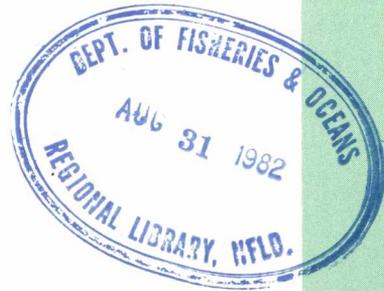


Shoreline Vegetation on Herring Spawning Grounds in Kitkatla Channel, British Columbia

C. W. Haegele and M. J. Hamey

Department of Fisheries and Oceans
Fisheries Research Branch
Pacific Biological Station
Nanaimo, British Columbia V9R 5K6



May 1982

**Canadian Manuscript Report of
Fisheries and Aquatic Sciences
No. 1664**



Government of Canada
Fisheries and Oceans

Gouvernement du Canada
Pêches et Océans

Canadian Manuscript Report of Fisheries and Aquatic Sciences

These reports contain scientific and technical information that represents an important contribution to existing knowledge but which for some reason may not be appropriate for primary scientific (i.e. *Journal*) publication. They differ from Technical Reports in terms of subject scope and potential audience: Manuscript Reports deal primarily with national or regional problems and distribution is generally restricted to institutions or individuals located in particular regions of Canada. No restriction is placed on subject matter and the series reflects the broad interests and policies of the Department of Fisheries and Oceans, namely, fisheries management, technology and development, ocean sciences, and aquatic environments relevant to Canada.

Manuscript Reports may be cited as full publications. The correct citation appears above the abstract of each report. Each report will be abstracted by *Aquatic Sciences and Fisheries Abstracts* and will be indexed annually in the Department's index to scientific and technical publications.

Numbers 1-900 in this series were issued as Manuscript Reports (Biological Series) of the Biological Board of Canada, and subsequent to 1937 when the name of the Board was changed by Act of Parliament, as Manuscript Reports (Biological Series) of the Fisheries Research Board of Canada. Numbers 901-1425 were issued as Manuscript Reports of the Fisheries Research Board of Canada. Numbers 1426-1550 were issued as Department of Fisheries and the Environment, Fisheries and Marine Service Manuscript Reports. The current series name was changed with report number 1551.

Details on the availability of Manuscript Reports in hard copy may be obtained from the issuing establishment indicated on the front cover.

Rapport manuscrit canadien des sciences halieutiques et aquatiques

Ces rapports contiennent des renseignements scientifiques et techniques qui constituent une contribution importante aux connaissances actuelles mais qui, pour une raison ou pour une autre, ne semblent pas appropriés pour la publication dans un journal scientifique. Ils se distinguent des Rapports techniques par la portée du sujet et le lecteur visé; en effet, ils s'attachent principalement à des problèmes d'ordre national ou régional et la distribution en est généralement limitée aux organismes et aux personnes de régions particulières du Canada. Il n'y a aucune restriction quant au sujet; de fait, la série reflète la vaste gamme des intérêts et des politiques du Ministère des Pêches et des Océans, notamment gestion des pêches; techniques et développement, sciences océaniques et environnements aquatiques, au Canada.

Les Manuscrits peuvent être considérés comme des publications complètes. Le titre exact paraît au haut du résumé de chaque rapport, qui sera publié dans la revue *Aquatic Sciences and Fisheries Abstracts* et qui figurera dans l'index annuel des publications scientifiques et techniques du Ministère.

Les numéros de 1 à 900 de cette série ont été publiés à titre de manuscrits (Série biologique) de l'Office de biologie du Canada, et après le changement de la désignation de cet organisme par décret du Parlement, en 1937, ont été classés en tant que manuscrits (Série biologique) de l'Office des recherches sur les pêcheries du Canada. Les numéros allant de 901 à 1425 ont été publiés à titre de manuscrits de l'Office des recherches sur les pêcheries du Canada. Les numéros 1426 à 1550 ont été publiés à titre de Rapport manuscrits du Service des pêches et de la mer, Ministère des Pêches et de l'Environnement. Le nom de la série a été changé à partir du rapport numéro 1551.

La page couverture porte le nom de l'établissement auteur où l'on peut se procurer les rapports sous couverture cartonnée.

Canadian Manuscript Report of Fisheries
and Aquatic Sciences No. 1664

May 1982

SHORELINE VEGETATION ON HERRING SPAWNING GROUNDS
IN KITKATLA CHANNEL, BRITISH COLUMBIA

by

C. W. Haegele and M. J. Hamey¹

Department of Fisheries and Oceans
Fisheries Research Branch
Pacific Biological Station
Nanaimo, British Columbia V9R 5K6

¹Address: P. O. Box 34
Zeballos, British Columbia V0P 2A0

(c) Minister of Supply and Services Canada 1982

Cat. No. Fs 97-4/1664

ISSN 0706-6473

PREFACE

After the development of methods in 1973 and 1974, a project was initiated at the Pacific Biological Station in Nanaimo to map the shoreline marine vegetation on herring spawning grounds from aerial photographs. Below are listed the geographical areas included in this project, the year of photography and the state of completion of mapping. Completed maps have been published as Fisheries and Marine Service Manuscript Reports and MS numbers are given where applicable.

Locality	Year of photography	Mapping-state of completion
STRAIT OF GEORGIA		
Comox Harbour to Deep Bay	1979	complete (MS 1617)
Denman and Hornby Islands	1979	complete (MS 1617)
Deep Bay to Dorcas Point	1979	complete (MS 1485)
Dorcas Point to Departure Bay	1975	complete (MS 1408)
Dodd Narrows to Ladysmith Harbour	1977	complete (MS 1534)
Thetis and Kuper Islands	1977	complete (MS 1534)
Ganges and Long Harbours	1975	complete (MS 1408)
Prevost Island	1975	complete (MS 1408)
WEST COAST OF VANCOUVER ISLAND		
Winter Harbour	1981	status uncertain
Holberg Inlet	1981	status uncertain
Brooks Bay	1981	status uncertain
Nuchatlitz Inlet	1976	complete (MS 1430)
Nootka Sound	1976	complete (MS 1430)
Hesquiat Harbour	1976	complete (MS 1430)
Clayoquot Sound	1978	complete (MS 1536)
Barkley Sound	1974, 1978	complete (MS 1549)
CENTRAL COAST		
Laredo Sound	1979	complete (MS 1580)
Thompson Bay	1979	complete (MS 1579)
Kildidt Sound	1979	complete (MS 1592)
NORTH COAST		
Port Simpson to Big Bay	1980	complete (MS in prep)
Kitkatla Inlet	1980	complete (this MS)
QUEEN CHARLOTTE ISLANDS		
Cumshewa Inlet	1979	complete (MS 1619)
Skincuttle Inlet	1982	status uncertain

ABSTRACT

Haegele, C. W., and M. J. Hamey. 1982. Shoreline vegetation on herring spawning grounds in Kitkatla Channel, British Columbia. Can. MS Rep. Fish. Aquat. Sci. 1664: iv + 29 p.

Shoreline vegetation maps were developed for Kitkatla Channel from 1:6,000 photographic scale 23 cm format colour and colour infrared diapositives. Eighty km of coastline were mapped from 453 photographs.

Key words: Marine vegetation, aerial photography, mapping.

RÉSUMÉ

Haegele, C. W., and M. J. Hamey. 1982. Shoreline vegetation on herring spawning grounds in Kitkatla Channel, British Columbia. Can. MS Rep. Fish. Aquat. Sci. 1664: iv + 29 p.

Des cartes de répartition de la végétation littorale du chenal Kitkatla ont été dressées à partir de diapositives de 23 cm en couleur et à l'infra-rouge, prises à échelle photographique de 1:6 000. Quatre-vingts km de littoral ont été cartographiés à l'aide de 453 photographies.

Mots-clés: végétation marine, photographie aérienne, cartographie.

INTRODUCTION

Pacific herring deposit adhesive eggs on rooted algae and sea grasses in the littoral and upper sub-littoral zone. These spawnings are surveyed annually to provide estimates of egg deposition and, hence, stock size. Maps of marine vegetation, obtained from aerial photographs, are used to record and assess these spawnings.

The subject of this report is vegetation maps for Kitkatla Channel on the north coast of British Columbia ($53^{\circ}49'N$ to $53^{\circ}58'N$ and $130^{\circ}20'W$ to $130^{\circ}42'W$).

METHODS

Vertical aerial photographs of 23 cm format at a photo scale of 1:6,000 were obtained for the shorelines in Kitkatla Channel. The photography was acquired with a Wild RC10 camera with a 152 mm focal length lens mounted in a Cessna 180 fixed wing aircraft and at an altitude of 914 m. There were 16 flight lines with parallel flight lines at 20% lateral overlap (Fig. 1). Forward overlap between frames was 60%. Photography was with Kodak Ektachrome MS Aerographic No. 2448 (COL) film and Kodak Aerochrome Infrared No. 2443 (CIR) film, both of which are colour positive films. A clear (420 nm) filter was used with the COL film and a medium yellow (525 nm) filter was used with the CIR film.

The shoreline marine vegetation was mapped at the scale of photography. Canadian Hydrographic Service Navigation Chart No. 3761 (scale of 1:36,530) was used as a base map and enlarged to photo scale with a reflecting projector.

Exposed vegetation was identified from the CIR diapositives by colour and texture, employing a key previously developed (Haegele 1975). Briefly, on CIR film, grasses appear pinkish red with a smooth to fluffy texture; rockweed is crimson with a rough texture; kelp and other brown algae such as Sargassum muticum are bright magenta with a smooth to fluffy texture; red algae are light red with a rough texture. Submerged vegetation was mapped from the COL diapositives mostly by texture since the colour information is confined to the narrow spectral range of dark green to light brown. Against a light background of sand, vegetation can be discerned to depths of 10 m in the absence of surface reflection.

RESULTS

The CIR imagery was obtained between 1002 and 1219 PST on June 4, 1980, for which day the predicted low tide was 1.2 m at 1120 PST. The COL imagery was obtained between 1247 and 1356 PST on June 6, 1980, for which day the predicted low tide was 1.7 m at 1325 PST. There were 226 CIR photographs on flight lines 3-16 and 227 COL photographs on flight line 1-12, part of flight line 14 and flight lines 15 and 16 (Fig. 1).

The study area was segmented into 12 maps of equal size (64 cm by 83 cm), each portraying an area of 19.1 km² at a photo scale of 1:6000 (Fig. 2). The vegetation, as mapped from the photographs, is presented on these 12 maps in Figs. 3-14. The published maps have been reduced photographically to a map scale of 1:24,000.

The vegetation has not been field checked by divers because of constraints of time and cost.

ACKNOWLEDGMENTS

We would like to thank Parker Williams and Dr. T. A. Rutherford of Integrated Resources Photography Ltd. for obtaining the excellent photographs.

REFERENCES

- Haegele, C. W. 1975. Vegetation mapping of herring spawning grounds in British Columbia. Ocean 75 Record. IEEE Publication 75OH0995-10EC. New York, N.Y. pp. 840-844.

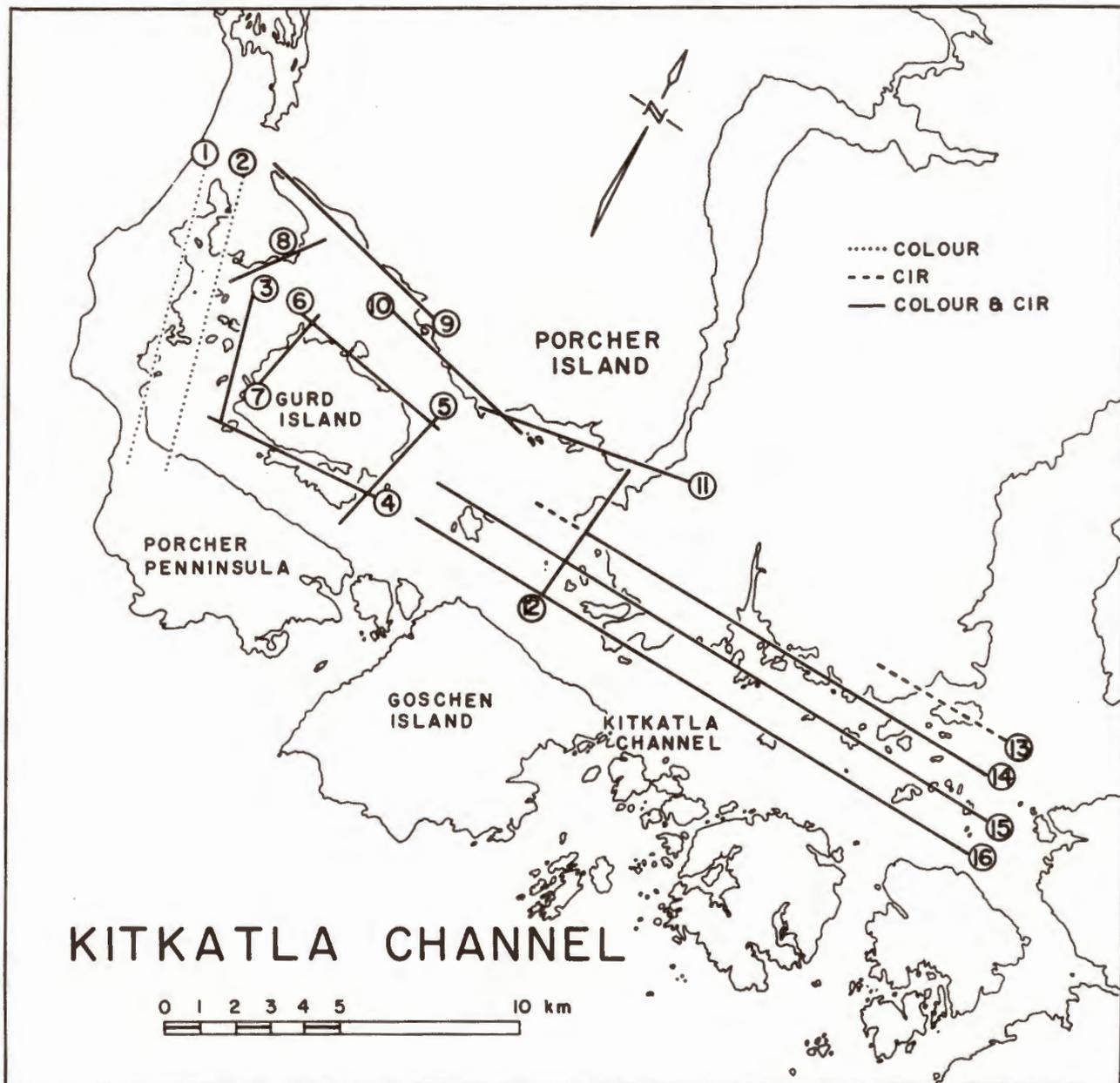


Fig. 1. Photographic flight lines for Kitkatla Channel.

Fig. 2. Kitkatla Channel shoreline segmented into large-scale maps.

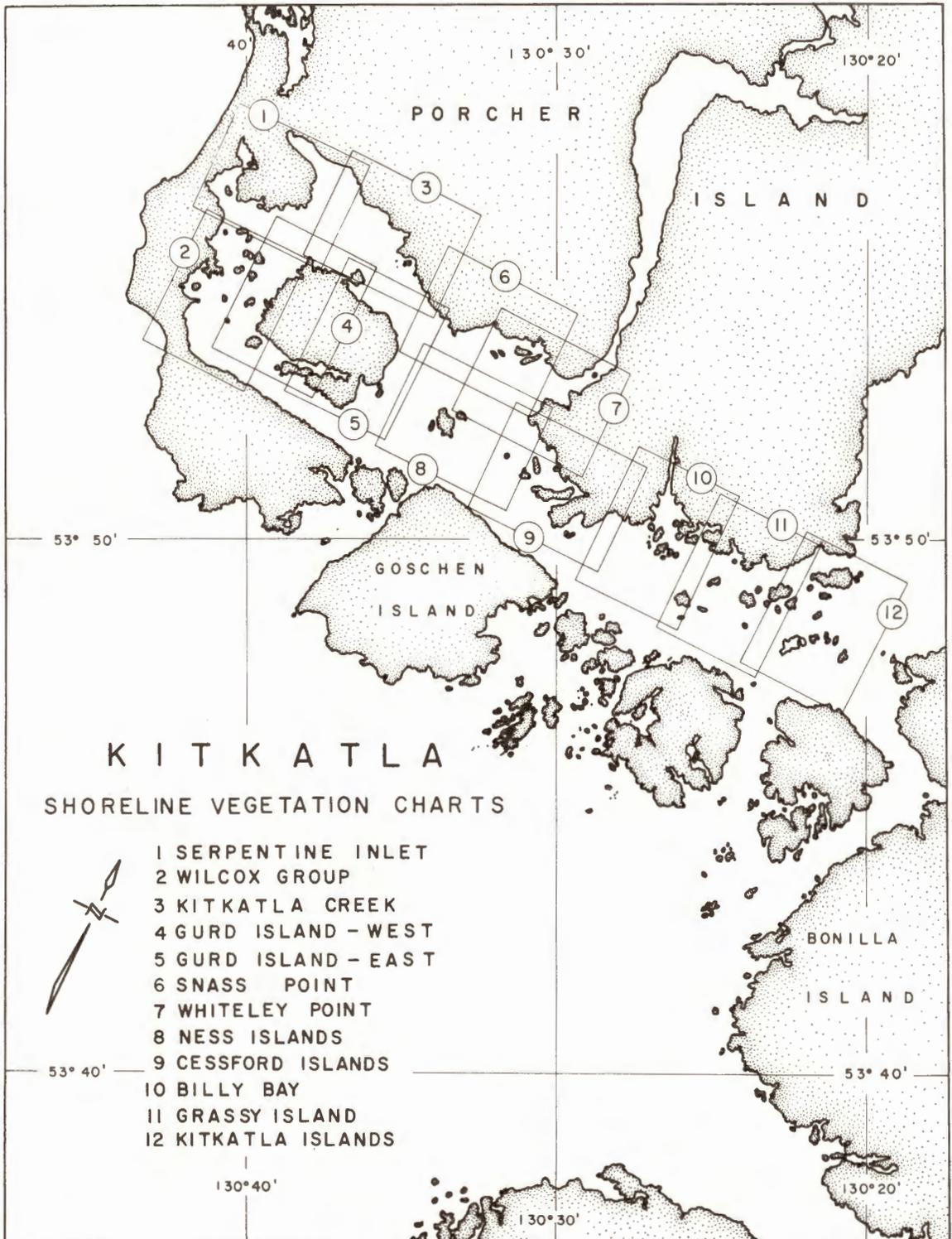


Fig. 3. Shoreline vegetation map from aerial photographs for Serpentine Inlet (map 1 in Fig. 2).

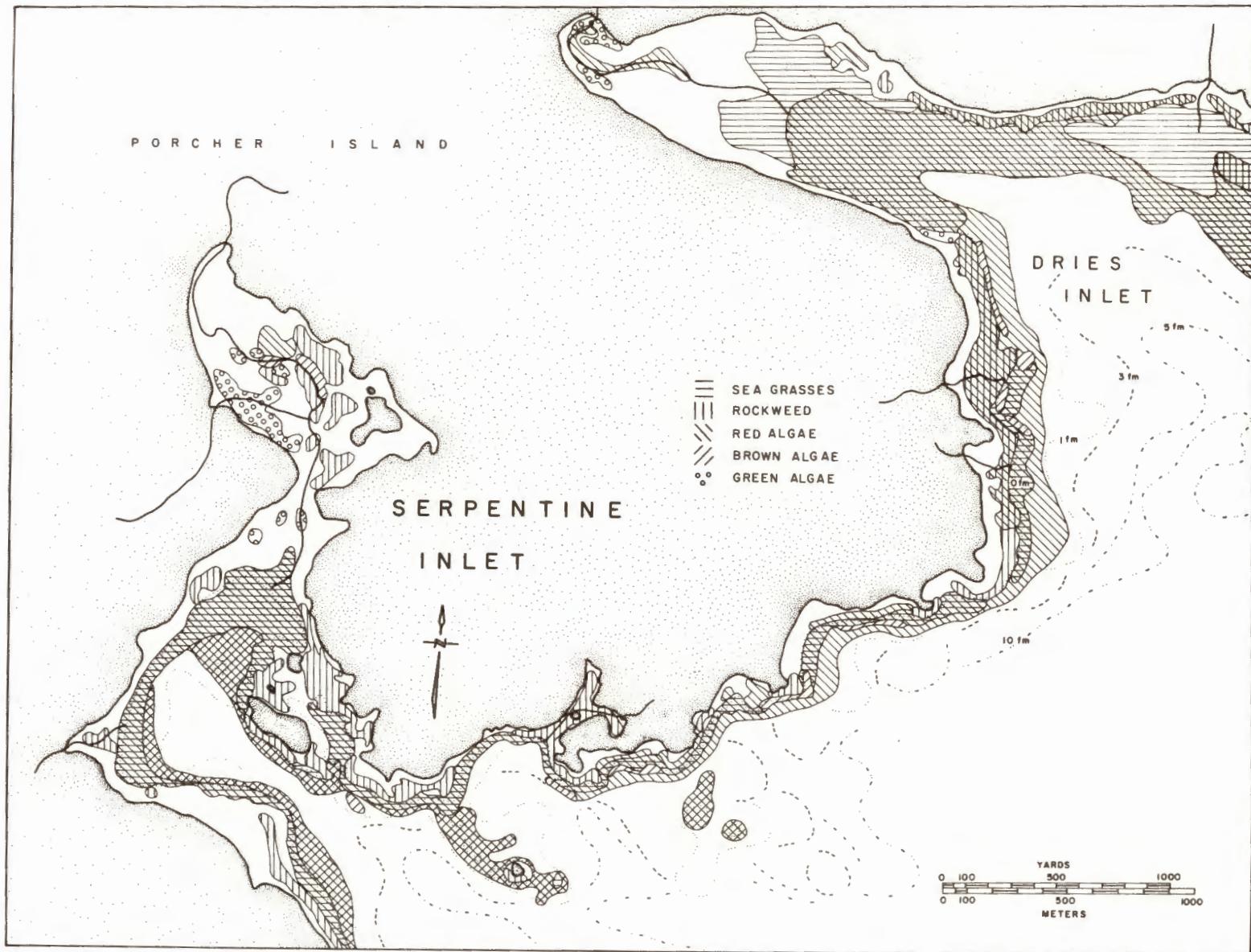


Fig. 4. Shoreline vegetation map from aerial
photographs for the Wilcox Group (map 2 in Fig. 2).

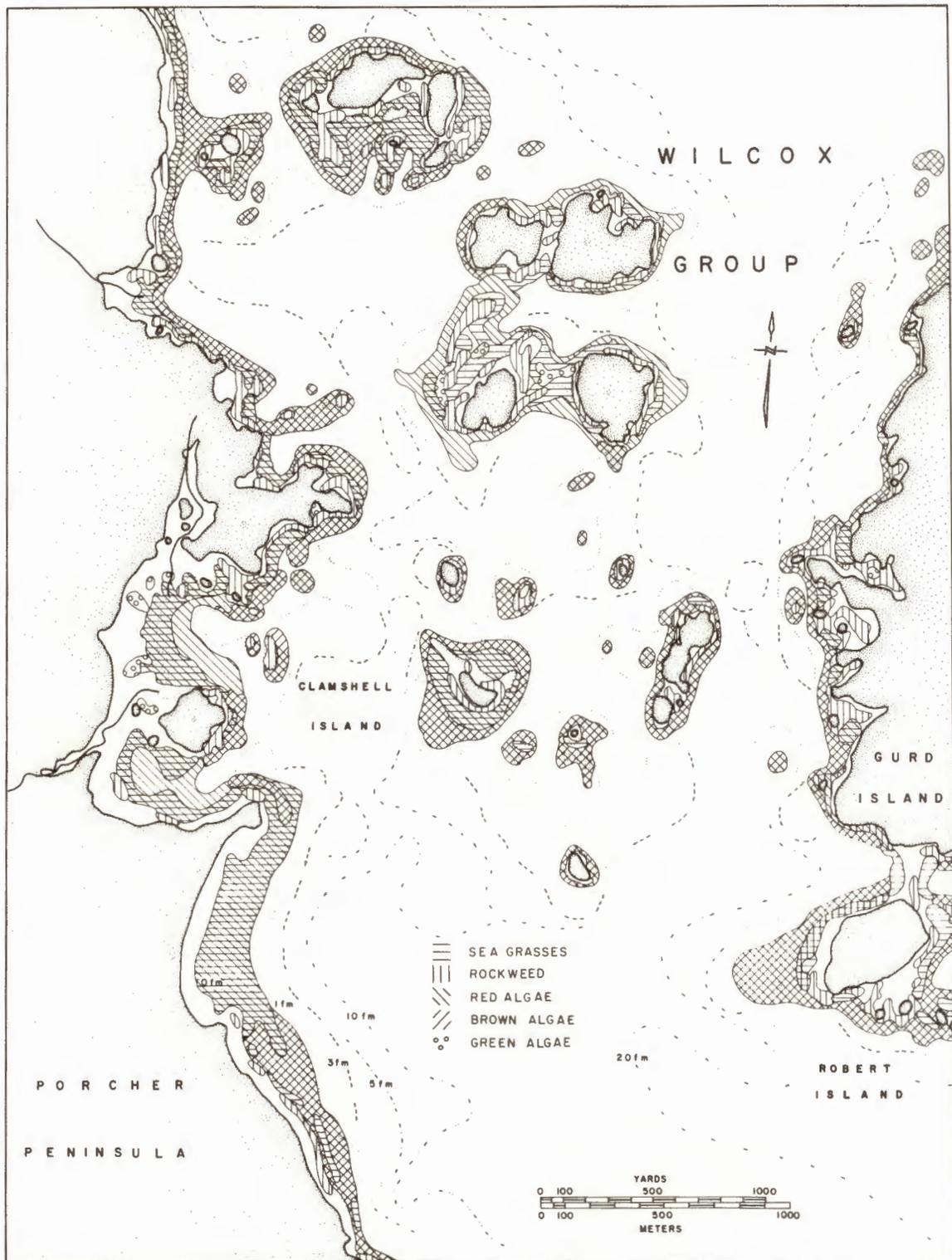


Fig. 5. Shoreline vegetation map from aerial photographs for Kitkatla Creek (map 3 in Fig. 2).

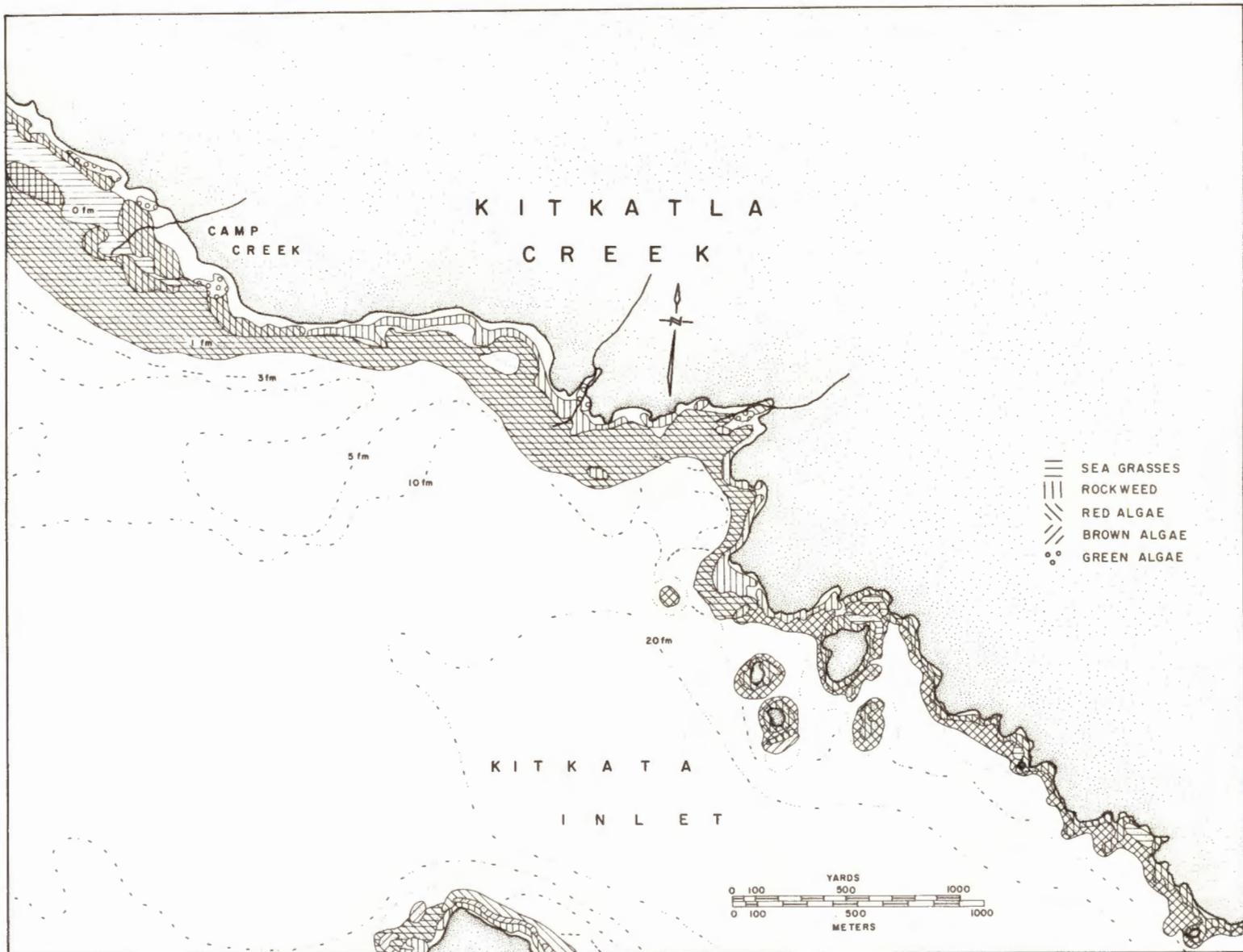


Fig. 6. Shoreline vegetation map from aerial photographs
for Gurd Island-West (map 4 in Fig. 2).

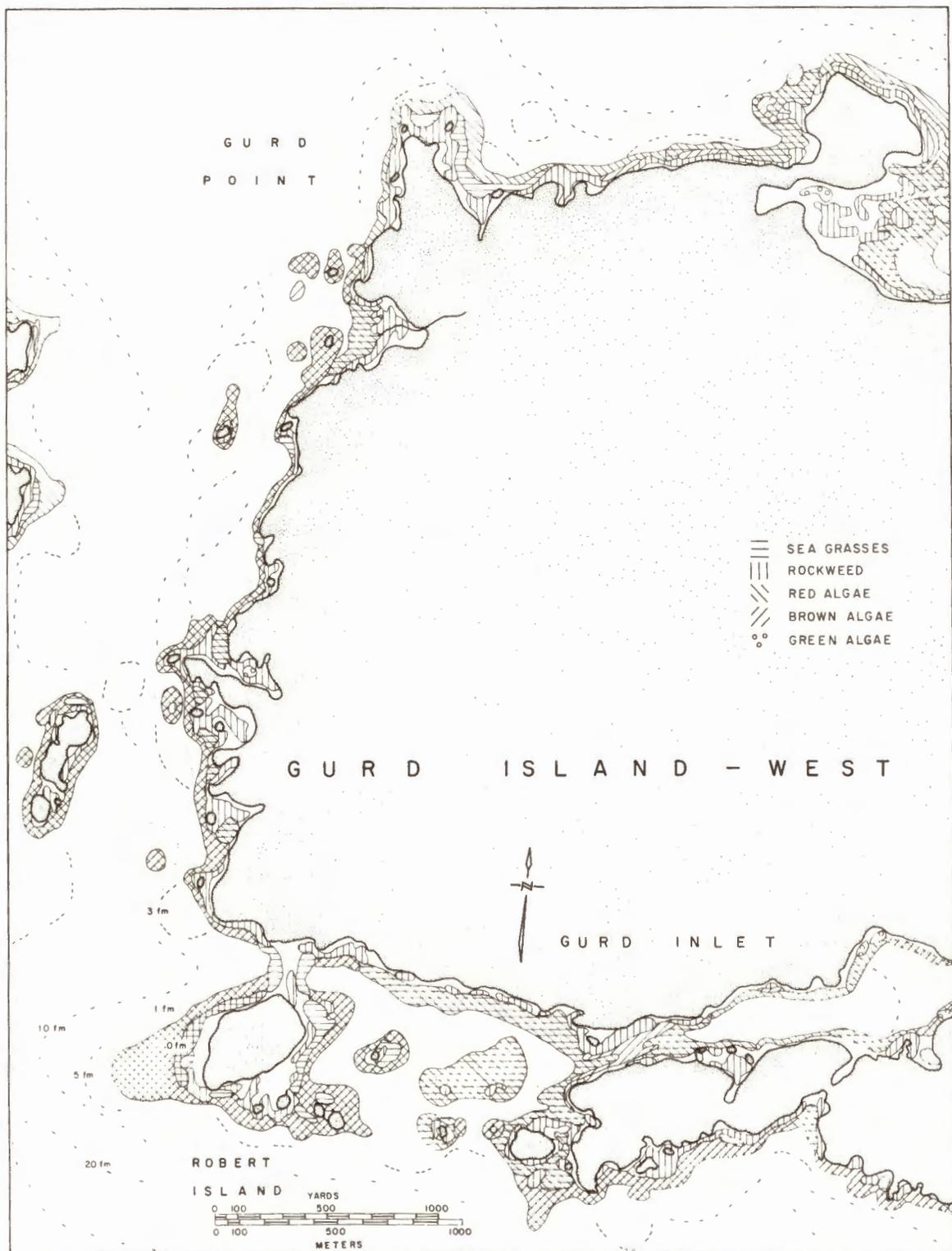


Fig. 7. Shoreline vegetation map from aerial photographs for Gurd Island-East (map 5 in Fig. 2).

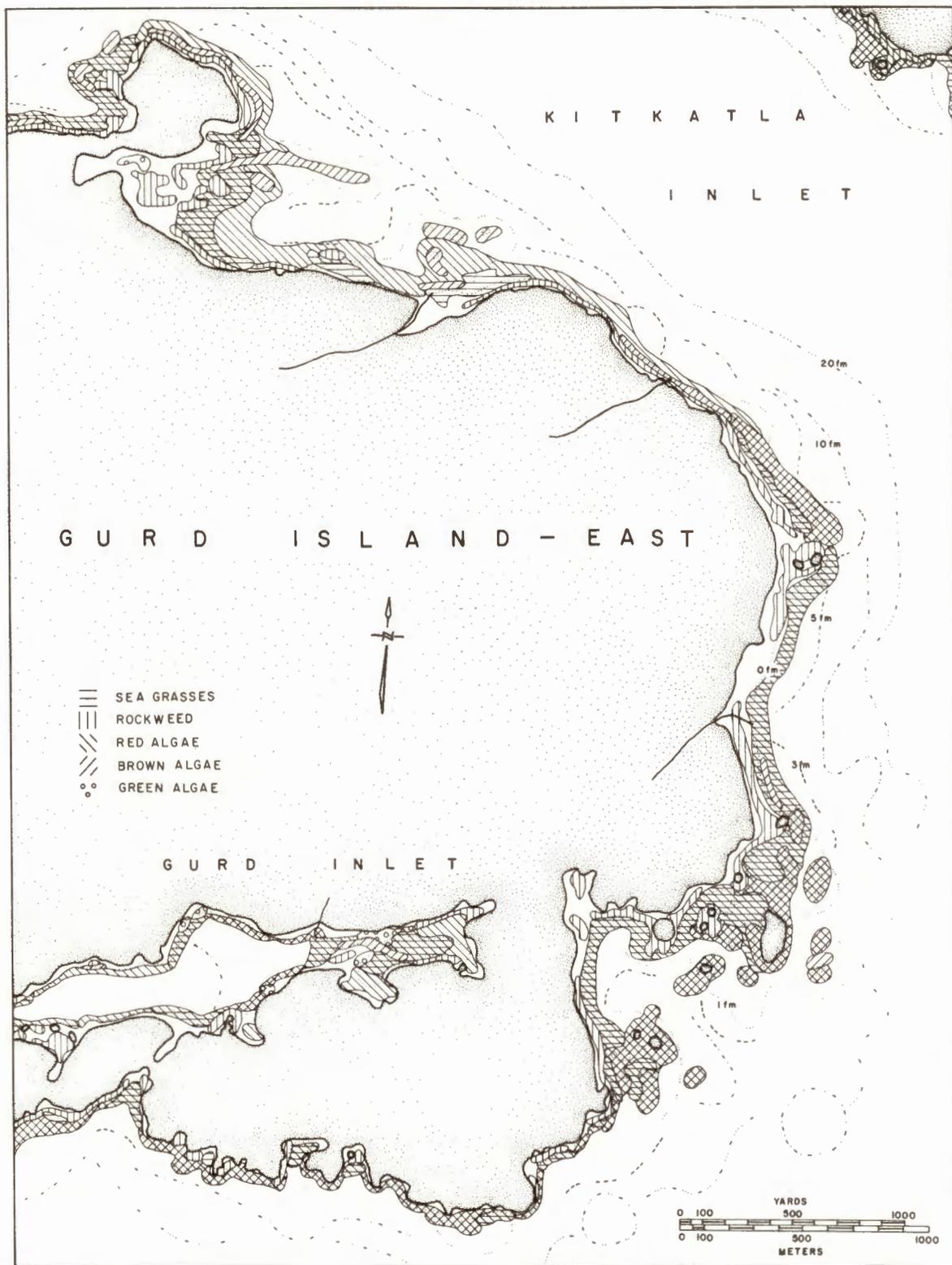


Fig. 8. Shoreline vegetation map from aerial photographs for Snass Point (map 6 in Fig. 2).

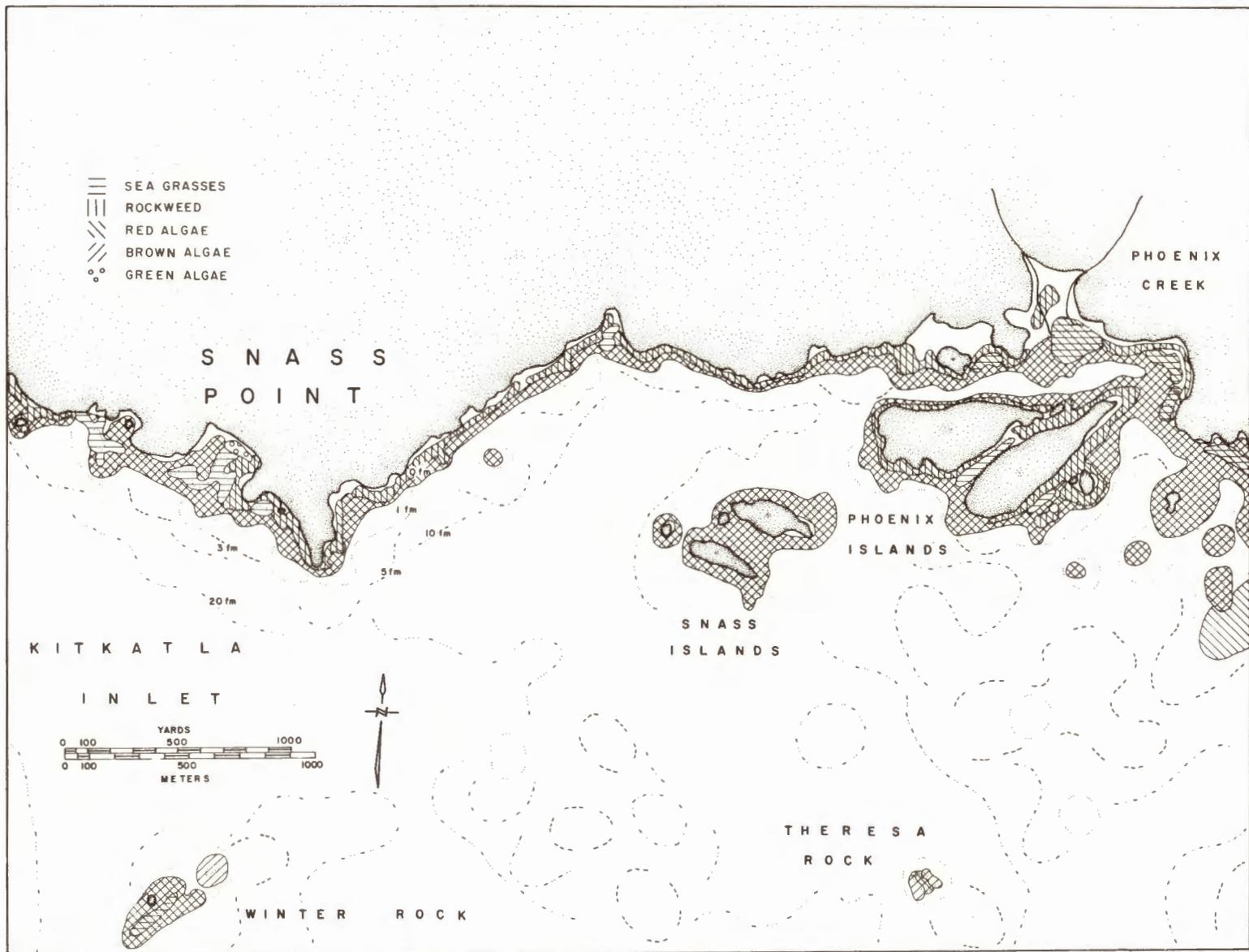


Fig. 9. Shoreline vegetation map from aerial photographs for Whiteley Point (map 7 in Fig. 2).

Fig. 10. Shoreline vegetation map from aerial photographs for
Ness Islands (map 8 in Fig. 2).

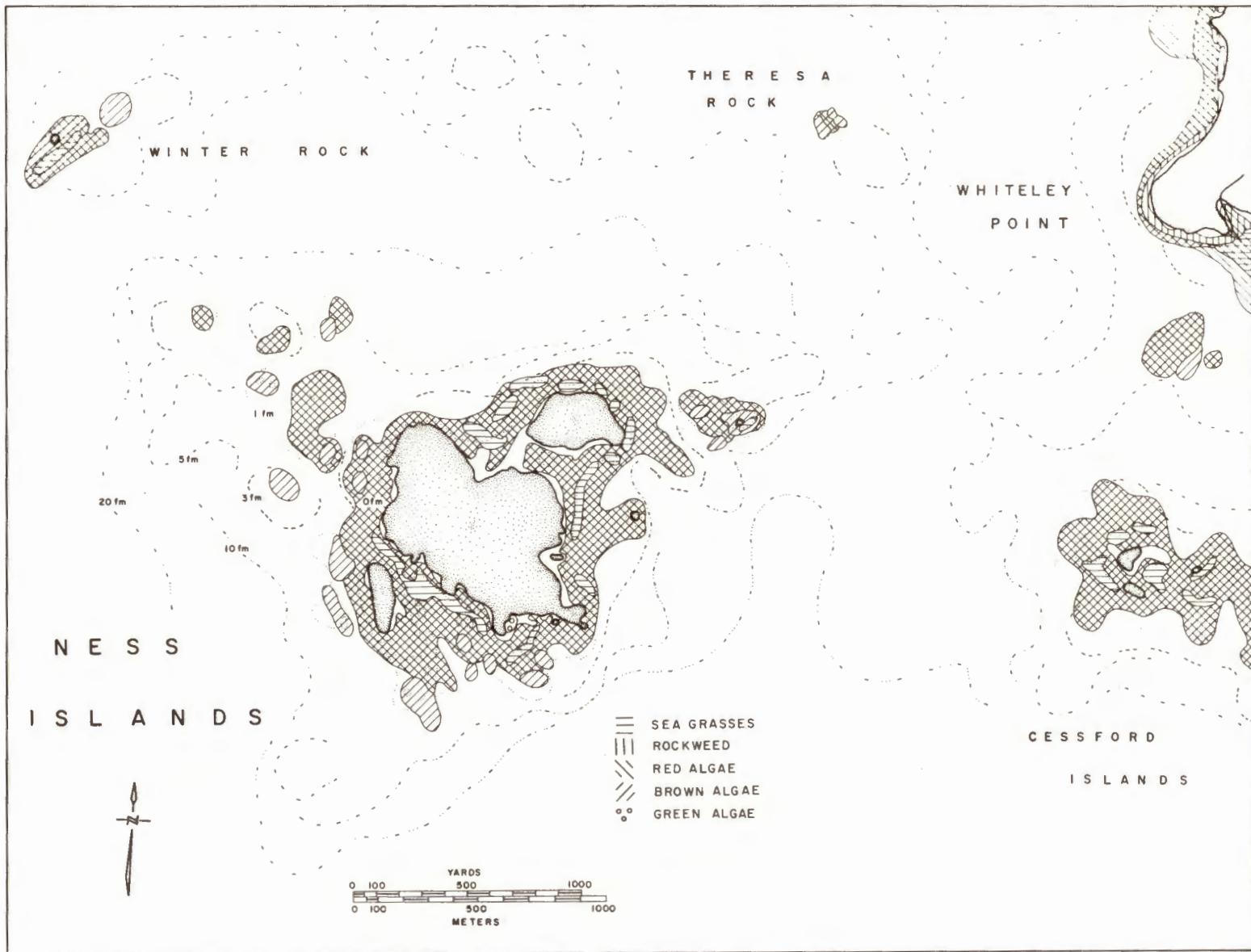


Fig. 11. Shoreline vegetation map from aerial photographs for Cessford Islands (map 9 in Fig. 2).

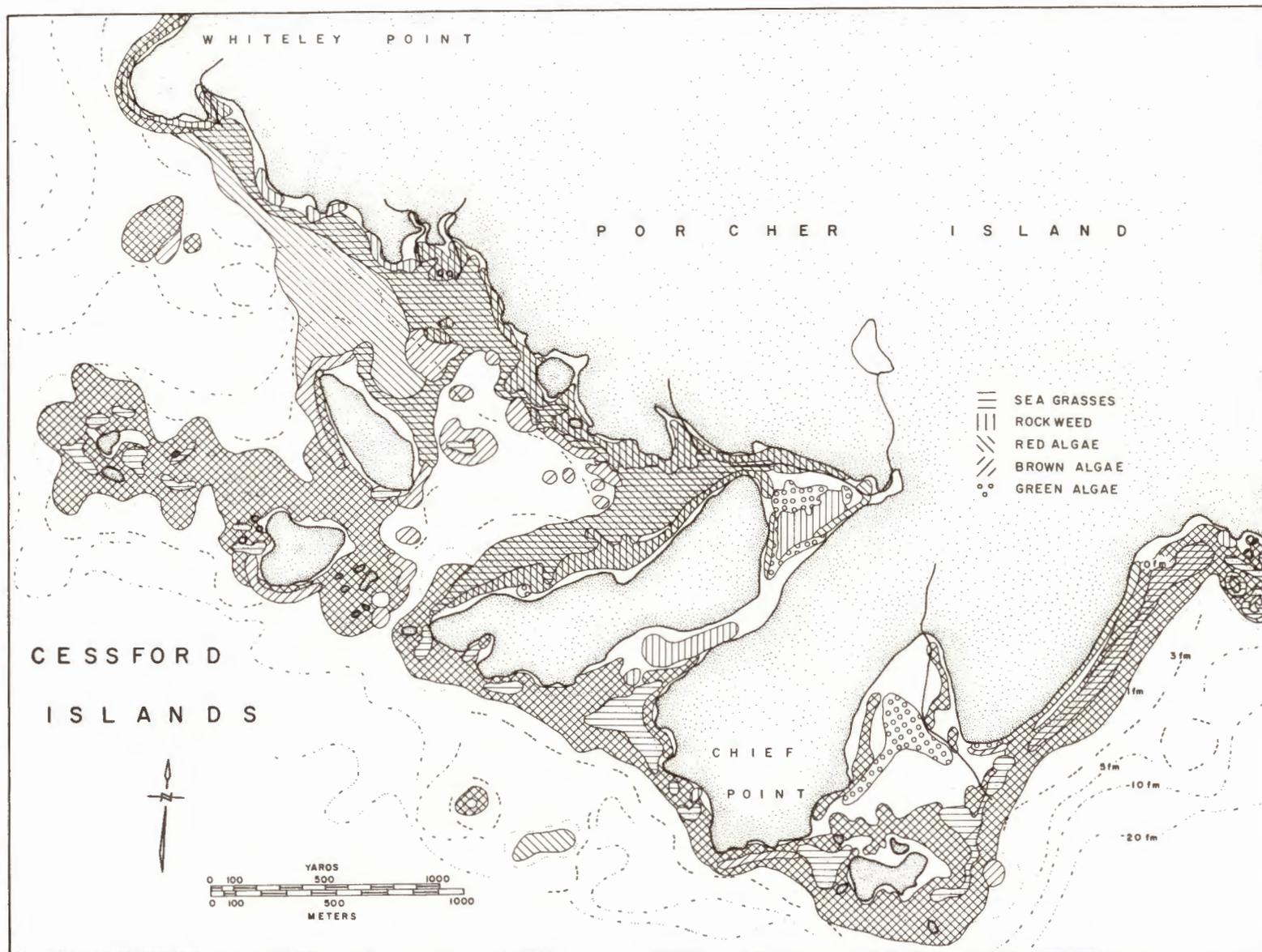


Fig. 12. Shoreline vegetation map from aerial photographs
for Billy Bay (map 10 in Fig. 2).

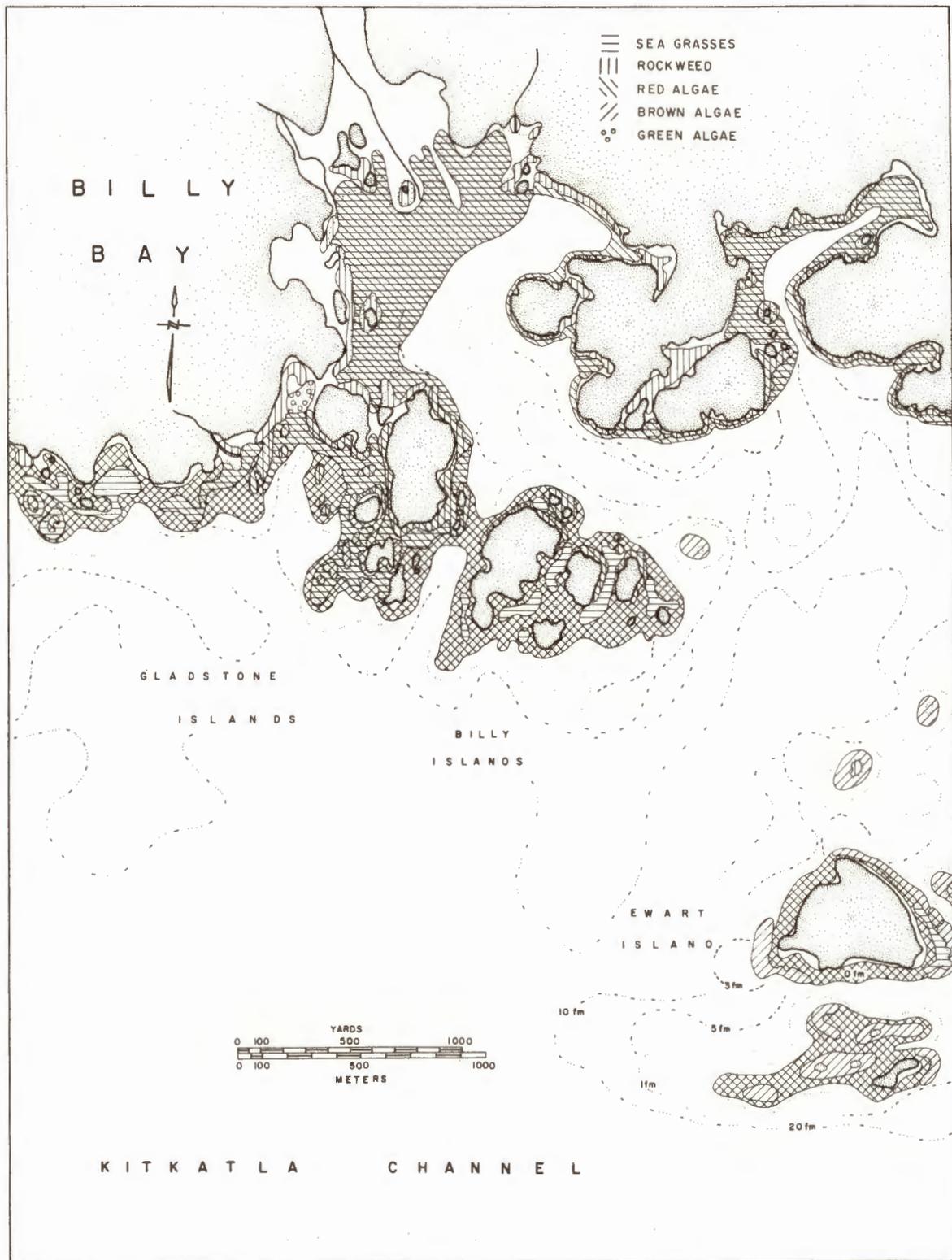


Fig. 13. Shoreline vegetation map from aerial photographs
for Grassy Island (map 11 in Fig. 2).

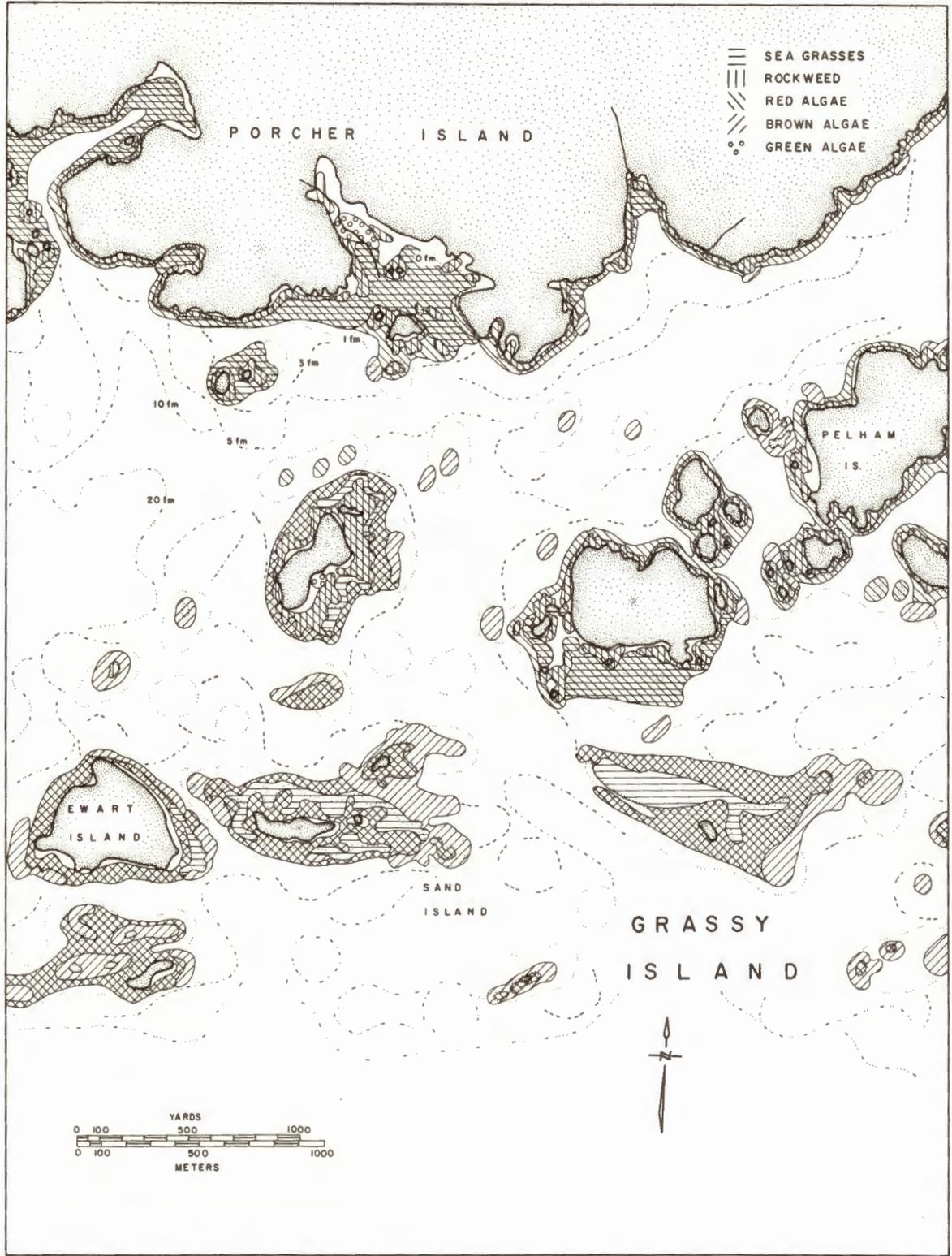


Fig. 14. Shoreline vegetation map from aerial photographs for Kitkatla Islands (map 12 in Fig. 2).

