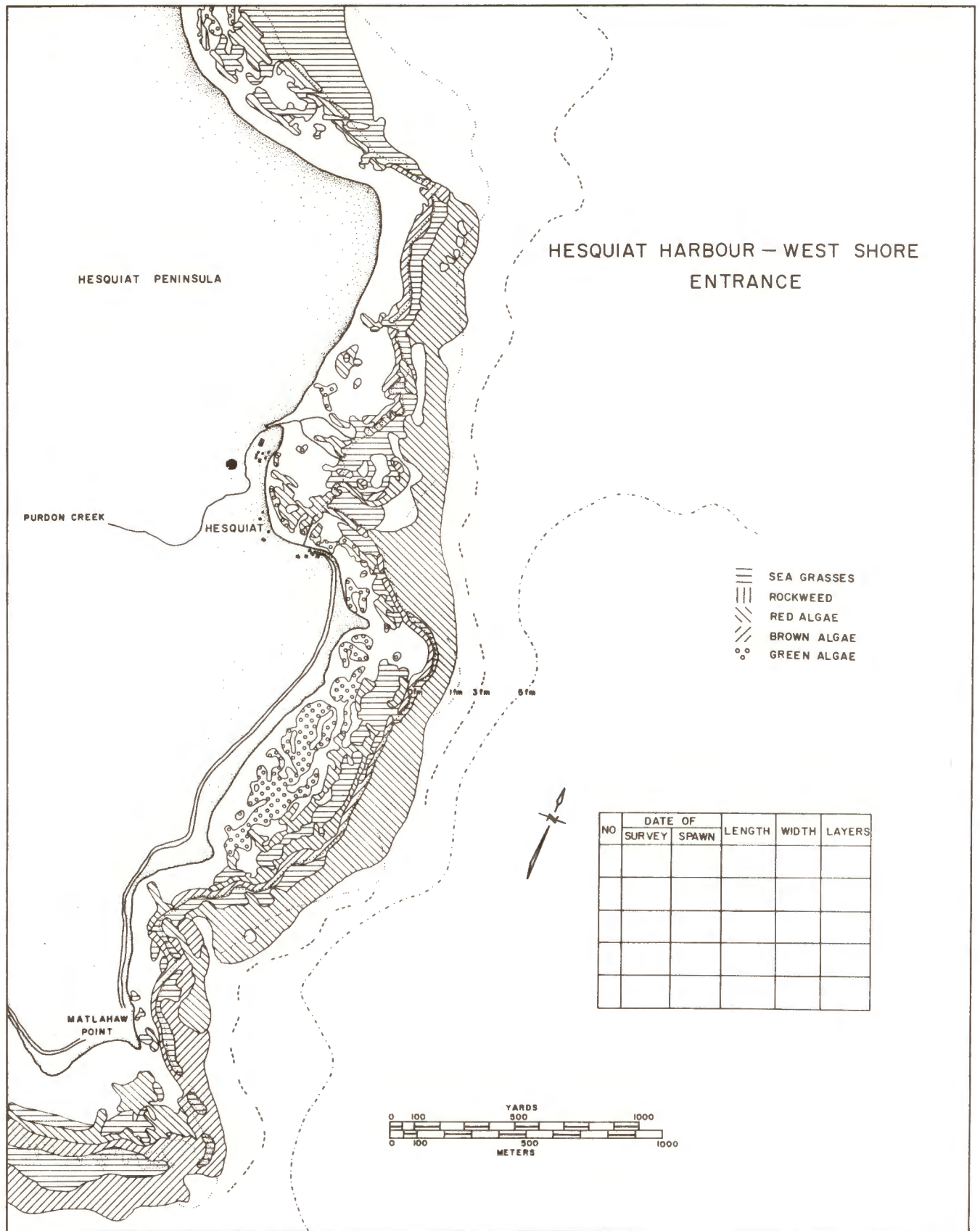


Fig. 13. Hesquiat Harbour - west shore - entrance.



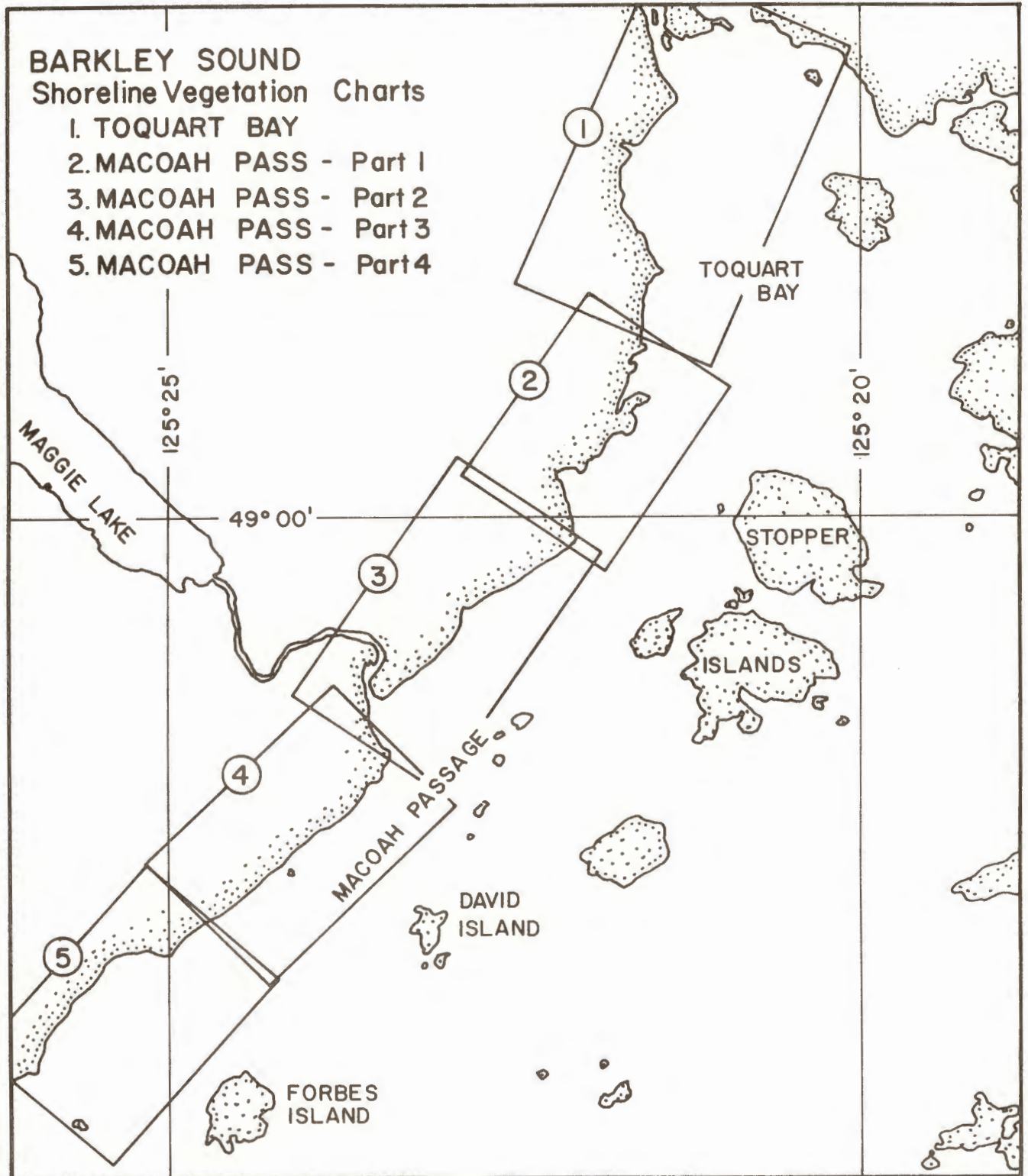


Fig. 14. Shoreline vegetation charts for Barkley Sound.



# BARKLEY SOUND - TOQUART BAY



- ||| SEA GRASSES
- |||| ROCKWEED
- //// RED ALGAE
- \\\\\\ BROWN ALGAE
- o o GREEN ALGAE

NO.	DATE OF		LENGTH	WIDTH	INT.
	SURVEY	SPAWN			

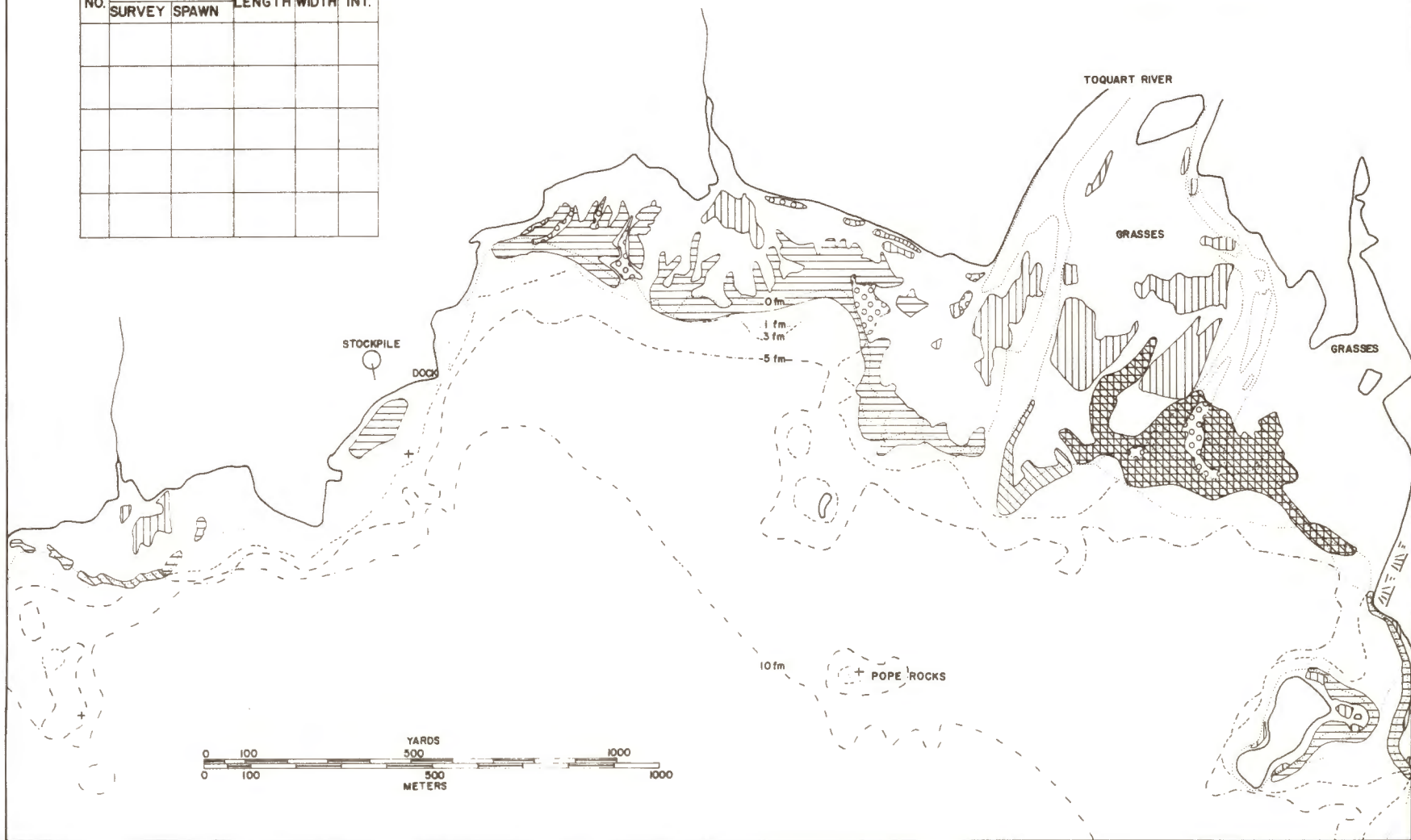
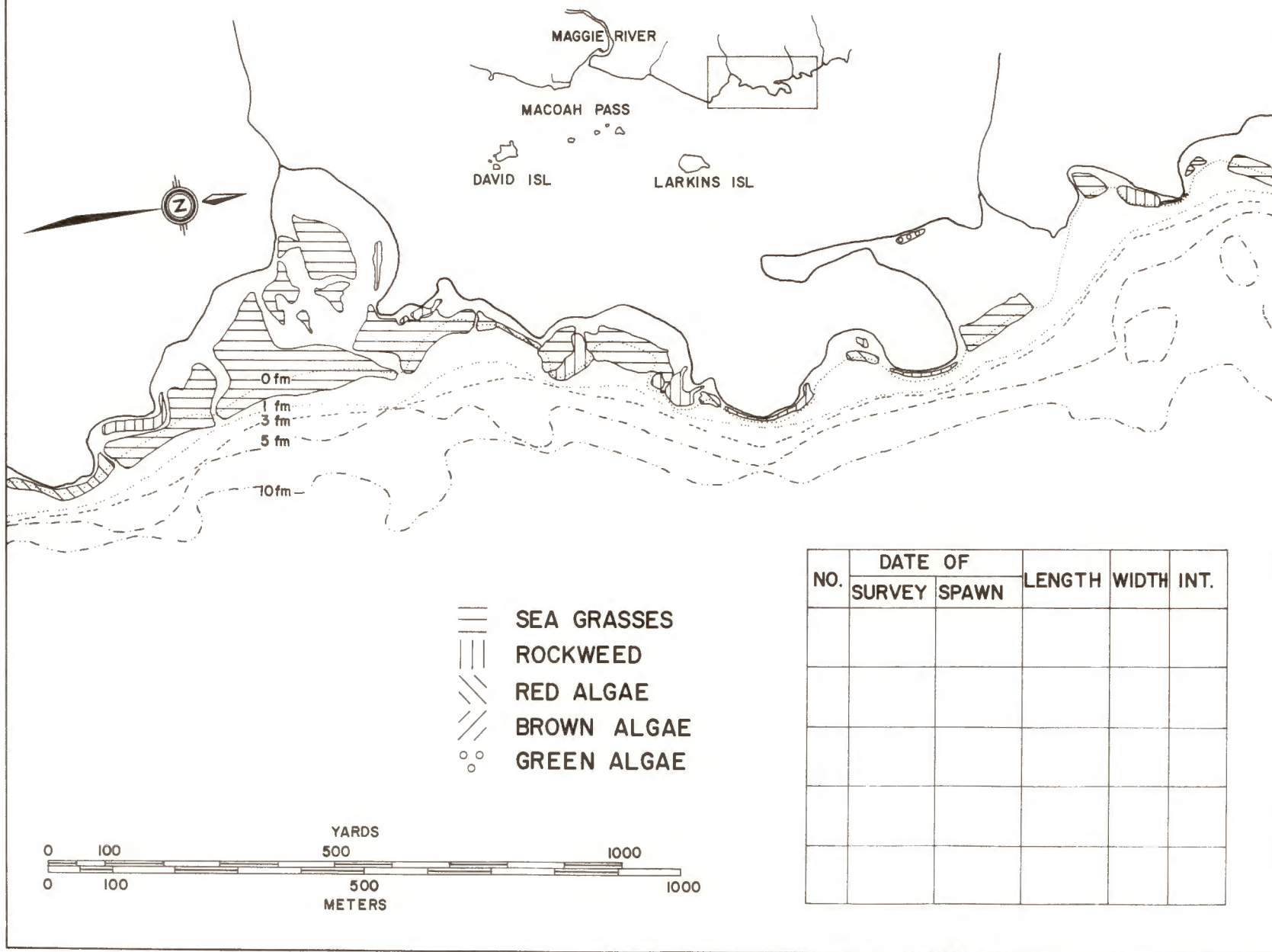


Fig. 15. Toquart Bay.



# BARKLEY SOUND - MACOAH PASS - Part I



NO.	DATE OF		LENGTH	WIDTH	INT.
	SURVEY	SPAWN			

Fig. 16. Macoah Passage - part 1.





# BARKLEY SOUND - MACOAH PASS - Part 2

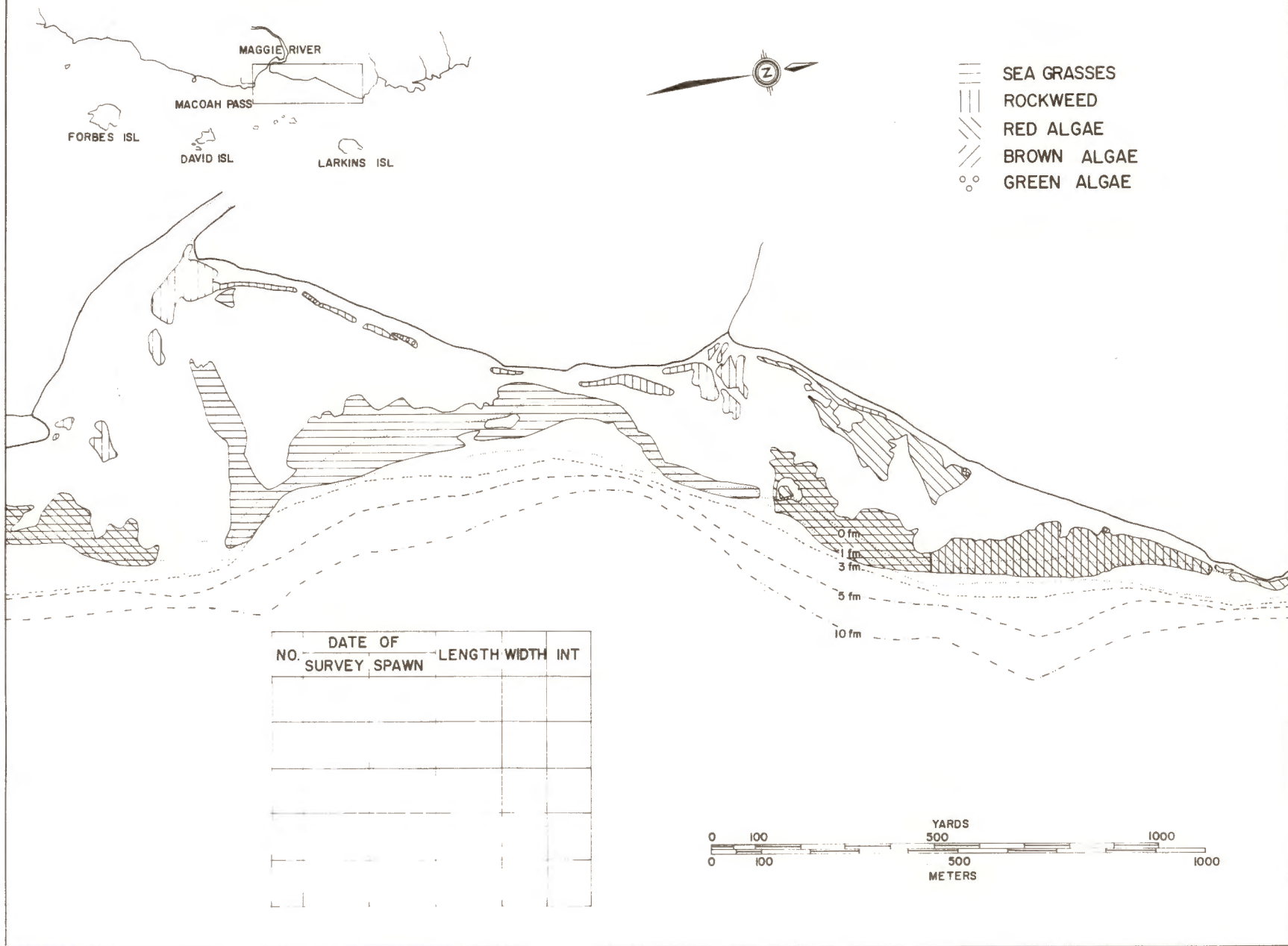
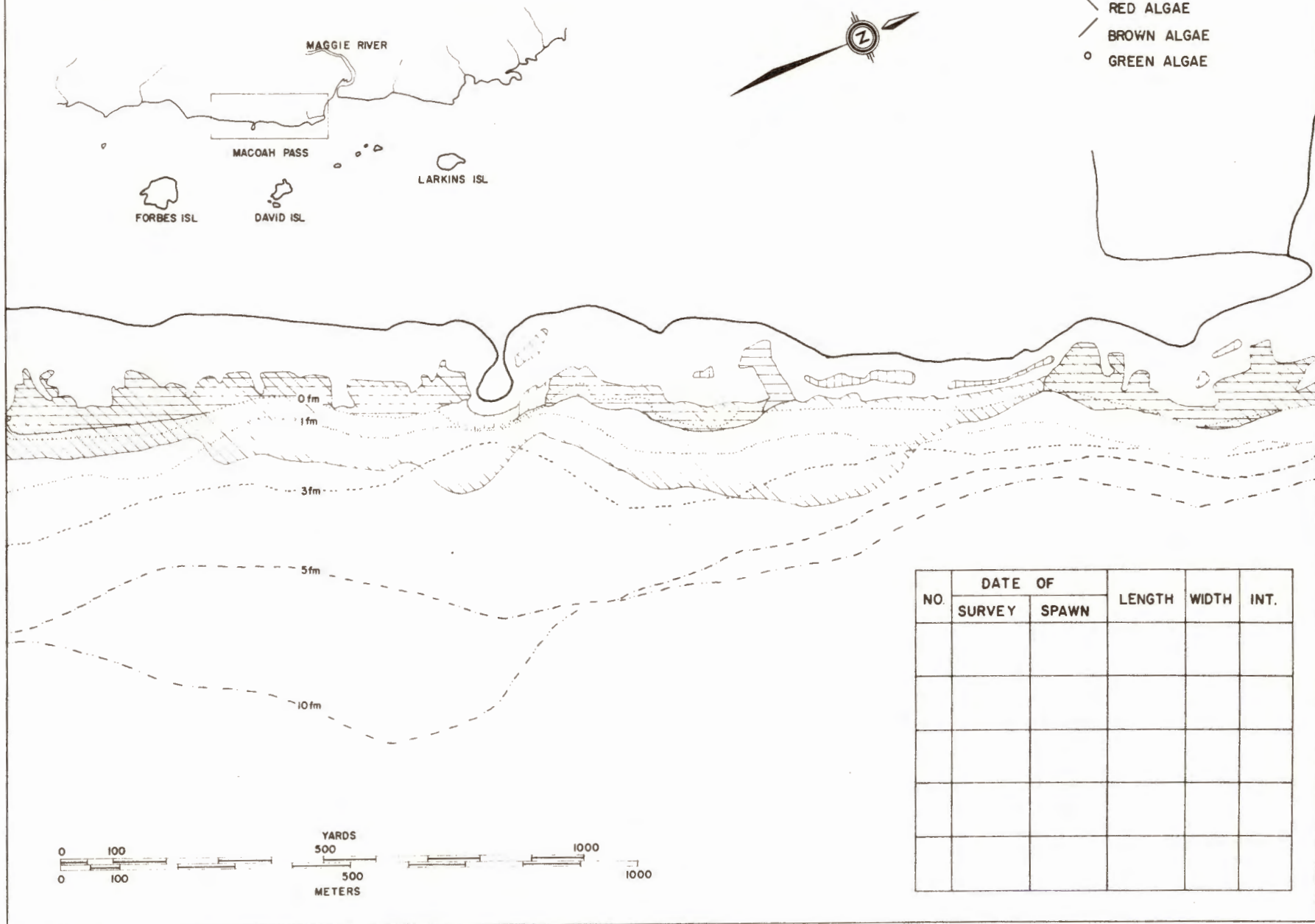


Fig. 17. Macoah Passage - part 2.



# BARKLEY SOUND - MACOAH PASS - Part 3

- SEA GRASSES
- | ROCKWEED
- RED ALGAE
- BROWN ALGAE
- GREEN ALGAE



NO.	DATE OF		LENGTH	WIDTH	INT.
	SURVEY	SPAWN			

Fig. 18. Macoah Passage - part 3.



# BARKLEY SOUND - MACOAH PASS - Part 4

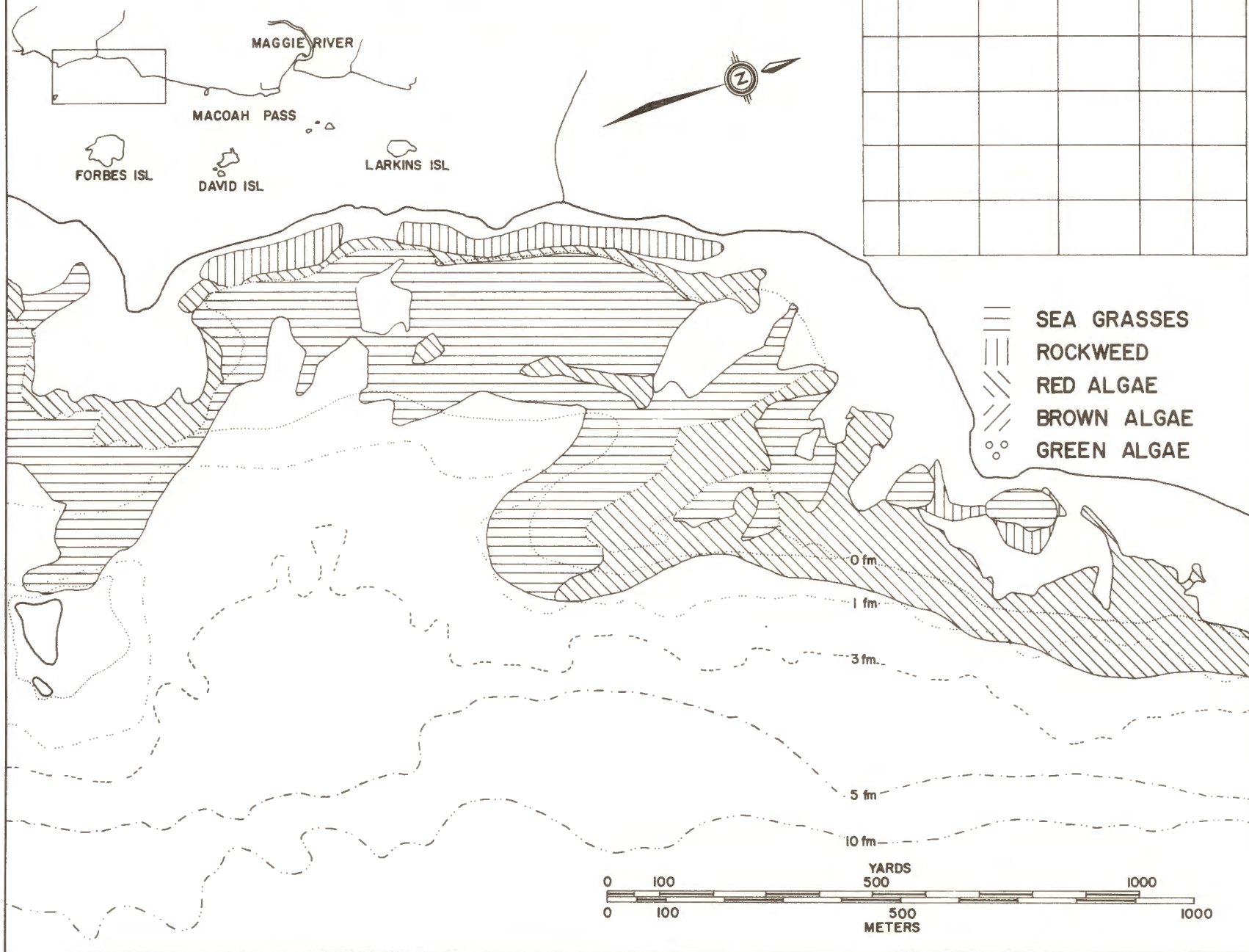


Fig. 19. Macoah Passage - part 4.