MARINE RECREATION IN THE DESOLATION SOUND REGION OF BRITISH COLUMBIA

by

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B.Sc., University of British Columbia, 1964

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ABSTRACT

The increase of recreation boating along the British Columbia coast is straining the relationship between the boater and his environment. This thesis describes the nature of this increase, incorporating those qualities of the marine environment which either contribute to or detract from the recreational boating experience. A questionnaire was used to determine the interests and activities of boaters in the Desolation Sound region. From the responses, two major dichotomies became apparent: the relationship between the most frequented areas to those considered the most attractive and the desire for natural wilderness environments as opposed to artificial, service-facility ones.

This thesis will also show that the most valued areas are those which are the least disturbed. Consequently, future planning must protect the natural environment. Any development, that fails to consider the long term interests of the boater and other resource users, should be curtailed in those areas of greatest recreation value.
EASY WILDERNESS . . .

Many of us wish we could do it, this 'retreat to nature'. Yet for the few of us who do it, with few exceptions, the distance of willing retreat is not very far, and there is more of the rat race going along than is left behind. In getting away from it all we take most of it with us. The raisins are from Australia, the coffee is from Brazil, the mug is from England, the rolled oats are from Peterborough, and the new fishing reel was made in Orillia. Aircraft periodically bring in the deafening mobility of the twentieth century, radios offer a steady diet of the city's over-reaction to trivia. Trips into the wilderness are accompanied by idleness, a noisy outboard, and pollution of the air and water. We want easy wilderness. As we go about getting it, we go about destroying it. (Edwards, 1970)
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Without their assistance the completion of this thesis would not have been possible.
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Boating and boat centred activities were once considered a luxury to be indulged in by only the select few - those with enough time and capital for boat expenditure and upkeep. While this still tends to be the case, an increasing number of people, aided by growth in incomes, leisure time and improved boat construction methods, are acquiring reasonably priced sail and motorboats which can be cruised extensively while living on board.

This boating boom is part of an overall trend of increasing outdoor recreation and escape from both the crowded urban environment and the rural highways clogged with summer camper and tourist traffic. In 1971, 75,000 Canadian boats and 10,000 American boats were cruising in British Columbia waters (Victoria Colonist, 8 Oct. 1971: p. 8). It is estimated that this number is increasing by 10% per year. Many of these boaters, with increasing navigational knowledge and marine skills, are exploring north of the more populated Gulf Islands - Puget Sound area close to Vancouver - Victoria - Seattle and discovering the great variety and beauty of the remotest channels and inlets of British Columbia's 10,000 mile coastline.

This northward migration in recreational boating is leading to pressures on the marine environment and on other boaters to an extent that planning problems have arisen effecting the most popular areas.
Map 1. Location of the Study Area
The effective control of recreational boating and the threat of
damage to the coastal environment by careless boater and by
indiscriminate land development is a challenge which must be faced
if the different uses of the coastline are to continue without friction
and without serious damage to the unique biophysical qualities of the
area (Quayle, 1971).

Background Studies

Many previous studies which have attempted to provide background
information for recreational planning have often stressed the importance
of analysing the physical capabilities of the resource to sustain
recreation activities. These studies have often resulted in massive
classification systems, zoning the different facets of landscape under
quantitative parameters (Peiluck, 1967). Although some of these have
attempted to synthesize the physical measurements with various human
uses (Pearson, 1965), a recent large scale inventory (ARDA, 1967) is
concentrating on the capability of various land types to sustain the
highest number of users without considering the resultant deterioration
in the recreation experience.

Several recreation studies have concentrated on the need for
providing facilities and services to aid access to, and use of the
resource. In British Columbia there have been two studies on water-
based recreation which considered the importance of boat launching
ramps, moorage space, and access through public land to beaches and
swimming areas (Lea & Associates, 1966; Clark, 1967).
Economic and market oriented studies have been based on the assumption that the amount and quality of recreation can be determined by the amount the recreationist spends on his equipment or in travel costs to the recreation site (Sewell & Rostron, 1970; Wennergren, 1964). Campbell's (1967) study of skiing emphasized analysis of the hinterland - the urban area from which recreationists radiate to the resource. A study by Beyers (1970) detailed the economic benefits accruing to areas on the perimeter of a national park and hypothesized that this could be used to evaluate the worth of the park. The basic assumption that aesthetic and recreation values can be determined by economic models is difficult to substantiate especially when such important questions as quality of experience, intangible values and environmental capacity are not fully considered.

There have also been several research attempts at describing and evaluating the recreational environment which stress ecological factors. Belknap and others (1967) have synthesized and classified the work of three well known environmental planners - P. H. Lewis, I. L. McHarg and G. A. Hills. A recent study by McHarg (1969) emphasizes the need for understanding natural processes and uses overlays of various facets of landscape capabilities and land uses to bring out the areas of conflict and the areas most suitable for certain types of use. Bugslag's thesis (1968) stressed the importance of relating planning for outdoor recreation with the ecological constraints of an area.

Behavioural, psychological and perceptual factors have also been stressed by Shepherd (1967) in his historical analysis of changing
attitudes to the land, Craik (1968) and Burton Litton (1968). In their study of wilderness users in the Cascade mountains Hendee and others (1968) found that the views of the wilderness 'purist' were generally those most compatible with the environment.

Important studies which have attempted to evaluate the quality of recreation experience of different types of recreationist by correlating travel patterns and activities with perceptions of the environment are O' Riordan's study (1967) of the Norfolk Broads and Lucas' study (1963) on boaters' perception of wilderness in the Quetico - Superior inland lake area. The latter study is notable in that Lucas showed how different users of the same wilderness area held diverging attitudes about the nature of their experience, the necessity for management and the appropriate number and activity of fellow recreationists. His study was a pioneering attempt to link the literature on perception and attitudes into a resource management context.

This study will attempt to synthesize the major facets of the ecological and perceptual approaches in describing and evaluating the boaters' recreation environment. In this context, the term 'environment' is defined as the boater's 'milieu' or sphere of physical and perceptual activity, including himself and other boaters as well as the land and waterscape.

Objectives of the Study

The main objective of this thesis will be to describe, for the
Desolation Sound area of British Columbia:

(1) The resources available for recreation

(2) The interests, activities, attitudes and travel patterns of the recreation boater and his perception of his recreational environment.

(3) A complementary objective will be to synthesize the two major objectives and develop criteria for evaluating the recreational potential of anchorages, moorages and cruising routes.

This will be done by:

(1) Making conclusions about boater activities and attitudes and the implications for both environment and boater.

(2) Developing techniques for measurement of popularity, frequency of use, scenic beauty (a very difficult measurement), physical capacities and crowding.

(3) Outlining the potential problems and conflicts of boat recreation as perceived by the boater and analysing his suggestions for solving or ameliorating these.

Another thesis, being written in conjunction with this one, and based on the same questionnaire data supplemented with observational data on boater behaviour, will deal with the social and economic aspects of marine recreation. It is important to note here that many of the results presented in this thesis stress only the environmental aspects of marine recreation, and a full understanding of the behavioural aspects of different types of boater can only be gained by referring to the other thesis (Oliver, forthcoming).
Location of the Study Area

The study area includes, in general, the southern portion of the British Columbia coast, but for the purposes of this thesis it was decided to narrow this down to a specific area which could be studied in detail by a comprehensive field survey and questionnaire-interview of boaters. The area chosen was the Desolation Sound - Refuge Cove area (see Maps 1 and 2) for the following reasons:

1) Varied shoreline - the Desolation Sound region has a diversity of beautiful scenery with inter-connecting inlets and channels, interspersed with islands and sheltered anchorages. The varied shoreline presents boaters with a wide range of recreational opportunities which will be analysed to determine the nature of recreation use.

2) Increasing boat use - recreational boating is increasing rapidly in this area due to a number of factors:
   a) The advent of cheaper, mass produced, self-contained boats which are capable of extended cruising in areas where supplies and fuel are limited.
   b) A desire by boaters to visit new areas rather than return to the familiar, more crowded areas of Puget Sound and the Gulf Islands (Lea, 1966; Clark, 1967).
   c) Wide exposure of the Desolation Sound Region in several yachting magazines (Nor'Westing, Sea & Pacific Motor Boat, Yachting).

These factors contribute to a rapidly changing situation which, through analysis, should give significant indication of what can happen in the remoter areas further north.
Map 2. The Study Area - Major Place Names
(3) North of previous studies - it is on the northern boundary of the Georgia Straits proper, and the area covered by Lea's Report (1966) - a federal government study on boating facilities in southern British Columbia and by Clark's study (1967) of the Gulf Islands.

(4) Remoteness - the area is still considered relatively remote by the non-boating public, being approximately 15 miles north of Lund - the terminus of the coast road. Therefore measures could be taken now to prevent spoiling of the area by indiscriminate development.

(5) Traffic node - Refuge Cove is something of a node for small boat traffic using the Desolation Sound area as well as for boaters continuing north and is therefore an ideal location for conducting the questionnaire survey.

Procedure for Data Collection

1. FIELD SURVEY

The field survey consisted of a thorough reconnaissance of Desolation Sound, Redonda Islands and Toba Inlet. Photographs were taken and sketches made of scenery, major boat anchorages and moorages, boat recreation activities and any specific attributes of the environment which contribute to the recreation experience. Sketch maps were made to show details not shown in the official charts and maps. A diary-log was kept in which boat movements, activities and boater behaviour were noted. Residents, commercial fishermen and non-boaters with an interest in the study area were also interviewed.

2. QUESTIONNAIRE SURVEY (see sample questionnaire - Appendix A)

A total of 845 questionnaires were distributed to boaters, 690 were
returned completed and there were 10 refusals. It was estimated that 60% of all recreation boaters using Refuge Cove from 21 June to 28 August, 1970 were covered by the questionnaire.

The questionnaire survey was designed to determine the nature and degree of recreational use of the Desolation Sound - Redonda Islands area and more specifically:

(a) To determine boater travel patterns in time and space.

(b) By assessing boater attitudes and time spent in various recreation activities, afloat and ashore in order to determine the relative importance of natural, or wilderness environments versus artificial or service facilities environments.

(c) By assessing responses to open questions on the boater's likes and dislikes to determine the specific features and attributes of the environment which contribute to, or diminish, the boater's recreation experience.

(d) To determine the boater's criteria for selection of a moorage or anchorage location.

(e) To determine areas in the northern Strait of Georgia which the recreation boater considered most beautiful or attractive.

(f) To determine attitudes toward marine parks in the Strait of Georgia.

(g) To solicit suggestions for ways of maintaining the environment.

3. LIMITATIONS OF THE QUESTIONNAIRE SURVEY

The questionnaire was designed to solicit as unbiased a response as possible. However, the following points should be borne in mind
when interpreting the results:

(a) Sample bias - the majority of questionnaires were distributed in Refuge Cove - the major supply centre in the area. Consequently boaters who had the desire for more facilities - fuel, food, water, etc., uppermost in their minds, were the ones most frequently sampled. Boaters who disliked commercial marina operations and who avoided Refuge Cove, were difficult to locate and reluctant to respond to the questionnaire when approached in the remoter anchorages. Because of this bias it was felt that an adequate sampling of the wilderness oriented boater was not obtained.

(b) Application of results to different areas - different areas draw different types of boaters whose attitudes and responses to questions vary considerably from boaters in other areas. The average Desolation Sound boater was found to be the affluent, comfort-loving American yachtsman who cannot be said to represent a fair cross-section of the recreational boater. Therefore, extreme caution should be used in applying the results of this survey to other areas.

(c) Pleasing the interviewer - many boaters only wrote down what they thought was expected of them in the way of an 'acceptable' response, rather than their true feelings or interests. Many boaters were often observed to say one thing on the questionnaire and to do the opposite in reality.

(d) Quality of response - many of the questions were hypothetical and as such enduced hypothetical responses. Boaters often confused the intent of questions and responded with only mild preferences and with
narrow or short-sighted thinking.

(e) Policy implications - finally, the questionnaire results are not meant to be interpreted as a guide to what recreational planners must provide to ensure future recreation enjoyment by the boater, but only as an indication of how the average boater presently thinks. It must not be assumed that the views of the majority represent the best interests of the area. Wise planning will consider the full implications of the boater's real needs as well as the needs of the environment and the unknown needs of future boaters and other resource users before recommending policies which would be difficult to reverse.

More detailed information on the questionnaire design, testing, sampling and evaluating will be found in the accompanying thesis (Oliver, forthcoming).

Outline of the Study

Figure 1 outlines in diagrammatic form the major components of the thesis study.

Chapter II will describe the resources available for recreation in the study area. Chapter III will deal briefly with the major resource uses, emphasising implications for the recreation environment. Chapter IV will present the aggregate results to the questionnaire and the boaters perception of his environment. Chapter V will present criteria for evaluating cruising routes and anchorages and Chapter VI will conclude with a discussion of future management problems.
Figure 1.A. - OUTLINE OF THE STUDY

**ELEMENT**

- RESOURCES
  - TOPOGRAPHY
  - FLORA & FAUNA
  - MARINE LIFE
  - WATER
  - CLIMATE
- RESOURCE USERS
  - LOGGING
  - FISHING
  - AGRICULTURE
  - SETTLEMENT
  - RECREATION
- BOATERS
  - TRAVEL PATTERNS
  - ACTIVITIES
  - INTERESTS
  - ATTITUDES
  - PERCEPTIONS

**DESCRIPTION**

**EVALUATION**

**CONCLUSIONS**

- THE BOATERS PERCEPTION OF HIS ENVIRONMENT
  - RESOURCES
  - OTHER BOATERS
  - OTHER RESOURCE USERS

- ANALYSIS OF:
  - ANCHORAGES
  - MOORAGES
  - CRUISING ROUTES

- MANAGEMENT PROBLEMS:
  - INCREASED USE
  - POLLUTION
  - DEVELOPMENT
II. PHYSICAL BACKGROUND

The purpose of this chapter is to briefly describe the physical background of the coast with special emphasis on those qualities in the study area which have an effect on the environment of the recreation boater. Land resources will be discussed first, stressing the importance of geology and topography as the foundation of scenery. Flora, fauna, tides, marine life and climate will also be discussed from the recreation standpoint.

TOPOGRAPHY

Geology

The study area as shown on Map 3, page 16, is almost entirely composed of plutonic rocks which vary from granites to gabbros in composition. These erosion resistant igneous rocks of the Coast Mountains intrusion extend westward to Vancouver Island and in consequence, the majority of islands have a mountainous topography similar to the mainland. The dramatic variations in relief found in this area are partly due to the varying and complex resistances of different rock types, but more importantly to the glacial scouring and deepening of pre-existing valleys, which roughly followed the predominant NE-SW and NW-SE fault structure.

The only extensive sedimentary, or soft rock deposits, are the drift deposits of glacial boulder clay, sands and gravels left by the retreating Strait of Georgia glacier which formed Harwood, Savary, Hernando and Marina Islands and the southern extremities of Cortes and Quadra Islands.
Map 3. Geology and Relief of the Study Area
(Sources: Bancroft, 1913; Cdn. Hyd. Charts 3562, 3594)
Coastline

The coastline of British Columbia is essentially a structurally controlled fiord coastline with deeply indented sounds and inlets, flooded glacial valleys and glacial cirques at and below sea level. The present coastline was submerged by ice-loading during the Pleistocene and has only recently emerged. It is thought that the sea level and land are now in equilibrium (Holland, 1964: p. 113), though the tortuous coastline, lack of shallows and depositional features, raised beaches and tidal lagoons on Cortes Island all point to an incomplete relift of the land.

The recent emergence of the coastline from beneath its 4,000 foot thick covering of Pleistocene ice, less than 11,000 years ago, accounts for the general lack of shoreline features of marine origin. Beaches are practically non-existent in areas of igneous bedrock but are found extensively on Savary Island, just 3 miles south of the study area, where unconsolidated glacial materials have provided an abundant supply of sand, (see Figure 2, p. 18). Elsewhere, steeply plunging submarine slopes and the limited fetch of the Strait of Georgia have not allowed beaches to be formed or retained, and the coastline remains rugged and resistant, (Figure 3, p. 18), inhibiting access to the coastline by the boater interested in exploring ashore.

Fiords

The many inlets and fiords, some of which are called arms and sounds or passages and channels if open at both ends, have separated the western
Figure 2. Beach at Savary Island

Figure 3. Resistant Shoreline Desolation Sound
slopes of the Coast Mountains into a ragged fringe of peninsulas, islands and interconnecting waterways. The fiords on the mainland rank in size and scenic grandeur with the world-famous fiord coastlines of Norway, Patagonia, Greenland and New Zealand (Holland, 1964: p. 115; Dawson, 1878: p. 91).

Four of the most prominent inlets on the coast are Knight, Jervis, Toba and Bute (see Map 1, p. 2). They have lengths of 62, 48, 20 and 41 miles respectively, with widths varying from \( \frac{1}{2} \) to 2 miles, and steep glaciated sides that rise from the waters edge in long, unbroken slopes to summits at 4,000 to 8,000 feet. Along their lengths, water cascades over falls and down rock faces which have been bared of all vegetation by previous landslides. In the grandeur of their scenery these four inlets surpass all others on the coast and rival in magnificence all examples of the fiord type in the world (Bancroft, 1913: p. 20), (Figure 4, p. 20, Toba Inlet on page 20).

The fiords or inlets generally follow directions parallel to or at right angles to the NW-SE trend of the Coast Mountains. Most are straight, some wind or change direction abruptly. The view ahead is then obstructed by projecting points, which when passed, open up a new vista of majestic scenery. At the entrance to some of the inlets the mountains are lower but they become progressively higher until the fiord reaches the heart of the Coast Mountains.

The delta lands at the heads of these inlets comprise the largest flat areas on the mainland coast. The delta of the Homathko River at the head of Bute Inlet is estimated to be 2,500 acres in size. The deltas
Figure 5. Computer Map - Inclined Contour View of the Study Area
extend seawards as mud flats during low tide which drop off sharply at their margins. A similar, but smaller, mud flat extends into Theodosia Inlet in the study area (Map 4, p. 32). The rivers flowing into the heads of inlets, though swift flowing, are often deep enough to be navigable by a shallow draft boat for several miles upstream. Some boaters have reported that Mt. Waddington, at 13,177 feet, the largest peak in the Coast Mountains, can be seen from 12 miles up the Homathko River. Within all the fiords the projecting points or spurs usually have the more gentle slopes, but generally the descent to the waters edge is extremely steep. In some places sheer cliffs rise thousands of feet from the waters edge; and some of the more majestic peaks are not more than two to three miles from the shore. For considerable distances it is impossible to anchor or even to tie a boat to the shore as the water is too deep and it is difficult to gain a foothold for a landing.

So near are the mountains to the shores of the inlets that within the larger fiords the lateral range of vision is very limited. Occasionally, however, there is a break in the steep walls caused by a hanging valley, which if low enough allows a small area of the sea to extend inwards. This depression of the sky line persists up the valley and a new vista of mountains in the background is gained which would normally have been concealed from view. Toba Inlet has one of these "lateral embayments" (Brem Bay), Homfray Channel has two - Homfray Creek and Forbes Bay (Figure 7, p. 25).

Snow on the north facing slopes above 5,000 feet sometimes lasts
Figure 6. Computer View - Perspective View of the Study Area

- View to northeast
- No exaggeration of scale
- Altitude 30°
- Coastline outlined
Figure 7. Lateral Embayments - Hanging Valleys, Homfray Channel
Figure 8. Waterfall, Toba Inlet
through the summer. In the upper réaches of Bute and Toba Inlets, glaciers and patches of ice occupy hollows and valleys above 5,000 feet, (Figure 4, p. 20). **Well developed cirques of various dimensions can also be seen from Toba Inlet and Homfray Channel. Several of the hanging valleys disgorge waterfalls from great heights directly into the inlet. In the spring, spray from these waterfalls extends outwards up to \( \frac{1}{4} \) of a mile from the shoreline. Unless fed by glacier or perennial snow, they reduce to a trickle by the end of the summer** (Figure 8, p. 25).

**Islands**

The topography of the major islands in Desolation Sound resembles that of the mainland. Most are mountainous with bald, steep slopes, difficult to climb. A few reach elevations between 3,000 and 5,000 feet. The highest point on any island between Vancouver Island and the mainland is on East Redonda Island where dome-shaped Mount Adenbrooke rises 5,120 feet above sea level (Figure 9, p. 27). This mountain was climbed to approximately 4,500 feet in order to take Figure 1, p. 7, of Desolation Sound. By comparison, West Redonda is somewhat lower in relief, though the north facing side of the island has magnificent cliffs rising steeply to 3,000 feet above sea level. Raza, a Matterhorn-shaped island caused by cirque glaciation has an elevation of 3,020 feet and an area of only 5 square miles.

The eastern shores of those islands which are directly adjacent to the mainland coast are generally smooth in outline (note East Redonda).
Figure 9. Mount Adenbroke, East Redonda Island
Figure 10. Computerized Shading of the Study Area
In contrast, the westernmost ends of some of the islands (West Redonda, Cortes) have a frayed appearance owing to the re-entrant nature of the shoreline, thus providing an abundance of small, sheltered anchorages. Cortes Island, overlain with Pleistocene drift deposits in the south, seldom rises over 1,000 feet, except in the north between Von Donop and Lewis Channel where an intrusive wedge rises prominently to over 1,500 feet.

Some of these islands have been formed by the simultaneous deepening of the strike and transverse valleys through the scouring and excavating action of the glaciers; but a large number seem to owe their origin to the dissection of the interfiord belts through the headward recession of their branches. What could have been lateral bays in an interglacial period, situated more or less opposite one another on adjacent fiords, receded headwards, with renewed glaciation, until they united. When the divide between two such branches had been lowered sufficiently, the ice would pass over it during the higher stages of flood, creating a through valley, the floor of which may have been eroded to a depth more or less in harmony with that which prevailed at the mouths of the branches (Bancroft, 1913: 32). An example of this type of divide could be the shallows which occurs in the middle of Lewis Channel, just north of Teakerne Arm). Given a sufficient length of time, a channel of uniform width and depth might well have been established.

The majority of smaller islands have a characteristic roches moutonées form with elongated hummocks or long swells parallel to the direction of ice movement. They generally have a broadly convex longitudinal outline

or a gentle slope on their stoss side and a steep and rough face on their lee side. Many of these smaller islands occur in clusters, aligned, parallel to the ice movement, close to the mainland and separated by a labyrinth of channels (Prideaux Haven and Copeland or Ragged Islands opposite Thulin Passage).

In the northern part of the Strait of Georgia proper, four islands - Savary, Hernando, Harwood and Marina - are of a very different character from the mountainous and rocky islands just described. Due to their composition of boulder clay with stratified sands and gravels they are extremely low lying with elevations never more than 450 feet above sea level. The southern shore of Savary is nonetheless exceptionally steep with the exposed bank showing clearly the relationship between the boulder clay and the stratified deposits. The extreme east end of Savary and Hidalgo Point on Hernando exhibit the resistant igneous base upon which the unconsolidated sediments rest (Bancroft, 1913: 25).

With the exception of the rocky points mentioned, their shores are, generally, low and dangerous to boaters, for on the shallow sea floor surrounding the islands, many large boulders are irregularly distributed. In some places many of these boulders are exposed upon the wide expanses of beach during low tide; others project above the water and thus stand as a deterrent to water skiers and as a warning to boaters of unexpected shallows, far from shore. Long narrow sand reefs extend southward from Marina Island and Sutil Point on Cortes Island for distances of up to a mile. Hernando and Savary Islands are almost joined by a sand reef, and a similar reef extends south from the east side of Savary for about 2 miles (Mystery Reef). Somewhat analogous
to these islands are the low sandy terraces, not more than 60 feet high, which border Squirrel Cove on Cortes Island. As a result of this Pleistocene deposition, these islands do possess fine sand beaches. Savary has an extensive beach on the north side which is quite popular for lazing and sunbathing (Figure 2, p. 18). Indeed, these four islands produce the only good sand beaches in the entire northern Straits.

**Lakes**

Several inland lakes lie in low, irregular, rocky basins (Map 4, p. 32). Some of these lakes, less than 14 feet above low water level, become saltwater lagoons at high tide (Squirrel, Von Donop and Carrington Lagoons on Cortes Island). The lake behind Refuge Cove, once a saltwater lagoon, is now a freshwater lake, caused by the building of a small dam and sluice some 30 years ago (Figure 11, p. 33). A similar development occurs at Black Lake behind Roscoe Bay. Other popular lakes are Unwin behind Tenedos Bay (Figure 13, p. 34), Cassel, which discharges into Teakerne Arm via a 75 foot waterfall (Figure 14, p. 34), and Hague Lake behind Manson's Landing. The latter possesses a white sand beach for it is located on the boundary of drift deposits. These lakes, often no more than a few minutes walk from the sea, and being fairly warm and fresh, have become quite popular for swimmers and those anglers seeking a bit of trout fishing as a break from the salt water variety. Several other lakes occur in the study area but are too far inland or elevated above sea level to be of
Map 4. Tides and Water Features of the Study Area
(Source: Cdn. Hyd. Charts 3562, 3594)
Figure 11. Refuge Lagoon

Figure 12. Outlet of Refuge Lagoon
Figure 13. Lake Unwin, Behind Tenedos Bay

Figure 14. Waterfall, Teakerne Arm
recreational significance to the boater.

Channels and Passages

The channels between the islands repeat the characteristic features of the mainland fiords. Although singularly free from shoals, the excessive depth of water near the shore makes it difficult to find anchorage with a reasonable length of line (10 fathoms). The depths of the channels and inlets used by boaters have been quite thoroughly charted by the Hydrographic Service. In Homfray Channel a depth of 399 fathoms is reached, which is the second deepest sounding in the Straits (the deepest being 400 fathoms in Jervis Inlet). While some of the channels are fairly uniform in depth and width, others have a definite narrows, where the water is shallower and away from which, in either direction, the breadth and depth of the water increases. This latter condition implies the submergence of a divide between valley glaciers of the Pleistocene. Waddington Channel narrows to a depth of 29 fathoms and a width of less than 200 yards before entering Pryce Channel. In some of these narrows, the water is so shallow that they are only navigable at high tide (Roscoe Bay, in the study area is a good example).

Bays and Coves

The bays and coves of the island and mainland shores correspond in some cases to the lateral bays of the fiords. Many of these coves are protected by islands (Prideaux Haven, Refuge Cove). Several have narrow entrances, but open up once inside to form almost perfectly enclosed
harbours (Gorge Harbour, Cortes Bay, Squirrel Cove and Von Donop). These harbours are analysed more extensively in Appendix C, p. 151.

FLORA AND FAUNA

Forests

Although the coast of British Columbia is noted for the density and size of its forest growth, the distribution of merchantable timber is far from uniform in the study area. The mountainous shores of the passages and channels, with insufficient soil covering and exposure to the prevailing winds, support only trees which are small, scattered and of interior quality. The predominating coniferous species are the Douglas Fir (Pseudotsuga menziesii), Western Red Cedar (Thuja gigantea), Hemlock (Tsuga heterophylla) and the Lodgepole or Scrub Pine (Pinus contorta), which grows in patches on the steeper and more rocky slopes. Map 5, p.37 depicts the distribution of coniferous and deciduous forest and barren ground (rock or alpine).

With the exception of the Cottonwood (Populus trichocarpa), Broadleaf Maple (Acer macrophylum) and Alder (Alnus rubra), deciduous trees are not common. They generally occur as second growth in recently logged areas, close to the shoreline, in river bottoms or up the flats of U-valleys (Homfray and Theodosia Rivers). Their bright foliage, a pleasant shade of lighter green, provides a break from the monotony of the darker green of the coniferous. The alder is the most predominant species in the study area, especially in the logged over areas bordering Squirrel Cove and at the head of Theodosia Inlet.
Map 5. Vegetation of the Study Area
(Source: B.C. Forest Service, Forest Cover Maps)
A few shrubby forms of the evergreen Arbutus (Arbutus menziesii) grow in the study area - the northern boundary being a line from Chatham Point on Vancouver Island to the entrance of Bute Inlet (Lyons, 1965, 53). They are most profuse on the small rocky islands bordering the mainland where rainfall is lowest (Prideaux Haven, Figure 32, p. 160, Ragged Islands).

Luxuriant, thicket-like undergrowth, interspersed with fallen trees, assures the dense appearance of the forests bordering the shoreline. Especially is this true of such favourable localities as valleys and ravines and along the west-facing slopes up to an altitude of 2,000 feet. The larger trunks of these fallen trees are often used as pathways over the underbrush by boaters adventuring ashore.

Common members of this underbrush are the abundant Salal (Gaultheria shallon), Willows (Salix spp.), Elders (Sambucus spp.), Ocean spray (Holodiscus discolor), Oregon grape (Berberis nervosa), Huckleberry (Vaccinium spp.), Salmon, black and raspberries (Rubus spp.) and the prickly Devils Club (Oplopanax horridus).

In the interior of some of the lower lying islands such as Mink Island, the forests are often less impenetrable, and it is possible to walk long upon a thick carpet of moss among veteran trees which have survived logging and forest fire.

**Wild Life**

The steep cliffs and lofty trees are a natural habitat for numerous eagles (Haliaeetus leucocephalus), hawks (Buteo spp.) and crows (Corvus spp.). The large blue grouse (Dendragapus obscurus), the ruff grouse (Bonasa umbellus) and the spruce partridge (Canachites canadensis)
inhabit the sunny spots where the forest is less dense. These are sometimes hunted from deserted logging roads where the thinner undergrowth attracts them.

Aquatic birds - gulls (Larus spp.), ducks (Bucephala, Athya, spp.), and cormorants (Phalacrocorax spp.) are abundant. A few herons (Ardea herodias) can be found but they usually avoid human contact. Shorebirds, which frequent the intertidal zone and feed on sea worms, crustaceans and other organisms, are the Black Oyster Catcher (Haematopus backmani), Surf Bird (Charadridae spp.), Pigeon Guillemot (Cephus grycle), Marbled Murrelet (Brachyramphus marmoratum), and the Sandpiper (Scolopacidae spp.). Several migrating birds such as the Loon (Gavia spp.), Grebe (Aechmorhorus accidentalis) and the Scoter (Oidemia nigra) are common to the area in winter but leave the coast in the spring for the freshwater lakes of the interior, returning in early fall (Carl, 1966, p. 45). The Coot (Fulica americana) may sometimes be seen nesting in marshes close to the salt water lagoons.

Bears (Euarctos americanus) are sometimes seen on the mainland, as well as the Columbian or Coast Deer (Odolocleus hemionos columbianus) which can also be found on the major islands. The mountain goat (Oreamnos americanus) lives only on the mainland being most numerous in Bute and Toba Inlets. Mink (Mustela vison), marten (Martes americana) and racoon (Procyon spp.) are often seen close to the water in the less frequented anchorages. The hairy seal (Phoca vitulina) will often surprise boaters in small craft by bobbing unexpectedly to the surface in quiet anchorages.
MARINE ENVIRONMENT

Fish

Fishing is generally good in the study area but quantity and quality varies with season and year. The most productive areas to fish are where shoals and headlands deflect tidal streams, causing turbulence and mixing, which attracts the feeding sports fish. Common fish caught are the Coho and Chinook salmon (*Oncorhynchus* spp.), Herring (*Clupea pallasii*) which provides food for game fish and are an important source of bait for the salmon fisherman; and the Dogfish (*Squalus suckleyi*), a small shark averaging 30 inches in length and considered a pest because of their tendency to take salmon lures.

Shiner seaperch (*Cymatogaster aggregata*) inhabit wharf and pile environments and are a popular small fish caught by younger children. Bottom fish, living below 10 fathoms, among kelpbeds and reefs, especially over deeper shoals where there are strong tidal movements are the Ling Cod (*Ophidon elongatus*), the Rock Cod and the Red Snapper (*Sebastodes* spp.).

Although not abundant, some marine mammals do occur. The Killer Whale (*Orcinus rectipinnna*) is sometimes seen in swarms of from 3 to 30 or more, travelling through the passages between the major islands and surfacing every five minutes or so to blow before sounding. They range in length from 20 to 26 feet and feed on anything 'catchable' - seals, porpoises, fish and sea-birds. There are no records of them attacking humans (Carl, 1966: 25). Other mammals seen in the area are the Porpoise (*Phocoena* spp.) and the Sharp-nosed Finner (*Baloenoptera acutor ostrata*) which has a habit of unexpectedly surfacing and blowing alongside
travelling yachts.

Shellfish

One of the most popular shellfish for eating is the Pacific Oyster (*Crassostrea gigas*) which was originally imported from Japan and now covers a large portion of the coast. The spat is grown commercially only in Pendrell Sound because of the exceptionally warm waters there (Department of Recreation and Conservation, 1969: 75), and it is found in abundance in most anchorages in the study area. Other popular molluscs, found in the mud flats at the heads of some of the anchorages (see Map 4, p.32), at depths from three to twelve inches are the Butter clam (*Saxidomus giganteus*), the Little-neck clams (*Protothaca staminea*), (*Venerupis japonica*), the Horse clam (*Schizothaerus capax*), the Cockle (*Clinocardium nuttalli*) and the Mussel (*Myteles spp.*). These molluscs are all susceptible to the red tide and therefore not recommended for consumption during certain periods of the summer months when concentrations become dangerous. The red tide is caused by the accumulation of a minute organism (*Gonyaulax*) whose toxin may cause paralytic poisoning (Ricketts, 1939: 185). Fisheries officials keep constant check on concentrations of *Gonyaulax* and post warnings when necessary.

Shellfish, because of their popularity have been somewhat depleted in the most popular anchorages (Prideaux Haven). While the flavour of the shellfish is not at its best during breeding (summer months), their taste can be further impaired by the discharge of raw sewage by many
boats into a small anchorage, and by oil spills from leaky outboard engines permeating their breeding grounds. Although abundant shellfish are available in Refuge Cove, this was the only locality where virtually no harvesting took place by recreation boaters throughout the summer. This was probably due to the above mentioned factors plus the additional hazards of increased pollution from spillage at the fuel dock and outfall from the shore rest-room facilities.

Seaweeds

Seaweeds are of considerable importance to the marine environment of the boater; indirectly, as a food source for waterfowl and habitat for food and game fishes, and directly, as indicators of dangerous shoals. Kelp (Nereocystis luetkeana), a greenish brown plant, consists of a long stalk anchored to the bottom and expanding into a hollow bulb at the top end. Emanating from this bulb are two pairs of leaf-like fronds which float on the water's surface. The length of the kelp stalk averages 30 to 75 feet and it grows on rocky bottoms in water depths from 5 to 50 feet. Because the bulbs and fronds are visible above water for a fair distance, kelp is extremely useful to the boater as an indicator of dangerous reefs, rocks and shoals. The kelp fronds indicate the direction and approximate speeds of currents by their action in the water. Small boats have also been known to use kelp as a temporary anchor by securing a line to the bulb.

Jap weed (Sargassum muticum) is a long, soft, flexible many-branched plant with many small, bladder-like floats. Normally anchored, it is
notorious when detached and floating free because of its tendency to become entangled in fishing gear and propellors. It is particularly hazardous after a period of rough weather or spring tides when it breaks loose in large chunks to float down on the unsuspecting boater.

Eel grass (*Zostera marina*) is a long bladed, grass-like plant with 3 to 6 leaves originating from a common root stalk and growing to lengths of 10 feet or more. Eel grass is a favourite food of many sea birds and marine animals. It is the favourite haunt of the crab and several food fish, and is widely used as a spawning bed by various fish, molluscs and other marine organisms. It commonly grows in the tidal lagoons and in mud flats just below low water level.

Other Marine Organisms

Other marine organisms of interest to the recreation boater and generally found in the littoral zone are the starfish (*Pisaster spp.*), sea urchins (*Strongylocentrotus helianthoides*), and sand dollars (*Echin-arachnius excentricus*). The giant sea cucumber (*Stichopus californicus*) is often seen on rocky shores below the low tide level. Despite their repulsive appearance they make good eating when the tough outer skin is stripped off. The stalk or neck of the Goose Barnacle (*Lepas anatifera*) can also be eaten. Numerous small shore crabs (*Hemigrapsus nudus*) are found under boulders in the tidal zone, but only a few edible Red Rock Crabs (*Cancer productus*) are caught in the study area.

Water Temperature

The temperature of the sea water in the study area is the warmest
in the Strait of Georgia, averaging 65 to 75 degrees F. in summer (Calhoun, 1969: 110), compared to approximately 60 degrees F. for the east central coast of Vancouver Island and 50 to 60 degrees F. for the southern Gulf Islands. Pendrell Sound, in East Redonda Island, has a popular reputation of having the warmest waters north of the Gulf of Mexico with temperatures rising up to 68 degrees F. as early as late May and by mid summer reaching 80 degrees F. to a depth of 10 feet (Department of Recreation and Conservation, 1969: 75). This warm water is due to a number of factors:

(1) The study area is located at the junction, or meeting point of flood tides entering Georgia Strait through Johnstone Strait to the north and Juan de Fuca Strait to the south. The actual boundary (see Map 4, p. 32) fluctuates considerably with weather conditions (a strong northerly wind pushes the boundary south), however, little tidal flushing or exchange of water takes place. Consequently, there is little mixing of the surface waters with colder ocean and bottom waters, thus enabling this relatively more stable water to retain its heat content.

(2) Many of the anchorages are considerably confined with narrow, shallow entrances, thereby inhibiting the mixing of colder waters outside with warmer, stable waters inside.

(3) Some anchorages contain tidal pools and lagoons which, when low tide occurs close to mid-day, retain the heat of the sun and transfer it to the incoming water when the tide changes in the afternoon.

(4) Pendrell Sound is unique in that there is very little fresh
water runoff; consequently salinity maximum occurs with an excess of evaporation over precipitation plus runoff (Pickard, 1961: 922), thus tending to raise the water temperature by increased solar heating.

Tides

The range - rise and fall of the tides - averages 7 feet for neaps and 15 feet for springs (maximum tides). This range exposes a wealth of interesting tidal marine life for the beachcomber to explore, and constitutes a factor which the boater must consider in the more shallow anchorages.

Currents

The rapid rise and fall of the tides four times every 24 hours (two floods and two ebbs in the Strait of Georgia) results in tidal currents that are often quite swift, especially in the narrow channels and passes. Boaters with experience can use these tidal streams to their advantage, but for others they may lead to frustration. Map 4, page 32, shows the distribution of flood and ebb tidal currents with maximum speeds for spring tides given. Because the study area lies at the junction or meeting point of the tides, currents, as previously mentioned, are relatively weak and irregular; though just north of Cortes Island, rapids, overfalls and whirlpools exist where channels are narrow or shallow. At the Yucultas (Stuart Island), tides flood at maximum springs of speeds up to 9 knots; and at Hole in the Wall (between Sonora and Maurelle Islands) of speeds up to 12 knots. These passes can be extremely dangerous - underwater obstructions, changes
in the shoreline, and the presence of rocks, islets and islands, all affect the flow of the current. Whirlpools up to 30 feet in diameter are found in the Yucultaws, and boats trapped in a whirlpool or overfall can easily be swamped and sunk. The safest way for the boater to navigate these passes is to enter against the tail end of the opposing current, for example, with the current setting against the boat but very close to slack water. The boat will then have slack water at least part of the way through the pass and when clear or almost so she will have the tide to assist her. The reading and comprehension of the appropriate tide and current tables is essential in order to determine the times of slack water for the various passes.

Tidal currents in the mainland inlets are often altered considerably by the predominant outflow of fresh runoff water which stays on the surface and is sometimes strong enough to counteract the strength of the flood tide, while increasing the strength of the ebb tide. These currents tend to be maximum along one side of the inlet, for example, boats travelling up Toba Inlet keep to the eastern shore where the current is weakest.

Wave Conditions

Because of the sheltered nature of the Georgia Straits, waves seldom exceed 6 to 8 feet in height. In Desolation Sound, with a maximum fetch of 7 miles in a west-east direction, the maximum height which waves could reach is 2 to 3 feet.
Temperature

The Strait of Georgia enjoys a mild, humid winter, a warm but not hot summer, and an even range of temperatures, typical of a mid-latitude, marine coast. In the Straits, sheltered somewhat from the moderating effects of the Pacific by Vancouver Island, temperatures are a little lower in the winter months and considerably higher in summer. In January and February, temperatures average 36 degrees F. although days when the temperature reaches 50 degrees F. are not uncommon. The temperatures improve steadily after mid-February, averaging about 55 degrees F. in May. Temperatures in June can be maximum for the year. In 1970 the highest recorded temperature in Redonda Islands for the summer was on 2nd of June when the thermometer reached 95 degrees F. (Doctor Bay). July and August are generally the warmest months, averaging 65 degrees F., the temperature rising from about 54 degrees F. at dawn to 75 degrees F. in the afternoon. The summers rarely ever bring uncomfortable heat, even for a few hours, for the cool sea breeze frequently blows whenever the land warms up unduly. Temperatures in excess of 86 degrees F. are of rare occurrence, except in the more narrow and confined passages where the sea breeze will have little fetch over cool water. North of Sonora Island the temperatures are considerably cooler than in the central portion of the Straits for the moderating effect of the Pacific begins to have more of an influence. Nights begin to get chilly during the latter part of August, but seldom go below 45 degrees F. until late September.
The period from April to October, when average temperatures are over 50 degrees F., is generally considered to correspond closely to the active boating season (Lea, 1966: 12). However, though temperatures are similar from Victoria up to Bute Inlet, spring and late summer boating is confined to the southern straits where high populations make day-use more possible.

Precipitation and Sunshine

The total precipitation on the eastern coast is very much less than on the western coast of Vancouver Island. Throughout the islands in the Strait of Georgia, the annual precipitation is generally less than 38 inches. The wettest period begins toward the end of October and lasts until the middle of February. In July and August the rainfall averages 3/4 to 1 inch per month, (at Refuge Cove, rain fell on only 8 days between 21 June and 28 August in 1970). On the average, the number of days with measurable precipitation varies from 19 to 20 in November, December and January to only 5 to 6 days per month in July and August. This low precipitation, in conjunction with the high summer temperatures results in an almost Mediterranean climate.

Correspondingly, cloudiness averages 70% from November to January, 60% in February, March and October and only 30 to 40% in July and August. Sea fog, though common on the west coast of Vancouver Island, rarely forms the more sheltered area of the Straits. Morning mists sometimes occur in late August but are usually burned off by noon.

The smoke from forest fires may sometimes cause much inconvenience
during the dry season, and often becomes a definite impediment to navigation. In some seasons, it has extended from the Strait of Georgia to Portland Inlet (B.C. Pilot, 1965: 47). With summer closure of forests in recent years, its prevalence has considerably diminished.

Surface Winds

Generally, the strength of the winds is not particularly high for a western coast facing the mid-latitude westerlies. The regime of prevailing winds along the inner coasts varies considerably with topography. The alignment of inlets and passages frequently deflects the wind from the barometric gradient and within short distances, especially when entering or leaving a passage, the wind direction and velocity may be entirely different. Because the majority of inlets and passages are aligned in a NW-SE or NE-SW direction the winds are almost invariably channelled to blow in these directions. Tables I and II on page 50 show average wind speeds, directions and frequencies for Comox Airport, 17 miles south of the study area, on Vancouver Island.

In summer cyclonic activity is much reduced, anticyclones more numerous and consequently northwest winds most frequent. The few gales that do blow are local and of short duration, bringing strong south-easterly and southwesterly winds. In late July and August calms are experienced more frequently with occasional light winds. All gales (in advance of sharp fronts) generally blow from the southeast. After passage of the front, the wind very rarely shifts to the northwest, usually only to southwest. The southwest wind sometimes comes blustering
### TABLE I.

**WIND BY DIRECTION**
*(Averages for Comox Airport)*

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#### MEAN % FREQUENCY

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(Sources: Lea, 1966, p. 14; Kendrew & Kerr, 1955, p. 12)

**NOTE:** In interpreting these figures it is important to bear in mind that Comox Airport is located on the east coast of Vancouver Island, at the edge of rolling country with mountains to the west running NW-SE.

### TABLE II.

**WIND SPEED**

<table>
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<th>PERCENTAGE FREQUENCY OF WIND SPEED</th>
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</table>

(Sources: Lea, 1966, p. 14; Kendrew & Kerr, 1955, p. 12)
in with gale force, even though the southeast wind ahead of the front was light. The northwest winds blow whenever a wedge of high pressure, covering the interior of British Columbia spills onto the coast or when they appear behind a cold front aligned southwest-northeast which is moving down the coast. West winds blow when the Hawaiian High moves onto the coast from the Pacific.

Strong local winds frequently occur in mainland inlets, especially those oriented from between northeast and east. They are caused by cold polar air being directed down the fiords by a high pressure system over the central and north interior. They seldom occur in the summer months but are frequent in late fall and winter. The 'Squamish' of Howe Sound and the 'Bute' of Bute Inlet are good examples. Wind direction in inlets is almost invariably channelled along the length of the inlet, following the bends, and most often directed up-inlet during the summer. When the up-inlet wind is strong it sometimes raises a nasty chop of short, steep seas - especially when the predominant outflow of fresh runoff water on the surface combines with a strong ebb tide.

In summary, the wind systems, though light to moderate in summer, are well suited to recreational boating, with generally enough wind for the average sailor but not too much to disturb the average motorboater.
CONCLUSION

This chapter has described the resource background of the study area, with emphasis on its unique bio-physical qualities - the magnificent scenery of fiords and islands with their faunistic and floral variety, the abundance of protected anchorages and cruising routes, the warm waters and tidal lagoons supporting diverse ecosystems, and the variations in climate from sea-level Mediterranean to Coast Mountain alpine (with glaciers and snow fields).

Traditionally, the marine environment was thought to be impervious to misuse. We now know this is not so for there are limits to its resilience. The sea shore is vulnerable (Quayle, 1971: p. 11). The manner in which it is used or cared for will have direct effects on the boater's enjoyment or his recreation experience.

In the next chapter the various uses of the area will be described and the possible sources of conflict and potential problems outlined.
III. RESOURCE USES

The major industrial, commercial, private and recreational uses of the resources described in the previous chapter will now be analysed, with emphasis on their effect on the environment of the boater.

Logging

The study area has been extensively logged in the past, but at present little active logging is carried on, due to the relative inaccessibility and poor quality of the remaining timber sites. Past timber cutting has tended to be selective with consequently little impairment of the visual landscape. Many old logging roads and timber cuts can only be traced by the often subtle changes of shading from coniferous to deciduous greenery. Old logging roads terminating in unused log dumps and booming grounds at the shoreline are sometimes spotted by the still standing A-frame derricks, discarded logging machinery and deserted loggers shacks. Those roads which are still somewhat usable, if only for foot travel, are marked on Map 6, p. 54.

More recent logging activities have left ugly scars in Pendrell Sound, Homfray Channel and Toba Inlet (Map 5, p. 37; Figure 15, p. 55, Figure 1, p. 7, Figure 4, p. 20). Where burning has occurred and logging 'cleanup' activities have followed, predominant scars mark the landscape; particularly, near the shoreline at Sarah Point (Figure 16, p. 55). In an attempt to prevent similar occurrences, boaters have erected 'NO CAMPFIRE' signs on Mink Island, Tenedos Bay, and Prideaux Haven.
Map 6. Settlements and Road Access in the Study Area
(Sources: Canadian Topographic Maps, B.C. Forest Maps)
Figure 15. Logging, Pendrell Sound

Figure 16. Entrance to Desolation Sound. Burned and Logged Over Sarah Point on Right
Other effects of logging which inhibit the boaters' recreation experience are noise pollution (not a major problem during summer months when most logging is restricted due to fire hazard), and silt pollution (impairment of water quality from increased soil erosion after logging). The latter adversely effects fish habitat and the visual appearance of the water. The major effect is debris pollution - especially in Pendrell Sound where there is little tidal flushing and elsewhere after high spring tides and storms have lifted driftwood from beaches and broken up a few log booms. Although deadheads (partially submerged logs) are considered a major hazard, some boaters consider them to have a positive effect in that their presence causes power-boaters to decrease their speed in order to look for them, thus dampening the effect of their high-speed wakes. Deadheads are a particular nuisance in confined anchorages and harbours and at the entrances to sounds and inlets on an ebb tide.

One positive effect of logging, seldom recognized by boaters, is that log booms in storage can provide a convenient mooring with access to shore over the logs in areas often too deep for anchoring. Conflicts may arise, however, when a towboat arrives in the middle of the night to remove the boom or when logs are boomed in shallow areas where the recreation boater would prefer to anchor by himself (booming has occurred as recently as 1968 in Melanie Cove, Prideaux Haven - the most popular single anchorage in the study area). Shore booming grounds near to logging camps also have serious side effects - particularly in tidal flats and estuaries. Deposition of bark and non-floating wood particles
on the sea floor create anaerobic conditions with the subsequent
destruction of all living organisms except bacteria. Unpleasant odours
often develop and it requires many years after cessation of logging
operations for the area to recover (Quayle, 1970: p. 12). Frequently
used booming grounds are shown on Map 6, p. 54. A mass of driftwood
on a beach is also a good indicator of a poor anchorage - for drift
piles up as a result of current, wind and sea (Dawson, 1965: p. 26).

It is interesting to note that Bancroft, in commenting on the
increase of logging on the coast in 1913 (p. 57) stated:

"Although the danger (of massive logging)
upon a large scale is not immediate,
except through the lack of individual
responsibility with respect to fires, the
Government would do well to reserve one or
two of the more picturesque fiords as parks,
while they are yet in a state of almost
primeval grandeur."

Fishing

Commercial fishermen operate in the study area and in the tourist
season compete on a seemingly amicable basis with the sports fisherman.
It was noted, however, that the commercial fishermen tended to abandon
use of government wharf facilities at Refuge Cove as the tourist
population increased, preferring instead, to congregate at the wharf in
Cortes Bay (Figure 17, p. 58). Several recreation boaters noted that
they had difficulty in finding space at Cortes Bay and tended to patronize
the facilities at Refuge Cove. When fishermen or loggers meet the
recreation boater, they are often considered as local characters, adding
personal colour to the landscape (Figure 18, p. 58): A role, many of
Figure 17. Cortes Bay - Fishing Boats

Figure 18. Forbes Bay - Retired Logger
them doubtless enjoy. The remains of an abandoned fish cannery, with several deserted homesteads, can be found in Redonda Bay in the northwest corner of West Redonda Island.

The Commercial Fisheries Branch of the Provincial Government operates a Pacific Oyster Breeding Station in Pendrell Sound which does not appear to interfere with boat recreation activities. The operation consists of spawning beds, but due to phytoplankton bloom in 1969, it has been a commercial failure (Department of Recreation and Conservation, 1969: 76).

Agriculture

There is virtually no active farming or cultivation of land within the study area, with the exception of private gardening by residents of Cortes Island and some small scale subsistence farming at a hippy commune in Galley Bay. Dawson (1965: 82) reports the existence of a large farm in Theodosia Inlet, originally homesteaded in 1899, though little evidence of the farm was found in 1970. Abandoned orchards are found in Laura and Melanie Coves of Prideaux Haven, Tenedos Bay and Redonda Bay.

Private Facilities

The major commercial marina facilities are listed in Table III. The largest development is that of B.C. Coastal Marine Resorts Ltd., in Refuge Cove. This operation will be discussed more completely in the accompanying thesis (Oliver, forthcoming). Wharves constructed by logging camps are not intended for public use, but during the summer months when there is little logging activity the boater is seldom discouraged from
<table>
<thead>
<tr>
<th>LOCALITY</th>
<th>GOVT WHarf</th>
<th>PRIVATE WHarf</th>
<th>LOGGING CAMP</th>
<th>FUEL</th>
<th>WATER</th>
<th>GROCERIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>GORGE HARBOUR</td>
<td>3 berths</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MANSON'S LANDING</td>
<td>10 berths</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CORTES LODGE</td>
<td>9 berths</td>
<td>16 berths</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>REFUGE COVE</td>
<td>10 berths</td>
<td>22 berths</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>CORTES BAY</td>
<td>4 berths</td>
<td>10 berths</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>SQUIRREL COVE</td>
<td>6 berths</td>
<td>4 berths</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BLISS LANDING</td>
<td>4 berths</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LUND</td>
<td>50 berths</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>SHARPES BAY</td>
<td>Disused</td>
<td>4 berths</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>REDONDA BAY</td>
<td>3 berths</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FORBES BAY</td>
<td></td>
<td></td>
<td>Disused</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TEAKERNE ARM</td>
<td></td>
<td>5 berths</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DOCTOR BAY</td>
<td></td>
<td>4 berths</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Sources: Lea, 1966: p. H7, 8; Morris, 1968: p. 31)
tying up.

Public Facilities

The Department of Public Works of the Federal Government has constructed several excellent wharves as public landings. The typical installation consists of a wharf and float, located in a sheltered bay and can be used by fishermen or visiting boaters as well as local inhabitants. In major centres a Wharfinger or Harbourmaster is appointed to supervise moorage and collect fees (Westview has the northernmost mainland appointee). The Provincial Parks Branch has recently established a marine park in the Ragged (Copeland) Islands, north of Lund. The first of several planned for the study area (see p. 107).

Settlements and Access

Settlements generally conflicts with boat recreation when access is denied to land by private property and when buildings or development begins to deteriorate wilderness qualities.

Cortes Island has been moderately settled and is connected to Vancouver Island by a ferry service via Whaletown, situated on the western tip of Cortes and Quadra Island. Approximately 20 miles of public road have been built on Cortes, connecting several small settlements and Indian Reservations. The official terminus of the mainland highway (101) is Lund, but a 4-wheel drive road extends north to Bliss Landing and there is also access to Malaspina Inlet, east of Lund, via Okeover Landing.

Aside from Cortes Island, private land in the study area is scarce,
due to Crown Reserve on all shoreline. In the Redonda Islands, the only permanent private residence is that of Mr. and Mrs. Hope who have recently sold their marina operation in Refuge Cove to B.C. Coastal Marine Resorts Ltd. Several loggers and beachcomber-fishermen have leases to erect homes on Crown Land while they are engaged in their trade. Several of these leases are located in north Refuge Cove (Figure 19, p. 64 and Figures 20, 21, p. 65) and there are a few connected with logging activities in Teakerne Arm, Doctor Bay, Pendrell Sound and Roscoe Bay (Map 6, p. 54 and Figs. 22, 23, p. 66).

Private Land and Historical Interest

There are several holdings of private land on the mainland in Malaspina Inlet, but only one, at Portage Cove, which is of direct influence on boating recreationists. The owner of this property (a prime location between Desolation Sound and Wooton Bay) dislikes tourists who land on his property with the intention of crossing the isthmus to look at the view. Mink Island is privately owned by four American yachtsmen who have issued 'charters' to worthy yachtsmen, giving authority to police the anchorage at Mink Cove against 'undesirable' boaters. They have stipulated their desire to keep Mink Island as natural as possible, for the enjoyment of all boaters, and have no expressed desire to build on their property.

Several deserted shacks, homesteads and abandoned orchards are found in the study area (Figures 24, 25, p. 67).

These provide interesting places to explore for the boater interested in
early settlement. The availability of various accounts of the early settlers and histories of the original inhabitants - the Indians, has stimulated many boaters to visit these waters (Blanchet, 1967; Dawson, 1965; Calhoun, 1969). The Indian Reserve at Squirrel Cove is the only one in the study area which is presently inhabited. The majority of Indians have abandoned their native traditions while being assimilated into white society. Teakerne Arm is also an interesting place to explore for it was here that Captain Vancouver anchored in July 1792 in the 'Discovery' while he explored the surrounding inlets and channels with the Spanish Captains Galiano and Valdes.

Recreational Use

The major recreational use has traditionally been for pleasure boating due mainly to the difficulty of access and the remoteness from centres of population. The various areas of the land and waterscape utilized by the boater and described in Chapters II and III are summarised on Map 7, p. 68. Potential problem areas resulting from conflicts with other resource users (logging, settlement) and from adverse environmental side effects (boater pollution, visual and environmental pollution from logging) are depicted on the overlay. In the next chapter, the boaters' attitudes, interests and perceptions of the recreational environment will be analysed and evaluated.
Figure 19. Logger - Fisherman Settlement in Refuge Cove
Figure 20. Fisherman's Shack, Refuge Cove

Figure 21. Logger's Floathome, Refuge Cove - Towed from Camp to Camp
Figure 22. North Tip of East Redonda Island

Figure 23. Logging Camp, Doctor Bay, Waddington Channel
Figure 24. Indian Community, Squirrel Cove

Figure 25.
Deserted Shack,
Laura Cove,
Prideaux Haven
Map 7. Major Recreation Areas
IV. BOATER INTERESTS, ATTITUDES AND ACTIVITIES

This chapter will describe the boater's interests, attitudes, activities, and travel patterns, as determined by analysis of responses to the questionnaire distributed in Refuge Cove and Desolation Sound throughout the summer of 1970 (Appendix A). Only the average or aggregate results will be considered in this chapter, with heavy reliance on maps and tables for ease of representation and organisation. A more detailed analysis, correlating individual and group responses with social, economic and behavioural data will be made in the accompanying thesis (Oliver, forthcoming). This thesis will correlate questionnaire responses with observed boater behaviour to aid in determining the degree of 'environmental awareness' of different types of boater.

The questionnaire was designed to solicit as unbiased a response as possible with several open-ended questions which could be correlated for accuracy of response with the ranking questions. Questionnaires were distributed in person to all boaters, regardless of boat type, weather, time of day or nationality with an explanation of the purpose of the survey - ("to determine the interests and activities of boaters to aid in future planning and for university research"). Boaters were encouraged to complete the questionnaire in their own time and return by mail, in person, or by leaving it in a box at the Refuge Cove Store. Nevertheless, the limitations of the questionnaire, outlined in Chapter I (p. 12) must be borne in mind when interpreting the results.
BOATER TRAVEL PATTERNS IN TIME AND SPACE

Origin and Length of Trip

An analysis of Table IV reveals that the majority of boaters began their trip to Desolation Sound from the United States. The average length of time taken to reach the area was found to be 6.3 days although over 60% of the boaters took fewer than 5 days. The average length of time spent in the study area was found to be 7.7 days which, when compared to the average time the boater was away from home of 23.2 days, leaves an average of only 3 days spent outside the study area and not in transit to or from home. This fairly low figure indicates that the majority of boaters considered Desolation Sound as the focal point of their holiday, since approximately 2/3 of their 'on-site experience' was spent within the study area. These travel time figures correlate well with the spatial distribution of travel routes as shown on Map 8, p. 72.

TABLE IV.

BOATER ORIGIN

<table>
<thead>
<tr>
<th>AREA</th>
<th>&quot;WHERE IS YOUR HOME&quot;</th>
<th>&quot;WHERE DID YOU BEGIN THIS TRIP&quot;</th>
<th>&quot;WHERE WILL YOU FINISH THIS TRIP&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Responses</td>
<td>%</td>
<td>Responses</td>
</tr>
<tr>
<td>LOWER MAINLAND</td>
<td>164</td>
<td>24</td>
<td>176</td>
</tr>
<tr>
<td>VANCOUVER ISLAND</td>
<td>75</td>
<td>11</td>
<td>85</td>
</tr>
<tr>
<td>MAINLAND COAST</td>
<td>19</td>
<td>3</td>
<td>52</td>
</tr>
<tr>
<td>OTHER CANADA</td>
<td>4</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>WASHINGTON</td>
<td>353</td>
<td>51</td>
<td>359</td>
</tr>
<tr>
<td>OTHER USA</td>
<td>74</td>
<td>11</td>
<td>17</td>
</tr>
</tbody>
</table>
Routes in the Strait of Georgia

A total of 430 boaters indicated their routes on the map provided in the questionnaire. Although many of these respondents attempted to sketch in their route with a fair amount of accuracy, many neglected to sketch in routes taken outside of the study area (delineated by a dashed line). Of the 246 boaters who indicated use of Malaspina Strait (located between Texada Island and the mainland), approximately 70% \( (93 + 77) \) crossed from Vancouver Island, with the remainder (76) following the mainland coast. This is due to the large number of boaters who travel north through the Gulf Islands, crossing the Straits (or 'Gulf', as it is known by most boaters) at Nanaimo. Only 58 boaters indicated use of the more exposed route between Texada Island and Vancouver Island.

Routes up Jervis Inlet

Of the 89 boaters who entered Jervis Inlet, only 10 returned by the same route. Most boaters entered east of Nelson Island and returned west of Hardy Island on their way up to Desolation Sound. Hotham Sound was entered by 18% (16) of these boaters and 19% (17) cruised beyond the Skookumchuck rapids into Sechelt Inlet. Of the 58 boaters who cruised north beyond Egmont Point, all but 2 reached Princess Louisa Inlet, indicating the magnet-like effect of this marine park.

Routes in the Study Area

Of the 356 boaters who indicated their entrance into the study area from the south, approximately 94% (333) used Desolation Sound east of Kinghorn Island with 8% (29) entering Malaspina Inlet. A fairly high
proportion - 66% (233) used Lewis Channel, north of Teakerne Arm; Waddington Channel - 48% (170) had more use than Homfray Channel - 24% (84), while 14% (51) continued north up Toba Inlet. North of the study area, 132 boaters (36%) indicated travel beyond Stuart Island. These figures are biased in that they are only a record of routes used by those boats which stopped at Refuge Cove and a few anchorages in Desolation Sound. For a more accurate account of boat traffic outside of Refuge Cove see Map 9, p. 75.

Intensity of Boat Use in Refuge Cove

Boat visitation was estimated by an analysis of total questionnaires received, field log book observations and Guest Book notations. The most accurate estimate of intensity of boat use in Refuge Cove is the summation of field log book observations made through the summer of 1970. Because several days were missed while survey work was being done in other parts of Desolation Sound, these summations were corrected to cover the full month by correlation with the Guest Book Register, located in the Refuge Cove Store. It was estimated that 1,100 different boats used Refuge Cove in the summer of 1970 with as many as 55 boats in the Cove at any one time. A total of 3,375 boat entrances was explained by the fact that many boats returned several times. Indeed, some boats passed up to two weeks in Refuge Cove, going out to fish or cruise and returning several times during the day.

Despite the fact that the Guest Book Register is a much less accurate method of estimating intensity of use, a comparison of entries
from previous years does give a rough estimate of annual increase in boat traffic. Totals for previous years were 534 (1968), 794 (1969), with 921 registrations in 1970 (up to 29 August).

TABLE V.
MONTHLY VARIATION OF BOAT VISITATION - REFUGE COVE

<table>
<thead>
<tr>
<th>MONTH</th>
<th>1970</th>
<th>1969</th>
<th>1968</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAY</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>JUN</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>JUL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AUG</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SEP</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The number of questionnaires returned does not provide an accurate measure because fewer were distributed, or completed, when Refuge Cove was most crowded. Several days were also missed while survey work was being conducted in other parts of Desolation Sound. Questionnaires were distributed in Refuge Cove only during the latter 10 days in June, 26 days in July and 18 days in August.
Map 9. Boat Traffic Outside Refuge Cove
Intensity of Boat Use in Desolation Sound

It was roughly estimated that 1/3 of all boat traffic using Desolation Sound stops at Refuge Cove. This estimate was made by observing boat traffic between 0900 hours and 1630 hours on Tuesday, 21 July (the peak of the boat season) from a vantage point outside Refuge Cove. The results are summarised on Map 9, p. 75. Of a total of 279 boat observations only 11 were non-recreational (9 fishing boats and 2 RCN coastal training ships). Of the 60 boats entering Desolation Sound from the south, 13 continued up Lewis Channel, 26 continued east up the sound and 10 entered Refuge Cove.

The intensity of boat use in several anchorages in the study area was determined by developing an index of crowding (see Chapter V and Appendix C for results). This measure was obtained by compiling the results of Q(38) "MARK 'X' THOSE PLACES YOU HAVE STOPPED AT OR DEFINITELY INTEND TO STOP AT", with observations made while visiting these anchorages through the summer and with the area of water available at each location for suitable anchoring. The most heavily used anchorages were Mink Cove, Prideaux Haven and Tenedos Bay.

Projected Expansion in Cruising Area

The responses to Q(31) "NAME TWO PLACES YOU INTEND TO VISIT IN YOUR BOAT OVER THE NEXT TWO YEARS", are depicted on Map 10 and in Table VI. The results indicate that there is a general tendency to explore further north. There were 225 mentions of localities north of the study area within British Columbia, while 56 responses mentioned Alaska. An
additional 41 responses were for the general term 'north'. Approximately 60% of the boaters indicated a desire to return to Desolation Sound (246 responses). The town which received the most responses was Campbell River with 26; Victoria was next with 10. A total of 61 boaters expressed a desire to visit the west coast of Vancouver Island, with Barkley Sound receiving 18 responses. The Canadian Gulf Islands received a total of 70 responses with the American Gulf Islands (San Juans) receiving 42.

An interesting trend developed when few boaters showed any desire to return to the Pender Harbour - Secret Cove area, although these areas are currently quite popular (see Map 13, p. 95). Their reluctance may stem from increasing residential and summer cottage development in these areas, which though not severe now, will probably be quite extensive in two years time. Among the miscellaneous responses were: 'around the world', 'Tierra del Fuego', 'a restaurant', and 'a clothes dryer'. The latter comment indicates the frustration felt by some comfort-minded boaters when the weather is bad in a remote area.

Time Spent Cruising and Ashore

The results to Q(15) "ON THE AVERAGE, HOW MANY HOURS DO YOU SPEND IN EACH 24-HOUR DAY: a) cruising, b) moored or anchored, c) ashore"; showed that the average boater spent an average of 4½ hours cruising in each 24 hour day, 16½ hours moored or anchored and 3 hours ashore. These averages have implications for the importance which the boater gives to various activities, afloat and ashore, which will be discussed next.
TABLE VI.
PROJECTED EXPANSION OF THE BOATERS' CRUISING AREA
PLACES INTENDED TO BE VISITED OVER THE NEXT TWO YEARS

<table>
<thead>
<tr>
<th>LOCALITY</th>
<th>RESPONSES</th>
<th>LOCALITY</th>
<th>RESPONSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Desolation Sound</td>
<td>246</td>
<td>Seattle</td>
<td>6</td>
</tr>
<tr>
<td>Gulf Islands</td>
<td>70</td>
<td>Shoal Bay</td>
<td>9</td>
</tr>
<tr>
<td>Alaska</td>
<td>56</td>
<td>Jervis Inlet</td>
<td>9</td>
</tr>
<tr>
<td>San Juans</td>
<td>42</td>
<td>Bute Inlet</td>
<td>8</td>
</tr>
<tr>
<td>West Coast of Vancouver Is.</td>
<td>37</td>
<td>Around Vancouver Island</td>
<td>6</td>
</tr>
<tr>
<td>Princess Louisa Inlet</td>
<td>29</td>
<td>Quadra Island</td>
<td>6</td>
</tr>
<tr>
<td>Knight Inlet</td>
<td>28</td>
<td>Nanaimo</td>
<td>5</td>
</tr>
<tr>
<td>Rivers Inlet</td>
<td>27</td>
<td>Hill Island</td>
<td>5</td>
</tr>
<tr>
<td>Campbell River</td>
<td>26</td>
<td>Loughborough Inlet</td>
<td>5</td>
</tr>
<tr>
<td>Stuart Island</td>
<td>26</td>
<td>Gulf of Georgia</td>
<td>5</td>
</tr>
<tr>
<td>Barkley Sound</td>
<td>18</td>
<td>Malcolm Island</td>
<td>4</td>
</tr>
<tr>
<td>Minstrel Island</td>
<td>17</td>
<td>Northern Vancouver Island</td>
<td>4</td>
</tr>
<tr>
<td>Queen Charlotte Islands</td>
<td>15</td>
<td>Silva Bay</td>
<td>3</td>
</tr>
<tr>
<td>Johnston Straits</td>
<td>15</td>
<td>Secret Cove</td>
<td>3</td>
</tr>
<tr>
<td>Alert Bay</td>
<td>14</td>
<td>Pender Harbour</td>
<td>3</td>
</tr>
<tr>
<td>Phillips Arm</td>
<td>12</td>
<td>Port Hardy</td>
<td>3</td>
</tr>
<tr>
<td>Victoria</td>
<td>10</td>
<td>Vancouver</td>
<td>3</td>
</tr>
<tr>
<td>Kingcome Inlet</td>
<td>10</td>
<td>Kitimat</td>
<td>3</td>
</tr>
<tr>
<td>Prince Rupert</td>
<td>9</td>
<td>Bella Coola</td>
<td>3</td>
</tr>
<tr>
<td>Howe Sound</td>
<td>3</td>
<td>'North'</td>
<td>47</td>
</tr>
<tr>
<td>Washington</td>
<td>16</td>
<td>Unknown other</td>
<td>17</td>
</tr>
<tr>
<td>California</td>
<td>9</td>
<td>Mexico</td>
<td>7</td>
</tr>
<tr>
<td>Lake Powell, USA</td>
<td>7</td>
<td>Hawaii</td>
<td>5</td>
</tr>
</tbody>
</table>

NOTE: Only localities with three or more responses are shown.
Map 10. Projected Expansion in the Boater's Cruising Area
BOATER ACTIVITIES

Afloat

The results to Q(14) "WHAT ACTIVITIES DO YOU ENGAGE IN WHILE CRUISING IN YOUR BOAT?", are tabulated in Table VII, p. 81. The boater was asked to rank these activities 1, 2, 3, 4 in order of importance. It can be seen that the boat-centred, more passive form of recreation activity of 'relaxing' was considered to be the most important (ranked 1, 2, 3 or 4 by 80% of the boaters); with the environmentally based activities of 'viewing scenery' (75%), 'exploring' (60%), and 'fishing' (60%) rating next in importance. Other more passive forms of boat-centred recreation - 'sunbathing' (37%), 'eating and drinking' (32%) and environment-centred recreation - 'observing wildlife' (21%), 'photography' (21%) do not significantly rate. In the 'other' category, 'sailing' received the highest response, followed by 'swimming' and 'scuba or skin diving'.

Ashore

In Q(16) "WHAT DO YOU LOOK FOR WHEN YOU GO ASHORE?", 'stores' and 'solitude and wilderness' both ranked first by 26% of the boaters, receiving overall scores of 65% and 60%, respectively. This response outlines one of the major dichotomies of recreation management - that of the boater's desire for solitude and wilderness, without sacrificing his apparent need for man-oriented facilities and amenities. Where do the boaters' ultimate sympathies lie? The question is difficult to answer but its resolution may be discerned from those trends of looking to the environment
TABLE VII.
WHAT ACTIVITIES DO YOU ENGAGE IN WHILE CRUISING IN YOUR BOAT

PERCENTAGE RESPONSE

<table>
<thead>
<tr>
<th>Activity</th>
<th>0%</th>
<th>10%</th>
<th>20%</th>
<th>30%</th>
<th>40%</th>
<th>50%</th>
<th>60%</th>
<th>70%</th>
<th>80%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relaxing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Viewing scenery</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Exploring</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Fishing</td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Sunbathing</td>
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<td></td>
<td></td>
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<tr>
<td>Eating &amp; Drinking</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Observing Wildlife</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Photography</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

TABLE VIII.
WHAT DO YOU LOOK FOR WHEN YOU GO ASHORE?

PERCENTAGE RESPONSE

<table>
<thead>
<tr>
<th>Activity</th>
<th>0%</th>
<th>10%</th>
<th>20%</th>
<th>30%</th>
<th>40%</th>
<th>50%</th>
<th>60%</th>
<th>70%</th>
<th>80%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oysters &amp; Clams</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stores</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Solitude &amp; Wilderness</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restrooms, garbage disposal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Viewpoints or outlooks</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trails</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Freshwater lakes</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shacks, homesteads</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hotels or taverns</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rank</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>Oysters &amp; Clams</td>
</tr>
<tr>
<td>2nd</td>
<td>Stores</td>
</tr>
<tr>
<td>3rd</td>
<td>Solitude &amp; Wilderness</td>
</tr>
<tr>
<td>4th</td>
<td>Restrooms, garbage disposal</td>
</tr>
</tbody>
</table>
for articles and values normally considered obtainable only in packaged containers or through man-made channels of communication. An example of this trend - exemplified by the need to feel self-sufficient - is noted in the accumulative percentage response of boaters going ashore to look for 'oysters and clams' (see Table VIII, p. 81). The high response of 67% may also be due in part to the boater who feels he is getting for 'free' something he normally has to pay a fairly high price for. Other responses illustrating this dichotomy - 'wilderness' versus 'civilised facilities' - are made in the analysis of the results to Q(24) and Q(30) on pages 88 and 112 respectively, and to Q(17) below.

Throughout the rest of Q(16) man-built facilities (restrooms, garbage disposal facilities, trails, etc.) vie in importance with environment-provided facets of the landscape (viewpoints or outlooks, fresh water lakes). Hotels or taverns were not generally considered important.

CRITERIA FOR CHOOSING ANCHORAGES, MOORAGES AND ROUTES OF TRAVEL

The results to Q(17) as shown in Table IX, p. 84, stress that the physical properties of a location are the most important factors considered when the boater is looking for a mooring or anchorage. 'Shelter' (86%) and 'suitable bottom, depth and tides' (68%) received the most responses, while the environmental (lack of development), social (lack of people) factor of 'solitude and quiet' received the next highest score (65%). The supply of man-made facilities was not considered important with 'fuel supplies, stores, restrooms' (42%) and 'adequate
TABLE IX.
WHAT DO YOU LOOK FOR IN A GOOD MOORING OR ANCHORAGE?

<table>
<thead>
<tr>
<th>WHAT DO YOU LOOK FOR IN A GOOD MOORING OR ANCHORAGE?</th>
<th>PERCENTAGE RESPONSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amount of shelter</td>
<td>0% 10% 20% 30% 40% 50% 60% 70% 80% 90%</td>
</tr>
<tr>
<td>Suitable bottom, depth, tides</td>
<td></td>
</tr>
<tr>
<td>Solitude and quiet</td>
<td></td>
</tr>
<tr>
<td>Local scenery</td>
<td></td>
</tr>
<tr>
<td>Fuel supplies, stores, restrooms</td>
<td></td>
</tr>
<tr>
<td>Adequate floats and wharves</td>
<td></td>
</tr>
<tr>
<td>Absence of other boats</td>
<td></td>
</tr>
<tr>
<td>Presence of other boats</td>
<td>0%</td>
</tr>
<tr>
<td>Other</td>
<td>0%</td>
</tr>
</tbody>
</table>

TABLE X.
WHAT FACTORS DO YOU CONSIDER MOST IMPORTANT IN PLANNING YOUR ROUTE?

<table>
<thead>
<tr>
<th>WHAT FACTORS DO YOU CONSIDER MOST IMPORTANT IN PLANNING YOUR ROUTE?</th>
<th>PERCENTAGE RESPONSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Winds, tides</td>
<td>0% 10% 20% 30% 40% 50% 60% 70% 80%</td>
</tr>
<tr>
<td>Presence of unspoiled wilderness</td>
<td></td>
</tr>
<tr>
<td>Location of shore facilities</td>
<td></td>
</tr>
<tr>
<td>Quality of fishing</td>
<td></td>
</tr>
<tr>
<td>Location of marine parks</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
</tr>
</tbody>
</table>

**RANKED FIRST**

**RANKED SECOND**

**RANKED THIRD**

**RANKED FOURTH**
floats and wharves' (41%) ranking behind 'local scenery' (53%). Several boaters indicated that this could have been two questions in that they looked for fuel and stores only at moorages (places with floats or wharves), while they considered shelter, solitude and scenery at anchorages. This point was well taken, however, the intent of this question was to determine, indirectly, which boaters preferred moorages (with developed facilities where environmental factors are not necessarily as important), and which preferred anchorages (where environmental factors must be considered). The results indicate that anchorages are more important than moorages.

Environmental factors were also of the greatest importance for the boater planning his cruising route. The responses to Q(21) Table X, p. 83, show that 'winds, tides' (74%) were ranked first by 43% of the boaters. 'Location of shore facilities' (57%) ranked first by only 9% of the boaters. 'Quality of fishing' (41%) and 'location of marine parks' (35%) were lowest in importance.

ATTITUDES TO THE ENVIRONMENT - LIKES AND DISLIKES

The results to Q(23, 24, 29, 30) were most interesting as an open response was solicited. These responses, could only be influenced by the preceding information supplied by the questionnaire. The results to Q(23) "WHAT DO YOU FIND MOST DELIGHTFUL ABOUT THIS AREA?" and Q(29) "DO YOU CONSIDER THIS AREA TO HAVE A UNIQUE OR SPECIAL QUALITY? PLEASE BRIEFLY DESCRIBE THIS QUALITY.", are tabulated in Table XI under ten categories. The tabulation of the responses to these two questions was
combined because of the similarity of replies. Few boaters, however, actually duplicated their response (if one quality or special like was mentioned in Q(23) a different one was supplied to answer Q(29)). From the ranking, the importance is similar for both questions but the weighing for each category received is varied. The categories were chosen after a perusal of the range of responses. Most responses were easy to classify but a few were difficult and could overlap into another category, e.g., the response 'serenity' was classified under 'scenery' although the word has connotations which could have classed it under 'solitude and quiet'.

TABLE XI.

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>(23) WHAT DO YOU FIND MOST DELIGHTFUL ABOUT THIS AREA</th>
<th>(29) BRIEFLY DESCRIBE THE UNIQUE OR SPECIAL QUALITY OF THIS AREA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RESPONSES</td>
<td>%</td>
</tr>
<tr>
<td>Scenery or beauty</td>
<td>421</td>
<td>61</td>
</tr>
<tr>
<td>Lack of Pollution or Development</td>
<td>155</td>
<td>22</td>
</tr>
<tr>
<td>Solitude and Quiet</td>
<td>137</td>
<td>20</td>
</tr>
<tr>
<td>Good Anchorages and Cruising</td>
<td>132</td>
<td>19</td>
</tr>
<tr>
<td>Warm waters, good swimming</td>
<td>124</td>
<td>18</td>
</tr>
<tr>
<td>Fishing, other marine, wildlife</td>
<td>105</td>
<td>15</td>
</tr>
<tr>
<td>Weather</td>
<td>57</td>
<td>8</td>
</tr>
<tr>
<td>Friendly people</td>
<td>29</td>
<td>4</td>
</tr>
<tr>
<td>Unspecified</td>
<td>34</td>
<td>5</td>
</tr>
<tr>
<td>No response</td>
<td>36</td>
<td>5</td>
</tr>
</tbody>
</table>
Sample responses for each category are given below:

Scenery or beauty - The range of responses for Q(23) included 255 mentions of the word 'scenery' alone; 'scenery' plus a descriptive adjective such as 'beautiful', 'rustic', 'natural', 'variety of', 'spectacular', etc., accounted for approximately 60 further responses. The remaining responses generally mentioned some facet of the topography or shoreline with or without a descriptive adjective. A few responses were for more general terms involving sense of sight, feeling, space, intangible qualities connected with scenery, etc. (e.g. 'God's country feeling'). In Q(29) only 49 boaters mentioned 'scenery' alone. The majority used descriptive adjectives on a much larger scope than in Q(23) to qualify what they considered unique about the scenery. A larger proportion also mentioned more detailed facets of the topography (e.g. 'high mountains close to water', 'steep fiord inlets', 'tranquil lagoons', etc.).

Lack of Pollution and Development - This category received a higher response in Q(29) than in Q(23) with the majority of responses in both questions being for the terms 'unspoiled' and 'wilderness'. Other common responses were: 'undeveloped', 'primitive', 'natural', 'lack of progress', 'unpolluted', 'clean waters' and 'uncivilized'.

Solitude and Quiet - The majority of responses were for the terms 'solitude', 'quiet', 'uncrowded'. Other typical responses were: 'peaceful', 'absence of other boats and people', 'remoteness', 'isolation'. A few terms were on the borderline with the lack of development category (e.g. 'underpopulated', 'lack of inhabitants').
Good anchorages and cruising - Several of the responses in this category could have been classed under 'scenery' (e.g. 'beautiful anchorages', 'virgin waters', 'many delightful fiords and coves to explore', etc.). But were classed under the above category, because the emphasis of these responses is toward an aspect of boat activity rather than viewing of scenery per se. A large proportion of the responses were for 'protected', 'sheltered', and 'calm waters' referring to the unexposed nature of the Strait of Georgia (a quality absent in United States waters with the exception of Puget Sound). Other responses mentioned the abundance of 'good, deep, safe, unique, and secluded anchorages' available and the 'endless variety of coastline, passages, coves', etc. to explore. A number of responses made comparisons of the area with other areas (e.g. 'better cruising than Norwegian fiords or Greek isles', 'most beautiful cruising ground in the world', etc.). Presumably these boaters were familiar with a large range of cruising waters.

Warm waters and good swimming - The majority of responses were for 'warm waters'. About a third of the responses mentioned 'swimming'. Although the warm waters are unique to this area (see Chapter II, p. 44), it was mentioned in Q(29) by only 70 as a unique quality, with a response of 125 in Q(23). Other responses were: 'unpolluted swimming water', 'accessible fresh water swimming' and 'clear, clean waters'.

Fishing, other marine and wildlife - Approximately half of the responses in this category for both questions mentioned 'fishing'. About a third mentioned 'oysters' or 'clams'. The remainder of the responses were for
seafood', 'wildlife', and other aspects of the natural environment ('wild berries', 'vegetation', etc.).

Weather - Included in this category were: 'climate', 'warmth', 'sunshine', 'good sailing winds', and 'poor weather' (classed as a positive quality because it has the effect of discouraging other boaters, thus increasing solitude and quiet).

Friendly people - Includes 'interesting inhabitants', 'colourful locals', 'congenial people' (referring to operators of Refuge Cove Store), 'friends', 'relatives', etc.

Unspecified - The majority of responses were concerned with the facilities and supplies provided by the store in Refuge Cove (some boaters presumably speculating that the questionnaire was a secret market survey, sponsored by the operators of Refuge Cove Store).

No Response - Only 36 boaters had no answer to give for Q(23). For the first part of Q(29) (Do you consider this area to have a unique or special quality?) 26 stated 'no' and 96 gave no response. A total of 149 boaters gave no response to the second part of the question (Please briefly describe this quality).

The results to Q(24) 'WHAT DO YOU FIND LEAST DELIGHTFUL ABOUT THIS AREA?' are tabulated in Table XII. It is interesting to note here that while only 5% of the boaters were unable to answer Q(23) 'WHAT DO YOU FIND MOST DELIGHTFUL...', 11% stated 'nothing' and 25% made no response for Q(24). Typical terms used under each category are given below Table XII. Please note that only sample responses are given here, a fuller, more complete analysis will be made in the accompanying thesis (Oliver,
TABLE XII.

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>RESPONSES</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of civilization, amenities &amp; facilities, etc.</td>
<td>129</td>
<td>19</td>
</tr>
<tr>
<td>People &amp; Boats (lack of solitude &amp; quiet)</td>
<td>101</td>
<td>15</td>
</tr>
<tr>
<td>Nothing</td>
<td>74</td>
<td>11</td>
</tr>
<tr>
<td>Pollution and Development</td>
<td>68</td>
<td>10</td>
</tr>
<tr>
<td>Natural Discomforts (mosquitoes, etc.)</td>
<td>55</td>
<td>8</td>
</tr>
<tr>
<td>Weather</td>
<td>55</td>
<td>8</td>
</tr>
<tr>
<td>Americans</td>
<td>44</td>
<td>6</td>
</tr>
<tr>
<td>Lack of garbage disposal facilities</td>
<td>21</td>
<td>3</td>
</tr>
<tr>
<td>Unspecified</td>
<td>19</td>
<td>3</td>
</tr>
<tr>
<td>No Response</td>
<td>173</td>
<td>25</td>
</tr>
</tbody>
</table>

Lack of Civilization, Amenities and Facilities - Typical responses were for: 'insufficient wharfage', 'lack of supplies', 'lack of ice', 'high prices at store', 'lack of shore facilities and restaurants', 'lack of liquor stores', and 'lack of shore power' (for hookup to electrical appliances in boats). There were a fair number of responses for 'lack of water' due to one week, at the height of the summer, when the Refuge Cove water supply ran dry.

People and Boats - Sample responses were: 'getting too crowded', 'large,
fast power cruisers', 'noise of outboard engines in quiet anchorages', 'loud, obnoxious, inconsiderate, etc., boaters', 'tourists'.

Nothing - This category included 'no problems', 'perfect', 'no complaints', etc.

Pollution and Development - The most typical responses were: 'garbage', 'pulpmill smoke and odour' (Powell River is located approximately 15 miles southeast of Refuge Cove), 'logging scars', 'increased commercialization and development', 'pollution at marinas', 'non-sinkable garbage thrown overboard by fellow boaters'. Some responses indicated more of an annoyance with 'careless people' than with garbage or pollution per se and were classed under the 'people and boats' category.

Natural Discomforts - The largest number of responses were for 'mosquitoes' with 'poor fishing', second. Other 'discomforts' listed were 'insects', 'anchorages too deep', 'poor beaches', and 'long distance from Seattle'.

Americans - Typical responses were: 'too many foreign boats although the people themselves friendly', 'uncooperative Americans', 'large, fast yankee vessels with big wakes', 'arrogant Americans who take our facilities for granted'.

Lack of Garbage Facilities - Many of these responses could have been classed under the 'pollution and development' category but it was felt that the large number and more positive nature of the response warranted a separate category.

Unspecified - A few responses were: 'lack of supervision', 'no marine parks', 'poor management of wilderness areas', 'government charts outdated', 'need for better marine weather forecasts'.
Popular Areas in the Strait of Georgia - The results to Q(25) 'NAME TWO AREAS YOU LIKE MOST IN THE STRAIT OF GEORGIA' are depicted on Maps 11, 12, p. 92, 93; and summarised in Table XIII. For ease of cartographic representation only those areas mentioned more than twice are shown on the maps. It is interesting to note that Desolation Sound, though north of the Georgia Straits, proper, received the largest number of responses. This is partly because many boaters consider the 'Straits' to include everything between Vancouver Island and the mainland, and partly because questionnaires were only distributed in Desolation Sound. The Gulf Islands were also extremely popular with 250 total mentions. Although the Silva Bay area of Gabriola Island received the most individual mentions (35), marine parks received more responses than other individual localities in the Gulf Islands.

AREAS ON THE COAST CONSIDERED MOST POPULAR, MOST BEAUTIFUL
Maps 13 and 14, p. 95 and 96, and part of Table XIV depicts the results to Q(38) 'ON THE MAP PROVIDED, MARK 'X' THOSE PLACES YOU HAVE STOPPED AT OR DEFINITELY INTEND TO STOP AT'. This question produced results apparently similar to those of Q(25) just described, but in form of response quite different. Q(38) required that specific places be located by the boater on the map provided, while Q(25) is more a measure of the boaters' remembrance of general areas most liked. Q(25) does however provide a convenient means of interpolating results from the northern straits to the southern straits and Gulf Islands for the map question, Q(38). Map 13 is necessarily a summary of all localities marked and grouped into one locality heading (e.g. all places marked north of Stuart Island are included within the
TABLE XIII.
AREAS MOST LIKED IN STRAIT OF GEORGIA

<table>
<thead>
<tr>
<th>AREA</th>
<th>AREA MENTION</th>
<th>SPECIFIC LOCALITY MENTION</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Desolation Sound</td>
<td>194</td>
<td>141</td>
<td>335</td>
</tr>
<tr>
<td>(2) Gulf Islands</td>
<td>134</td>
<td>116</td>
<td>250</td>
</tr>
<tr>
<td>(3) North of Georgia Straits proper</td>
<td>-</td>
<td>61</td>
<td>61</td>
</tr>
<tr>
<td>(4) Jervis Inlet</td>
<td>31</td>
<td>57</td>
<td>88</td>
</tr>
<tr>
<td>(5) Nelson and Hardy Islands</td>
<td>23</td>
<td>26</td>
<td>49</td>
</tr>
<tr>
<td>(6) Pender Harbour</td>
<td>68</td>
<td>9</td>
<td>77</td>
</tr>
<tr>
<td>(7) Secret Cove and Welcome Pass</td>
<td>40</td>
<td>42</td>
<td>82</td>
</tr>
<tr>
<td>(8) Other in Strait of Georgia</td>
<td>15</td>
<td>82</td>
<td>97</td>
</tr>
</tbody>
</table>

TOWNS

- Nanaimo 30
- Lund 10
- Westview-Powell River 7
- Campbell River 7
- Other 6

'Bute Inlet' symbol). Arrows attached to symbols indicate the range of responses. It must be noted that responses within the study area are considerably higher than those outside, since the intent of the questionnaire was to concentrate on this area. Some discretion should therefore be used in comparing popularity of areas within the study area to areas outside.

The places most frequently stopped at within the study area were Refuge Cove (307 responses, due mainly to the number of questionnaires distributed...
MAP II
AREAS MOST LIKED IN STRAIT OF GEORGIA

- Individual Mention
- Total Mentions

NOTE: Only locations mentioned more than twice are shown

SEE MAP 12 FOR (2) GULF ISLANDS
Map 12. Areas Most Liked - Gulf Islands
Map 14. Places Most Frequently Stopped At (Marked with an 'X')
See Results to Q(38) for Names of Localities (Map 24, Table XIV)
Outside the study area, highest responses were for Stuart Island (115), Savary Island (67) and the towns of Campbell River (56), Lund (141), and Westview (116). The developed summer home-resort area of Pender Harbour received 115 responses while the less developed area of Secret Cove (including Smugglers Cove) received 121 responses.

As outlined above a similar procedure was used to depict the results to the latter half of Q(38) 'MARK '0' THOSE AREAS YOU CONSIDER MOST BEAUTIFUL OR ATTRACTIVE'. The results are shown on maps 15 and 16, p. 98, and 99, and in Table XIV. Within the study area, the highest scores were for Prideaux Haven (125) and Tenedos Bay (112). The next highest scores were for Mink Cove (45) and Von Donop Inlet (44) on Cortes Island. An additional 9 boaters circled the entire study area. The largest response outside the study area was for Princess Louisa Inlet (67) and the Secret Cove - Smugglers Cove area (44).

Because the number of '0' responses does not necessarily indicate that an area within the study area is more beautiful than an area outside (with fewer responses). A more accurate measure of 'relative beauty' would be established through a ratio of 0's to X's (number of responses for a place considered beautiful, divided by the number of people who stopped at that place). The results are shown on Maps 17 and 18, p. 101 and 99 and in Table XIV.

Several considerations must be borne in mind when interpreting these maps. Firstly, places may have been marked with a '0' which offered no opportunity for stopping (as is the case in many of the inlets). Secondly,
MAP 16. PLACES CONSIDERED MOST BEAUTIFUL (MARKED WITH AN '0')

MAP 18. INDEX OF RELATIVE ATTRACTIVENESS (RATIO OF '0's/'X's)
it was assumed that even where opportunity for stopping existed, many boaters marked only an '0' instead of an '0' plus an 'X' though they may well have stopped at that place. This is obviously the case with Princess Louisa, which recorded only 49 'X's' and 67 '0's' for a ratio of 1.37. Another explanation for this high ratio is that boaters may have visited Princess Louisa in previous years, or that boaters do not stop at Princess Louisa once they get there (an unlikely event). At any rate, the high index indicates that Princess Louisa Inlet has an established reputation as one of the most beautiful areas in the northern Straits.

Maps 16 and 17 show only those localities with a denominator (number of 'X's') larger than 10 as below this figure the index becomes somewhat unreliable. The index does offer a more reliable means of comparing relative attractiveness or beauty of areas within the study area with areas outside. In comparing Maps 16 and 17 with Maps 14 and 15 some interesting relationships become apparent.

Within the study area it can be seen that Refuge Cove has the lowest ratio (Map 18), while according to Map 16 it appears as the seventh most beautiful place. Similarly, the smaller anchorages which were visited by fewer boaters have more importance in Map 18 (e.g. Talbot Cove, Thulin Passage, Isabel Bay, etc.). Note that Tenedos Bay (.88) has replaced Prideaux Haven (.70) as the most 'beautiful' place in the study area. It can also be seen that North Pendrell Sound appears equal in beauty to Doctor Bay and Roscoe Bay on Map 16, while in Map 18 its significance is diminished. The overall criterion which seems to
INDEX OF ATTRACTIVENESS
- A MEASURE OF THE RELATIVE BEAUTY OF LOCATIONS ON THE COAST
- DETERMINED BY FINDING THE RATIO OF Number of Boaters who Considered a place Beautiful Number of People who Stopped at that place

NOTE: Only Localities with Denominator (# of X's) larger than 10 are shown on map.
- See Table XIV for identification of localities
diminish the measure of beauty in all cases for Map 18 is that where
the degree of development, or increased contact and crowding with other
boaters is high, the index of attractiveness will be low (e.g. North
Pendrell Sound has extensive logging, Refuge Cove and Cortes Bay are
the major developed commercial marina centres).

This criterion also applies outside the study area. Stuart Island,
Pender Harbour and Secret Cove, all established commercial marinas with
high scores on Map 15 have been replaced by the undeveloped areas of
Okisollo Channel, Hole in the Wall, Toba Inlet and Nelson and Hardy
Islands on Map 17. This map is therefore a more useful tool in
deciding priorities for protection of beautiful areas.

Index of Attractiveness for Selected Cruising Routes - The volumes of
boat traffic between selected channel points (see Map 8, p. 72) was
compared with the number of '0's' marked between the points to arrive
at a rough index of relative attractiveness for cruising routes similar
to the index of attractiveness just described (p. 97). The results are
shown on Map 19. The highest index in this case is for Malaspina Inlet
in the study area (1.9), this is probably due, in part, to the fact that
many more boaters indicated their presence in the inlet by '0's' and 'X's
rather than by drawing a line to mark their route because the inlet, itself,
is fairly small as shown on the map. The next highest index is for
Princess Louisa Inlet (1.27). Other routes considered especially
beautiful are Hotham Sound (1.06), Southwest Cortes (.97), Desolation
Sound (.89) and Sutil Channel (.60). Routes within the study area will be
further analysed in Appendix D. This technique has many applications, for
land as well as water routes, since it could be used to determine the relative attractiveness of hiking trails or scenic highways.

BOATER ATTITUDES TO MARINE PARKS

Throughout the Strait of Georgia 14 Marine Parks have been established by the Provincial Parks Branch of the Department of Recreation and Conservation since 1957. The location of these and proposed future parks are shown on Maps 20 and 21. These parks are intended to provide essential facilities for the enjoyment of the boating public, keeping in mind the need to maintain the natural surroundings of the area. An inventory of facilities provided at these parks is given in Table XV. They generally offer sheltered anchorage, with mooring buoys, floats and water-front recreation facilities such as picnic tables, fire circles and water supply. Sanitary facilities are located at all developed parks and provision made for collection and disposal of refuse. These parks are distinct from the commercial marinas which offer fuel, provisions, boat rental and other marine services. The average cost of acquisition of these properties has been quite high for their size, exclusive of their development, and has increased tremendously in recent years. Because of their small size they are used primarily by the small boater (length under 25 feet) who may wish to camp ashore.

What is the attitude of the boater to those marine parks provided by the Provincial Government? Response to Q(27) 'HAVE YOU VISITED ANY OF THE MARINE PARKS IN THE STRAIT OF GEORGIA' indicated that 382 (55%)
Map 21. Marine Parks - Gulf Islands (See Table XV)
<table>
<thead>
<tr>
<th>MAP KEY</th>
<th>PARK</th>
<th>LOCATION</th>
<th>BOAT FLOATS</th>
<th>MOORING BUOYS</th>
<th>CAMPSITES</th>
<th>PICNIC SITES</th>
<th>FIREPLACES</th>
<th>TOILETS</th>
<th>WATER</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SIDNEY SPIT</td>
<td>Sidney Island</td>
<td>Yes</td>
<td>8</td>
<td>6</td>
<td>6</td>
<td>9</td>
<td>4</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>BEAUMONT</td>
<td>South Pender Is.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>3</td>
<td>MONTAGUE</td>
<td>Galiano Island</td>
<td>Yes</td>
<td>12</td>
<td>31</td>
<td>25</td>
<td>31</td>
<td>10</td>
<td>Yes</td>
</tr>
<tr>
<td>4</td>
<td>TENT ISLAND</td>
<td>South of Kuper Is.</td>
<td></td>
<td>5</td>
<td>4</td>
<td>4</td>
<td></td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>NEWCASTLE ISLAND</td>
<td>Nanaimo</td>
<td>Yes</td>
<td>18</td>
<td>15</td>
<td>18</td>
<td>6</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>PLUMPER COVE</td>
<td>Keats Island</td>
<td>Yes</td>
<td>8</td>
<td>10</td>
<td>6</td>
<td>10</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>PRINCESS LOUISA</td>
<td>Jervis Inlet</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>10</td>
<td>REBECCA SPIT</td>
<td>Quadra Island</td>
<td></td>
<td>5</td>
<td>5</td>
<td>10</td>
<td></td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>
TABLE XV. (PART B)

INVENTORY OF MARINE PARKS

Undeveloped

<table>
<thead>
<tr>
<th>MAP KEY</th>
<th>PARK</th>
<th>LOCATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>PIRATES COVE</td>
<td>De Courcy Island</td>
</tr>
<tr>
<td>8</td>
<td>SMUGGLERS COVE</td>
<td>North of Sechelt</td>
</tr>
<tr>
<td>11</td>
<td>PRINCESS MARGARET</td>
<td>Portland Island</td>
</tr>
<tr>
<td>12</td>
<td>*RAGGED ISLANDS</td>
<td>North of Lund</td>
</tr>
<tr>
<td>13</td>
<td>GARDEN BAY</td>
<td>Pender Harbour</td>
</tr>
<tr>
<td>16</td>
<td>THURSTON BAY</td>
<td>Sonora Island</td>
</tr>
<tr>
<td>17</td>
<td>ECHO BAY</td>
<td>Gilford Island</td>
</tr>
<tr>
<td>20</td>
<td>GIBSON</td>
<td>Flores Island</td>
</tr>
</tbody>
</table>

Proposed

<table>
<thead>
<tr>
<th>MAP KEY</th>
<th>PARK</th>
<th>LOCATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>HARMONY ISLANDS</td>
<td>Hotham Sound</td>
</tr>
<tr>
<td>15</td>
<td>BOHO BAY</td>
<td>Lasqueti Island</td>
</tr>
<tr>
<td>18</td>
<td>*WALSH COVE</td>
<td>Waddington Channel</td>
</tr>
<tr>
<td>19</td>
<td>*VON DONOP</td>
<td>Cortes Island</td>
</tr>
<tr>
<td>21</td>
<td>*PRIDEAUX HAVEN</td>
<td>Desolation Sound</td>
</tr>
<tr>
<td>22</td>
<td>*TENEDOS BAY</td>
<td>Desolation Sound</td>
</tr>
<tr>
<td>23</td>
<td>*GRACE HARBOUR</td>
<td>Malaspina Inlet</td>
</tr>
<tr>
<td>24</td>
<td>*CARRINGTON BAY</td>
<td>Cortes Island</td>
</tr>
<tr>
<td>25</td>
<td>BILLINGS BAY</td>
<td>Jervis Inlet</td>
</tr>
<tr>
<td>26</td>
<td>QUARRY BAY</td>
<td>Jervis Inlet</td>
</tr>
<tr>
<td>27</td>
<td>BLIND BAY</td>
<td>Jervis Inlet</td>
</tr>
</tbody>
</table>

* Located in Study Area
boaters had visited a park, 269 had not and 39 gave no response. A large number of boaters indicated that they did not know what marine parks were. Many stated that they were not well advertised and therefore did not know how to find them. A few boaters confused the commercial operation at Refuge Cove with a marine park and gave responses indicating a wish for more facilities (shore power, restaurants, etc.).

The results of Q(28) 'BRIEFLY LIST YOUR FAVOURABLE (AND OTHERWISE) IMPRESSIONS OF THOSE MARINE PARKS', are listed in Table XVI.

TABLE XVI. (PART A)
BOATER COMMENTS ON MARINE PARKS

<table>
<thead>
<tr>
<th>RESPONSES</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Favourable Comment</td>
<td>249</td>
</tr>
<tr>
<td>Unfavourable Comment:</td>
<td></td>
</tr>
<tr>
<td>- due to crowding</td>
<td>65</td>
</tr>
<tr>
<td>- due to lack of maintenance</td>
<td>24</td>
</tr>
<tr>
<td>- due to lack of facilities</td>
<td>48</td>
</tr>
<tr>
<td>- unspecified</td>
<td>20</td>
</tr>
<tr>
<td>Need More Marine Parks</td>
<td>42</td>
</tr>
<tr>
<td>No Response</td>
<td>242</td>
</tr>
</tbody>
</table>

Several boaters indicated the name of the park alongside their comments. This gave an indication of the relative popularity or scale of visitation to these parks:
TABLE XVI. *(PART B)*  
BOATER COMMENTS ON MARINE PARKS

<table>
<thead>
<tr>
<th>PARK</th>
<th>FAVOURABLE COMMENT</th>
<th>UNFAVOURABLE COMMENT</th>
<th>TOTAL MENTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Montague Harbour</td>
<td>19</td>
<td>10</td>
<td>45</td>
</tr>
<tr>
<td>Newcastle Island (Nanaimo)</td>
<td>19</td>
<td>5</td>
<td>33</td>
</tr>
<tr>
<td>Tent Island</td>
<td>8</td>
<td>9</td>
<td>22</td>
</tr>
<tr>
<td>Princess Louisa</td>
<td>11</td>
<td>6</td>
<td>19</td>
</tr>
<tr>
<td>Plumper Cove (Keats Island)</td>
<td>5</td>
<td>9</td>
<td>17</td>
</tr>
<tr>
<td>Pirates Cove (De Courcy Island)</td>
<td>5</td>
<td>2</td>
<td>15</td>
</tr>
<tr>
<td>Beaumont (Bedwell)</td>
<td>4</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>Rebecca Spit</td>
<td>3</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>Sidney Spit</td>
<td>2</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>Smugglers Cove</td>
<td>2</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>*Mitlenatch Island (Nature Reserve)</td>
<td>2</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Portland - Princess Margaret</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Other (not a marine park or in U.S.)</td>
<td>5</td>
<td>4</td>
<td>15</td>
</tr>
</tbody>
</table>

*NOTE: Mitlenatch Island, located approximately 4 miles south of Cortes Island is not an official marine park, but a 'nature reserve' with a seabird colony and a Parks Branch Naturalist who interprets bird life for tourists in the summer.*

Sample responses for Q(28) are given below:

Favourable Impressions - The majority of responses commented on the high
degree of maintenance - 'well kept', 'clean', 'well maintained', etc. Others commented on the siting of the parks - 'good shelter', 'well laid out', 'good location', etc.; and facilities, including 'good shore camping spots', 'hiking trails', 'ease of mooring on individual floats'. An important factor was that the land was public property, 'able to go ashore without feeling I'm trespassing'; and also that an effort was made to retain the natural beauty while providing essential facilities.

Unfavourable Impressions - Crowding: The majority of unfavourable comments noted the crowded nature of these parks at peak periods and the feeling that the parks themselves were too small. It is interesting to note that while several boaters had never heard of marine parks and would have liked to see them advertised, those who had visited them often found them too crowded. Some boaters thought that the parks were a good idea solely because they tended to concentrate a fair number of boaters in a 'known' place, thus leaving the 'undiscovered' anchorages more peaceful and less crowded. However, this comment does not carry the thinking process too far, for how long can boaters continue to enjoy the 'undiscovered' places if they do not have a protected status and are pressed into other uses.

Lack of Facilities - Facilities which were often found lacking in marine parks in order of importance were: number of mooring buoys, garbage disposal, floats and wharfage, and water supply. A few boaters mentioned lack of fuel and provisions, stores, etc., which are restricted to the commercial marinas.

Lack of Maintenance - The responses in this category were mainly concerned
with the disposal of garbage at present facilities and rates of collection, which, in some of the parks was found to be inadequate for the number of boaters who use these facilities. A few boaters mentioned the condition of mooring buoys and the results of vandalism, although vandalism in marine parks is considerably lower than in the highway parks because of limited access.

Unspecified - These comments ranged from 'do not like' to comments on boaters' behaviour within the park - 'too much water-skiing in crowded conditions', 'not enough supervision of thoughtless boaters'.

Need More Marine Parks - A fairly large number of boaters stated that there were far too few marine parks. Typical responses were 'need more for poorer boaters who can't afford moorage fees', 'being developed too slowly', 'need hundreds more', 'acquire more before all shoreline becomes private property'.

It should be noted that only 19% of the boaters who had visited marine parks were displeased with the facilities or maintenance.

BOATER ATTITUDES TO MAINTENANCE OF THE ENVIRONMENT

The results to Q(29) 'DO YOU CONSIDER THIS AREA TO HAVE A UNIQUE OR SPECIAL QUALITY?', have been discussed on page 85 and tabulated in Table XI. Q(30) asked 'DO YOU HAVE ANY SUGGESTIONS HOW TO MAINTAIN THIS QUALITY?'. The results are listed in Table XVII under 10 categories, chosen after a perusal of the range of responses. The most significant result is that 36% of the boaters had no suggestions.
TABLE XVII.

SUGGESTIONS FOR MAINTENANCE OF THE MARINE ENVIRONMENT

<table>
<thead>
<tr>
<th>SUGGESTIONS</th>
<th>RESPONSES</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>STOP DEVELOPMENT</td>
<td>186</td>
<td>27</td>
</tr>
<tr>
<td>STOP POLLUTION</td>
<td>141</td>
<td>20</td>
</tr>
<tr>
<td>MORE MARINE PARKS</td>
<td>50</td>
<td>7</td>
</tr>
<tr>
<td>IMPROVED OR PLANNED DEVELOPMENT</td>
<td>33</td>
<td>5</td>
</tr>
<tr>
<td>KEEP PEOPLE OUT</td>
<td>31</td>
<td>5</td>
</tr>
<tr>
<td>EDUCATION</td>
<td>27</td>
<td>4</td>
</tr>
<tr>
<td>RESTRICT LOGGING</td>
<td>22</td>
<td>3</td>
</tr>
<tr>
<td>OFFICIAL SUPERVISION</td>
<td>20</td>
<td>3</td>
</tr>
<tr>
<td>CRUISING PERMIT OR FEE</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td>UNSPECIFIED</td>
<td>32</td>
<td>5</td>
</tr>
<tr>
<td>NO RESPONSE</td>
<td>257</td>
<td>36</td>
</tr>
</tbody>
</table>

Typical responses for each category are given below.

Stop Development - Responses were broken down into four sub-categories:

(1) Stop subdivisions and selling of waterfront property - e.g. 'restrict private ownership', 'prevent selling of crown land to real estate and private interests', 'stop land investors from speculating on coastal land', 'keep out developers of private and summer homes'.

(2) Stop commercialization and development - e.g., 'keep out money-making ventures', 'stop exploitation', 'restrict marina and hotel resort development', 'don't build any roads or new facilities', 'no more buildings', 'keep out
'civilization', 'don't encourage artificial developments'.

(3) Don't advertise or improve - 'don't make it attractive or convenient for boaters', 'don't advertise, especially south of the border', 'ban 'tourist' oriented development', 'no more marine parks'.

(4) Do nothing - 'leave it as it is', 'keep natural', 'keep ownership in Queen's name', 'nature cannot be improved'.

Stop Pollution - The responses were sub-divided under problem headings, ranked in order of importance determined by magnitude of response:

(1) General pollution - 'stop', 'restrict', 'control', 'check', 'prevent'.

(2) Boaters' garbage - 'establish barges for ease of garbage disposal', 'encourage boaters to burn and bury', 'more care and co-operation from boaters', 'boaters should burn burnables, sink sinkables and bury floatable unburnables', 'garbage should not be dumped over the side, especially in marinas', 'bulky garbage should not be dumped at marinas or on shore'.

(3) Disposal of garbage at marinas - 'more efficient garbage collection', 'marinas should be discouraged from dumping garbage at sea'.

(4) Sewage disposal on boats - 'prevent sewage disposal at marinas and anchorages', 'require chemical toilets and/or holding tanks', 'more shore toilets', 'all boats should have proper sewage facilities'.

(5) Pulpmills - 'shut down Powell River', 'require anti-pollution devices on pulp mills', 'keep pulp mills out'.

(6) Miscellaneous - 'prosecute those boaters who hazard forests by lighting fires on shore', 'ban noisy, smelly, oil-leaking boats', 'prevent people from painting signs on rocks', 'individuals should make effort to
improve their sense of values regarding pollution.

More Marine Parks - The responses in this category can be sub-divided into those who wanted to see more marine parks similar to the ones presently established (approximately 1/3 of the responses) and those who would like to see much larger areas, if not the whole Strait of Georgia made into a marine park. Included in this category were those who mentioned different types of reserve, such as 'public trusts', 'crown land for recreational purposes', 'wilderness areas', 'recreational reserves', 'co-operative ownership for public recreation', etc..

Improved or Planned Development - Typical responses were 'careful, comprehensive planning', 'more small marinas and mooring facilities', 'develop adequate facilities to attract boaters and keep undeveloped areas uncrowded', 'more, improved facilities and better advertising', 'concentrate development and leave the rest natural'.

Keep People Out - Sample responses in this category were: 'limit American entry', 'keep the hippies out of your beautiful country', 'prohibit sale of land to foreigners', 'birth control', 'keep American tourists from spoiling', 'outlaw motorboats', 'government wharfs and marine parks for Canadians only', 'keep Seattle boats out (like us)'.

Education - Sample responses were: 'educate boaters in courtesy, boat handling, and pollution control', 'teach conservation', 'post signs such as 'no fires', 'slow down', 'quiet', etc.', 'should have literature on safe anchorages and places for garbage disposal'.

Restrict Logging - Some responses were: 'keep loggers out', 'prevent logging to shorelines', 'keep logging out of sight', 'enforce selective
logging and cleanup of debris'.

Official Supervision - Typical responses were: 'strict enforcement and patrolling of anti-pollution laws', 'RCMP surveillance', 'proper policing', 'government patrols', 'more harbour commissions and harbour masters'.

Cruising Permit or Fee - 'tax tourists', 'charge to maintain facilities', 'fee for taking oysters, clams, salmon and other resources out of the country'.

Unspecified - Some responses were: 'strict use controls', 'keep up the good work', 'golden rule', 'keep it raining' and 'Jehovah shall bring to ruin those ruining the earth'.

An analysis of these results when compared to the results of Q(24) (p. 89) proves most interesting. The highest category in Q(24) 'WHAT DO YOU FIND LEAST DELIGHTFUL ABOUT THIS AREA?' is the lack of civilised amenities and facilities, etc., while the highest category in Q(30) 'DO YOU HAVE ANY SUGGESTIONS HOW TO MAINTAIN THIS QUALITY?' is stop development. This dichotomy is one of the major problems of recreation management, namely, how to provide facilities needed by the facilities-oriented recreationist while at the same time protecting the natural or 'wilderness' environment which is a major contributor to the boaters recreation experience. It is important to note here that roughly 30% of the boaters wanted both facilities and wilderness while the remainder 25 to 35% wanted one with the exclusion of the other. (See Oliver, forthcoming, for a more detailed breakdown and comment on different types of boater). Wise management can only solve this dilemma by careful planning and by
encouraging active or passive recreation which involves a closer participation and involvement with nature. The boater will then have opportunity to learn that nature, if properly cared for, can provide many of the things directly which he now seeks only from artificial or man-made facilities. Chapter VI will deal with this problem in more detail and recommend appropriate planning and management policies.
V. EVALUATION OF SCENERY AND THE BOATING ENVIRONMENT

This chapter will review various criteria for evaluating the scenery and recreation potential of the marine environment. Some new techniques to aid in evaluation of scenery and compatibility and capacity for various recreation activities will be introduced. The evaluation of anchorages and cruising routes will evolve from the synthesis of boater assessments and perceptions, the physical properties or environmental attributes, and the degree of development and availability of facilities and services.

PLANNING AND EVALUATION OF RECREATION AREAS

According to Hamill (1971: p. 149) there are six types of classification for planning large recreation areas:

(1) Reconnaissance system - to provide overview of the region and to differentiate between various areas according to their recreation potential, scenic quality, recreational or tourist demand, etc.

(2) Identification of recreation uses.

(3) Identification and rating of the visual attributes of scenery.

(4) Rating recreation potential and scenic attributes of rivers, waterbodies, and shorelines.

(5) System to identify and map opportunities and needs for development.

(6) Administrative classification for public recreational land incorporating decisions about policies for management of amenity resources. Where private land is involved this classification would include legal
zoning restrictions.

In this thesis, Chapters II and III have provided a descriptive background for the first step - the reconnaissance survey, Chapter IV attempted to identify present as well as potential recreation uses (step 2). This chapter will now present criteria and techniques for identifying and rating scenery and recreation potential of anchorages and cruising routes (steps 3 and 4). As previously stated, steps 5 and 6 have often resulted in classifications and policies for commercial recreation or service facility developments. This thesis, will instead, attempt to identify areas for non-development and strict use controls as management policy for preserving the scenic attributes and recreation environment of the boater, (Chapter VI).

EVALUATION OF COASTAL SCENERY

Little research has been done on visual evaluation or recognition of the scenic resource since it was first suggested as a valid pursuit of geography (Younghusband, 1920). This is because attempts to describe scenery in verbal terms, aside from being subjective, are generally not too successful. Even visual descriptions based on maps and photographs are a poor substitute for the three-dimensional reality of the landscapes. The most important limitation is that evaluation attempts consider the landscape as a visual, physical entity and not as a state of mind or an abstract emotional quality. Labelling the landscape as a scenic resource assumes that it has aesthetic value. From this assumption, evaluation techniques can provide a point of view as to what constitutes the
landscape, what affects visual perception of it and how it may be analysed (Burton Litton, 1968).

This point of view is important, not so much to justify measuring scenic values against traditional resource values, or even to measure one type or view of scenery against another, but in developing a new facet of, or means of communication with, the landscape as something to 'see', preserve and protect for what it is and for others to see and enjoy as well.

The classification of scenic resources may include two kinds of survey: (Hamill, 1971: p. 150).

(1) A classification of the total area landscape into sub-areas, based on scenic quality;

(2) A classification of the landscape or scenery as seen from roads, trails or viewpoints.

The area analysis permits the identification of landscape sub-areas that merit special management or protection, as well as sub-areas in which landscape management may be relatively unimportant. The identification of important scenic resources such as mountains, glaciated valleys, fiords, waterfalls, lakes, etc., has been done in Chapter II. Those areas which the boater considered especially attractive or beautiful have been delineated in Chapter IV.

The analysis of landscape as seen from roads, trails and viewpoints was first suggested in a 1963 book, The View From the Road, (Appleyard, et al.). The techniques subsequently developed can also be applied in an analysis of scenery from anchorages and cruising routes, providing
criteria for location of marine park sites and for developing management plans for areas that are visible from cruising routes. An attempt to measure scenic values by correlating amount of land and water seen from various anchorages and cruising routes with patterns of observation and landscape forms was undertaken with the aid of the computer (results in Appendix C and D).

PLANNING METHODS FOR EVALUATION OF MARINE RECREATION AREAS

The practical evaluation of recreation sites stresses the availability of acquiring land or water for recreation use (Brooks, 1966); the natural site (topography, vegetation, climate, etc.) and the human use factors (activities, needs for facilities, limitations, preferences, etc.). Planning guidelines stress the following criteria for establishment of marine parks (B.C. Provincial Parks Branch, 1959; 1963):

(1) Selection of site based on:

(a) quality of offshore - shelter from prevailing winds and seas
- texture of bottom (most bottoms acceptable, except for sheet rock, few boulders, rocks, kelp or weed)
- sufficient depth (10 to 50 feet)
- entrance free of obstructions, good approach
- 5 acre minimum foreshore (1 acre for every 7 boats to be anchored) 50 acres most desirable size

(b) quality of shoreline
- sand beaches, otherwise sandstone or gravel acceptable,
mud or silt not acceptable.

(c) quality of upland
- sufficient upland to preserve scenic outlook from foreshore, and suitable for development of fire circles, campsites, etc. (5 acre minimum, 10 acres preferable, plus buffer terrain)
- maximum slope of 10 to 12%
- light to medium forest cover, good aspect
- fresh water supply an asset

(2) Necessity for park:
(a) outstanding scenery
(b) good water sport area
(c) public access to good beach
(d) shelter in an area of sudden storm
(e) protection of an established recreational anchorage

These criteria are for the marine equivalent of the wayside or highway park. There are at present several of this type of park in the Strait of Georgia (see p. 104). However, due to the popularity and subsequent overcrowding of these parks and the possibility of loss of the rest of the coast to development and private interests, a more comprehensive type of protection is needed, such as provided by the inland wilderness parks or multi-use recreation areas which include wilderness zones. At present, specific criteria for the evaluation and selection of this type of marine park do not exist. The next section will suggest some major factors and techniques for evaluation and
description of anchorages and moorages, which will assist in establishing background information for developing criteria for coastal wilderness parks as well as for individual marine park sites. These criteria will be applied to the study area with results in Appendix C and D.

CRITERIA FOR EVALUATION OF ANCHORAGE OR MOORAGE LOCATIONS

(1) Environmental Attributes

(a) Shelter - The degree of protection is dependent on the nature of the surrounding topography for protection from winds, which if strong enough, will cause a boat at anchor to slew about or drag anchor. Tidal barriers, such as reefs or breakwaters, protect an anchorage from seas which cause a boat to pitch or roll as swells or waves pass under it. The direction of exposure in an unprotected sector is an important consideration with exposure to the southeast being potentially the most dangerous. Where an anchorage is open to seas, a fetch of under 3 miles will only raise a moderate chop, a fetch of over 5 miles will make an anchorage uncomfortable and a fetch of over 10 miles with a SE exposure is dangerous. An important consideration is whether the fetch is restricted or channeled by narrow passages, as this will have a damping effect on seas, though wind strength may be increased.

(b) Anchorage quality - area - this is a relative measure of area of water available within an anchorage which offers suitable anchoring (protected areas of depths one to ten fathoms). A suitable area for one boat will allow enough space for a boat to swing on its anchor with
changes in wind direction or tidal currents and also allow for changes in scope of the anchor line with rise and fall of the tide (normally boats anchor with at least three times the depth of the anchorage paid out in scope). This area can also be interpreted as the physical capacity for safe anchoring (in reality this capacity can be exceeded since boats often tie together and swing from one anchor or tie a line from the stern of the boat to the shore to prevent swinging).

- **bottom** - mud, sand or gravel at least a foot deep is best, a rock bottom is not always suitable, especially when smooth, for the anchor may slide on the rock surface without grabbing. Bottoms in the study area are generally mud of good holding quality unless otherwise specified.

- **rocks** - rocks and shoals present a hazard to the unwary boater, especially those between high and low water levels and those located near the entrance to an anchorage.

- **winds and currents** - tidal currents and winds are a nuisance for they swing a boat at anchor with each change of the tide or gusts of wind, this can lead to a fouled anchor which may break and drag. Currents are generally negligible in study area anchorages; winds are variable and sometimes fairly strong depending on local topography.

(c) **Scenery** - area of viewable land and water - several computer maps were produced depicting areas which can be seen from several anchorages. The total area of land and water visible is also given as a means of comparison between anchorages. In each case the height of viewing is 10 feet above sea level from the centre of the anchorage. In
reality, areas of land and water visible will vary considerably from one end of an anchorage to the other. Other important considerations are that no allowance is made for screening by vegetation or for land and water visible outside of the study area (this factor only important for Cortes Bay and Prideaux Haven). Allowances aside, these maps give a valuable indication of what can be seen and thus give a relative quantitative measure of the scenic attributes possible for each anchorage. It must be emphasised that satisfaction derived from viewing scenery is not entirely dependent on the 'amount' of land or water seen, for often the most enclosed anchorage is regarded as the most beautiful (e.g. Tenedos Bay). The importance of scenery for each anchorage can often be a subtle blend of almost complete enclosure, with distinctive 'micro' or foreground scenery, plus a sector with unrestricted or open vistas to far distant views of striking topography (e.g. Prideaux Haven). Therefore when interpreting these maps, single sectors of small areas stretching for long distances from the anchorage are often more important, scenically, than isolated large or small areas seen at great distance (e.g. Squirrel Cove).

- scenic features - any specific topographic or water features such as cliffs, waterfalls, lagoons, etc. which are visible from, or located in the vicinity of the anchorage are listed.

(d) Accessibility and quality of shoreline for recreation activities - a measure of the amount of shoreline accessible by land (on foot) or water (dinghy) for exploring or beachcombing. Quantity and quality of shellfish available is dependent on area of rocky shores in
tidal zone (oysters) and mud flats at the head of an anchorage (clams) (see Map 4, p. 32), or on the degree of pollution present in the anchorage.

(e) Freshwater access - streams - most anchorages have freshets or small streams running into them which are accessible by dinghy if shoreline vegetation is not too thick, or by land if they run into the head of an anchorage where a mudflat is located.

- lakes - accessibility of freshwater lakes for swimming, trout fishing or scenic value.

(2) Artificial Attributes

(a) Degree of development or lack of 'wilderness' - a measure of the amount and density of commercial development, logging camps, buildings or other indications of the presence of civilization, (a negative quality).

(b) Service facilities - availability of fuel, water, ice, power, groceries, telephone, washrooms, laundromats, showers, etc.

(c) Wharf space or mooring buoys - number and condition of berths available (one berth equals approximately 30 feet of wharf space); number of mooring buoys.

(d) Road access - distance to nearest public road or presence of logging roads or tracks which can be used as hiking trails.

(3) Boater Assessments

(a) Popularity - the relative popularity can be measured by comparing the number of mentions for Q(24) 'NAME TWO PLACES YOU LIKE MOST IN THE STRAIT OF GEORGIA' (see p. 91) between different anchorages.
Another good indication of the degree of use, or frequency of boat stops, is the number of 'X's marked for each anchorage (p. 96 and Table XIV, p. 149) from Q(38).

(b) Attractiveness - the relative attractiveness for each anchorage can be measured by comparing the number of '0's Q(38) and the indices of beauty ('0's/'X's).

(c) Crowding - An index of physical capacity or degree of crowding tolerable for each anchorage can be determined by dividing the number of boater stops ('X's) by the anchorage area (A) from (1) b, p, plus the number of mooring buoys or berths available at government or private wharves (2) c, p. (C = 'X's/A+B). This is only a crude measure since the degree of crowding tolerable for anchorages and moorage varies considerably with other factors (including tolerance of incompatible activities pursued by other boaters (see (d) below)). Usually, if wharfage is available, virtually no boats choose to anchor out. Anchoring occurs only where there are no wharves or when all wharf space is taken. The index was devised to produce a quantitative measure of an often intangible 'feeling'. The desire for solitude ranks very high as a factor in selecting anchorages (see p. 83), but to measure lack of solitude is extremely difficult since social factors such as boating courtesy and manners, antipathy to 'types' of boat (motor or sail), nationality and environmental factors, such as degree of development, are often most important. A more accurate analysis of the psychological carrying capacity or 'saturation point' for anchorages and moorages will be discussed in the accompanying thesis (Oliver, forthcoming).
(d) Compatibility of different recreation activities - In small anchorages, many boaters are in the position of having to compete with one another for a small amount of water and shoreline. Conflicts ensue, especially when the activities they pursue have different space requirements. Boating density standards depend on the type of activity pursued (Jackson, 1970: p. 35). Some activities can be classed as "invulnerable" if they have an unfavourable or restricting influence on other types of boating activity that takes place, or attempts to take place, simultaneously. "Vulnerable" activities are affected and influenced in an unfavourable or limiting way by other boating activity. For example, water-skiing and boat racing form the most noteworthy "invulnerable" activities, especially for swimmers and skin-divers, rowing, sailing, nature study and sometimes beachcombing are "vulnerable" activities, disrupted by high speed power boating which brings problems of noise, pollution and wash. The spatial requirements of boats may generally be regarded as being directly proportional to the speed of the boating activity. Table XVIII depicts the compatibility of various boating activities and their different space requirements.

CRITERIA FOR EVALUATION OF CRUISING ROUTES

(1) Environmental Attributes

(a) Protection - this factor is generally not important within the study area since all routes offer good protection for sheltered cruising and the majority of boats reaching the study area have entered via the more exposed southern Straits.
TABLE XVIII.

BOATING ACTIVITIES: COMPATIBILITY OF USE OF WATER

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<th>NATURE STUDY</th>
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<th>SWIMMING</th>
<th>SKIN DIVING</th>
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(Source: adapted from Gloucestershire CC, in Patimore, 1970: p. 149).

NOTE: Non compatible activities are shown by the shaded squares: thus sailing is compatible with nature study but not with water-skiing. Increasing space requirement means decreasing compatibility.

Activities are roughly ranked according to minimum space requirements (Some types of nature study could, in fact, require more space than power boat racing, also some types of fishing (trolling for salmon) require more space than other types (jigging for cod)).

Although this Table emphasises compatibility between boating activities (it should be noted that) with the exception of beachcombing and fishing increasing space requirement also means decreasing compatibility with the physical environment.
(b) Cruising hazards - currents, rocks, shoals, kelp, drift, etc. - generally negligible in study area due to depth of cruising routes (Malaspina Inlet is the only exception).

(c) Availability of anchorages and moorages - number and quality of anchorages along route, including available service facilities.

(d) Scenery - this is a fairly important factor since viewing scenery is one of the major activities engaged in while cruising (see p. 81). The computer maps indicate the amount and patterns of land and water visible from selected points along each cruising route. These 'visual corridors' are useful to determine the impact of logging or other development activities in 'seen' areas. They should not be used as a device to condone neglect or bad logging practices beyond the visible zone.

(e) Wilderness quality - a measure of degree of development dependent on lack of visible evidence of effects of civilization - absence of buildings, logging scars, pulp mill smoke, roads, etc.

(2) Boater Assessments

Based on popularity or degree of use of cruising routes from map 8, p. 72, (volume of traffic between selected channel points) and the Index of Attractiveness for Cruising Routes (map 19, p. 103).

These criteria are used in the analysis of selected anchorages and cruising routes in the study area (Appendices C and D).
VI. CONCLUSIONS

This study will conclude with a discussion of the major problems as perceived by the recreation boater in Desolation Sound and his suggestions for solving, or at least ameliorating these same problems. Basically, all problems are the result of increased use and expanding development. With an increase in number of boats a larger proportion of boating demand is satisfied, but the result is a lowering of quality of the boating experience. Major problems are:

(1) Crowding - lack of solitude and quiet
(2) Pollution - industrial and recreational
(3) Development - deterioration of wilderness quality

(1) CROWDING

Increased use of the coastline is inevitable with increasing boat ownership and the desire to explore north of the more populated areas. This problem at present, has little direct adverse effects on the environment, other than pollution, but is of considerable importance to the environment of the boater who values solitude and quiet as a major component in the enjoyment of his recreational experience. Suggested solutions which would ameliorate the problem of increased use are:

(a) Education of boaters

- in boating skills, navigation, boat handling, etc. This will open up a wider range of cruising routes and anchorages, presently little used because of access difficulties. Malaspina Inlet generally has a low visitation rate due to the rock and shoal infested entrance
which discourages the less skilled boater)

- in boating courtesy and manners, which would emphasize the need for harmonious relations between boaters of different boat type, nationality etc. Many boaters appear objectionable when they 'drive' their boats at high speeds in narrow passages and crowded anchorages creating large wakes which tend to disturb the more 'tippy' boats. Loud stereo-systems, TV sets and outboard motors on dinghies disturb quiet anchorages. Activities which are considered dangerous and incompatible with the environment are: shooting off firearms, cannons, firecrackers, etc., and water-skiing in crowded areas where people are swimming or skin-diving.

- in a range of possible recreational activities they should encourage closer contact with the environment and foster greater understanding of the need for ecological harmony, e.g. - nature interpretation programmes similar to the one established at the bird sanctuary on Mitlenatch Island.

(b) Increasing the capacity of the area

- by building more wharf and float space in areas which have these facilities at present. This expansion would concentrate people who prefer to moor rather than anchor.

- by providing means for mooring in areas which provide shelter but are too deep for anchoring (see Figure 26, p. 133).
- by encouraging use of the area in months considered 'off-season' when average temperatures are above 50 degrees F. - May, June and September.

(c) Controlling recreation activity
- by zoning areas for recreation activities which are incompatible with other activities or with the environment, (i.e. water-skiing). This is a difficult solution to implement since it entails a fair amount of education and supervision. It should only be considered if crowding becomes much more intense than it is at present.

(d) Controlling access and limiting use
- tourist cruising permits - similar to registration required for entrance to federal national parks. These would limit the
length of visit and the area to be visited, and be graduated to encourage off-season use.

- tourist fishing licences - for canning, packaging or selling of fish and shellfish by visiting sports fishermen and recreation boaters.

- fees or taxes - based on fuel consumption, horsepower or length of boat.

- quota systems - requiring reservations to be made to visit certain wilderness areas which were subjected to high use. Restrictions based on residence could also be considered.

(2) POLLUTION

Most boaters tend to be fairly pollution conscious with regard to disposing of garbage at sea, but disposal tends to create serious side effects for land facilities which are not prepared to cope with the masses of garbage deposited ashore by conscientious boaters (see Figure 28, p. 159). A more acceptable solution would be to educate boaters in proper disposal of their own garbage by:

(a) not using inadequate shore facilities ('pack out what you pack in').

(b) disposing of sinkable garbage at sea in waters over 100 fathoms deep, rather than over the side in shallow anchorages.

(c) listing of moorage locations which have adequate disposal facilities.

Commercial marinas and government wharves should be encouraged to
establish facilities for bulk disposal of garbage. The provisions for enforcement of anti-pollution legislation as outlined in the B.C. Litter Act (July, 1970) should be applied to tidal as well as to inland waters. Regulations restricting the use of heavily-polluting outboard engines which leak oil and gas and discharge noxious fumes, should also be enacted. Encouragement should be given to the installation of holding tanks or chemical toilets for boats, which could be discharged at sea rather than in restricted anchorages and moorages.

Pollution caused by pulpmills and logging should be discouraged by enforcement of anti-pollution laws and careful management of logging operations such as selective logging, debris cleanup and erosion control.

(3) DEVELOPMENT

Although the majority of recreation boaters felt that the environment could be maintained most effectively by stopping all development, such an approach is basically backward looking, and typifies the response of 'stop the world I want to get off'. Wise planning should try to enable all facets of land and water use to live together. Traditional planning has often attempted to create better living conditions by isolating incompatible activities through a policy of zoning. The results can be seen in clear cut, deforested slopes; concentrations of industrial pollution close to squalid living conditions for the poor, while the 'natural' areas are reserved only for those who can afford them.

This thesis has tended to treat the land behind the shoreline as
only an adjunct to the study - important only in the way it is perceived by the recreation boater. Other uses (future as well as present) must be equally considered as part of the whole. Boaters' needs are only one of several differing needs which have to be reconciled in any comprehensive land and water use plan. The question is: should any one use have priority? Nan Fairbrother (1970: p. 304) states:

"Single land-uses seldom create an environment any more than separate piles of butter and sugar and flour constitute a cake; for like a cake an environment is a complicated whole created by skilful blending and fusing of suitable raw materials. Thus instead of the old-style segregation we now need a new style of integration-zoning, not by land-use but by environment, to create specific areas where suitable groups of uses coexist in a suitable setting. This would be zoning as a constructive process - the integration of separate land-uses to form interacting combinations in planned environments."

In other words, land and water must be shared, rather than acquired and used. Each use must consider and respect the requirements of other users. Different uses do not have to be incompatible. Commercial marina developments should be examined carefully and designed to preserve aesthetic aspects by closer integration with the coastal environment. Existing facilities, such as those at Refuge Cove, should be improved to service the increasing number of recreation boaters rather than building new developments in other locations as presently planned (Turner Bay and Hernando Island). Controlled logging can serve to enhance the topography
by considering the needs of the environment as well as the scenic impact. The conflict between leisure home owners and the transient boater can be resolved by reserving intricate shorelines with protected anchorages for the boater, while zoning straight stretches of coastline which have little appeal for the boater, for cottage and private development (see map 22, p.138). Cottage development should be based on ecological principles and strictly controlled with limits on the minimum amount of land capable for sustaining each cottage. Design of subdivisions should ensure minimum tree removal with all buildings set back from the shoreline.

Although the most beautiful areas should be given high priority for preservation (not development) as marine parks or wilderness areas, equal concern for enhancing and protecting the remaining coastal environment should be exercised. Otherwise, parks and wilderness areas might tend to become museum pieces while the rest of the coastline is devastated. "Amenity matters - that is now accepted. It matters everywhere - that is not." (Fairbrother, 1970: p. 316).

Recommendations for the Study Area

The recommendations outlined above are summarised in map 22, p. 138. This map is a synthesis of the physical evaluation of anchorages and cruising routes with boater responses (Appendices C and D). Areas which are not frequently seen from the water (see maps 33 and 38) are designated as preferred logging areas with areas of little relief on Cortes Island and Malaspina Peninsula recommended for controlled cottage development. Four anchorages in Desolation Sound are designated as
Map 22. Recommended Planning Zonation of the Study Area
special use areas and should be managed in a manner similar to the present marine park with no development other than shore toilets, facilities for garbage disposal, and cleared campsites for the small boat camper. Service facilities (gas, fuel, supplies and moorage) should be limited to Refuge Cove, Cortes Bay and Lund. The recommended wilderness park designation would ensure restrictions on all development - logging, mining and private commercial or cottage development. Coastal wilderness values in the areas considered most attractive would thus be protected for the enjoyment of future boaters in a manner similar to the nature conservancy areas of inland wilderness parks.

CONCLUSIONS

The major recommendation of this thesis that the most popular and attractive anchorages and cruising routes be reserved now as marine recreation areas is dependent on effective regulations and management. Unfortunately there is no legislation at present to protect such areas outside of parks. A boating recreation plan is needed in order to establish these areas which could complement the existing system of marine parks. Recreation areas outside the jurisdiction of the Provincial Parks Branch are currently administered by the Forest Service and the Lands Branch; providing only limited protection. Although it is difficult at present, to set legislation in motion which might prejudice economic gain, there are optimistic signs that trends are changing (Yeomans, 1971: p. 41). In 1957, the British Columbia government reserved all unsurveyed islands and islets from Victoria north to the 50 degree
North latitude; and all unsurveyed Crown islands and islets lying between 50 degrees and 51 degrees North latitude for the use, recreation and enjoyment of the public. In 1969, sub-divisions in the Gulf Islands were limited to 10 acre parcels. This by-law and others, emphasising the preservation of natural values, are now being extended northward to cover coastal land in the northern Straits. In January of 1971 several ecological reserves, including the eastern half of East Redonda Island, were set aside for research and educational purposes associated with aspects of the natural environment.

Planners must realize that use of the coastal environment, whether for industry or recreation, must be based on the concept that the resource is exhaustable. There must be a close relationship between intensity of use of the resource and the quality of the use. The marine environment is a natural resource which falls into this classification. The amount of recreation that an area can withstand should be calculated to achieve two aims: (Jackson, 1970: p. 38)

1) to protect the natural qualities of the area

2) to allow the recreation boater to maintain a density of use and activity which will be considered attractive by the boater.

Hopefully this thesis will provide useful background information for a more comprehensive policy of resource management by closer correlation of the needs of the environment with those of the recreation boater.
MARINE RECREATION SURVEY

BOATER'S QUESTIONNAIRE

(1) LOCATION __________________________ (2) DATE __________________________ (3) TIME __________________________

(4) WHERE IS YOUR HOME? ____________________________________________________________

(5) HOW MANY PEOPLE ARE ABOARD? ________

(6) ARE YOU:  a) a family? ________ or  b) a group of friends? ________

(7) WHAT IS THE RANGE OF AGES IN THE CREW? ________ years to ________ years

(8) IS THIS YOUR MAIN HOLIDAY THIS YEAR? ________

(9) WHERE DID YOU BEGIN THIS TRIP? ________________________________________________

(10) WHERE WILL YOU FINISH THIS TRIP? ____________________________________________

(11) HOW LONG WILL YOU BE AWAY FROM HOME? ________ days

(12) HOW LONG DID YOU TAKE TO REACH THIS AREA? ________ days

(13) HOW LONG WILL YOU BE IN THE AREA MARKED BY THE BOX ON THE ATTACHED MAP ________ days

(14) WHAT ACTIVITIES DO YOU ENGAGE IN WHILE CRUISING IN YOUR BOAT? (PLEASE RANK 1, 2, 3, 4 IN ORDER OF IMPORTANCE. MARK 'X' AGAINST THOSE NOT IMPORTANT.)
   a) exploring______ d) relaxing______ g) observing wildlife______
   b) sunbathing______ e) photography______ h) viewing scenery______
   c) fishing______ f) eating and drinking______ i) other (please specify and rank)______

(15) ON THE AVERAGE, HOW MANY HOURS DO YOU SPEND IN EACH 24-HOUR DAY:
   a) cruising______ hrs.  b) moored or anchored______ hrs.  c) ashore______ hrs.

(16) WHAT DO YOU LOOK FOR WHEN YOU GO ASHORE? (PLEASE RANK 1, 2, 3, 4 IN ORDER OF IMPORTANCE. MARK 'X' AGAINST THOSE NOT IMPORTANT.)
   a) freshwater lakes_________________ g) stores_________________
   b) trails_________________ h) old deserted shacks, homesteads etc.______
   c) oysters and clams_________________ i) restrooms, garbage disposal facilities______
   d) viewpoints or outlooks_________________ j) other (please specify and rank)______
   e) hotels or taverns_________________ f) solitude and wilderness______

(17) WHAT DO YOU LOOK FOR IN A GOOD MOORING OR ANCHORAGE? (PLEASE RANK 1, 2, 3, 4 IN ORDER OF IMPORTANCE. MARK 'X' AGAINST THOSE NOT IMPORTANT.)
   a) amount of shelter________ e) fuel supplies, stores, restrooms______
   b) local scenery________ f) presence of other boats______
   c) solitude and quiet________ g) suitable bottom, depth, tides______
   d) absence of other boats______ h) adequate floats and wharves______
   i) other (please specify and rank)______

Appendix A. Boater's Questionnaire
18. What are the most important sources you consult in deciding on an anchorage or mooring? (Please rank, 1, 2, 3, in order of importance. Mark 'X' against those not important.)

- Charts
- Tourist guides and books
- Your own observation
- Information from friends
- Information from local residents
- Other (please specify and rank)

19. If you find no vacant wharfage in an area, do you prefer to:

- Anchor out
- Tie up alongside another boat
- Anchor in another area
- Wait until space is available
- Move to a less crowded wharf
- Other (please specify)

20. a) Do you object to paying moorage fees?
   b) What is a fair fee?

21. What factors do you consider most important in planning your route? (Please rank, 1, 2, 3, in order of importance. Mark 'X' against those not important.)

- Winds, tides
- Presence of unspoiled wilderness
- Location of marine parks
- Quality of fishing
- Location of shore facilities
- Other (please specify and rank)

22. Why did you come to this area?

- A "different" area
- Been before and liked it
- Heard about it from friends
- Read about it
- Own property here
- Get away from "crowded" waters
- Other (please specify)

23. What do you find most delightful about this area?

24. What do you find least delightful about this area?

25. Name two areas you like most in the Strait of Georgia:

a) 

b) 

26. If you have visited the Gulf Islands/San Juan Islands, did you find it:
   (Please rank, 1, 2, 3, in order of importance. Mark 'X' against those not important.)

- Overcrowded
- Pleasant
- Polluted
- Beautiful
- Too developed
- Quiet
- Other (please specify and rank)

27. Have you visited any of the marine parks in the Strait of Georgia?

28. Briefly list your favourable (and otherwise) impressions of those marine parks.
(29) DO YOU CONSIDER THIS AREA TO HAVE A UNIQUE OR SPECIAL QUALITY?

PLEASE BRIEFLY DESCRIBE THIS QUALITY

(30) DO YOU HAVE ANY SUGGESTIONS HOW TO MAINTAIN THIS QUALITY?

(31) PLEASE NAME TWO PLACES YOU INTEND TO VISIT IN YOUR BOAT OVER THE NEXT TWO YEARS:

a) ___________________________  b) ___________________________

(32) OVER THE NEXT FIVE YEARS, DO YOU INTEND:

a) to buy a larger boat    b) to sell your boat altogether

(33) HOW LONG HAVE YOU BEEN ASSOCIATED WITH BOATS? ____________________________ years

(34) WHAT IS THE TYPE OF YOUR BOAT?

length __________________________ feet  H.P. __________________________
sail_____________________________  Cruiser __________________________

THE FOLLOWING SECTION, AS WITH THE FOREGOING, WILL BE TREATED AS CONFIDENTIAL

(35) PLEASE MARK 'X' AGAINST YOUR APPROPRIATE "INCOME BRACKET" (TOTAL FAMILY INCOME)

a) under $6,000   d) $15,000 - $19,999
b) $6,000 - $9,999   e) $20,000 and over

c) $10,000 - $14,999

(36) WHAT IS YOUR OCCUPATION?

a) managerial   d) sales   g) craftsman
b) professional   e) services   h) retired
      technical    f) transportation &  i) self-employed
      clerical    communication   j) other

(37) WHAT IS YOUR EDUCATIONAL STATUS?

a) elementary school   d) some university or trade
b) some high school   training at college

c) high school graduate   e) university graduate
f) post graduate

(38) ON THE MAP PROVIDED, PLEASE DRAW ROUGHLY YOUR INTENDED ROUTE IN THIS AREA. MARK 'X' THOSE PLACES YOU HAVE STOPPED AT OR DEFINITELY INTEND TO STOP AT. MARK '0' THOSE AREAS YOU CONSIDER MOST BEAUTIFUL OR ATTRACTIVE.
TABLE XIV.

PLACES CONSIDERED MOST POPULAR, MOST BEAUTIFUL
(Results to Q(38))

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<th>NORTHERN AREA LOCALITY</th>
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<th>(# of 0's) PLACES CONSIDERED MOST BEAUTIFUL</th>
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TABLE XIV.

PLACES CONSIDERED MOST POPULAR, MOST BEAUTIFUL

(Results to Q(38))

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TABLE XIV.

PLACES CONSIDERED MOST POPULAR, MOST BEAUTIFUL
(Results to Q(38))

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MAP 23
IDENTIFICATION MAP
REFER TO TABLE XIV
FOR LOCALITY NAMES
TABLE XIV.

PLACES CONSIDERED MOST POPULAR, MOST BEAUTIFUL
(Results to Q(38))

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Map 24. Identification Map for Table XIV
ANALYSIS OF SELECTED ANCHORAGEs IN THE STUDY AREA

(See endpaper chart and Map 24 for index key)

REFUGE COVE

(1) Good shelter exists in both arms at head of the cove due to protection from island at mouth (Figure 27, p. 153). There is a small exposure to the SW with a fetch of 3 miles. There is good anchorage close to shore north arms of cove and north of island at entrance to cove. No rocks or current. Anchorage area = 22.

Map 25 indicates views across Desolation Sound to Cortes Island (visible areas are shaded, centre of viewing is indicated by a small square). There is a good viewpoint from a cliff behind the cove, accessible by a 10 minute walk from the shoreline. Area visible = 7.2 sq. miles (1.1 water, 6.1 land).

Beachcombing is poor, due to pollution from fuel dock and accumulated garbage washed ashore (Figure 28, p. 153).

Refuge Lagoon, a freshwater lake, is accessible by a 30 minute walk north through the woods (no trail) from the government wharf or a 5 minute walk from the north arm of the cove.

(2) Refuge Cove is a commercial marina operation (BC Coastal Marine Resorts Ltd.) with a 24 hour generator providing electric power. There is a logger-fishermen settlement in the north arm of the cove (Figures 19, 20 and 21, pages 64 and 65) and two permanent residences in the south arm of the cove. Facilities present are fuel, ice, water, groceries, showers, laundromat, restrooms, post office and radiotelephone. Moorage exists for 38 boats.
(3) Refuge Cove is fairly popular with 13 mentions for Q(25) and 307 'X's for Q(38). These scores are biased considerably due to questionnaire distribution location. Refuge Cove is not considered especially beautiful with a '0' response of 37 and a very low index of attractiveness of .12 (the lowest in the study area). Degree of crowding index is 5.1 (Figure 29, p. 155).
Map 25. Areas Visible from Refuge Cove
Figure 27. Refuge Cove, Looking West Towards Cortes Island

Figure 28. Present Garbage Disposal Facilities at Refuge Cove
Figure 29. Refuge Cove - Uncrowded. Beginning of Season, 22 June, One Fishboat, One Sailboat

Figure 30. Refuge Cove - Crowded. Height of Season, 16 July, 32 Recreational Boats
PRIDEAUX HAVEN

(1) Excellent protection from seas in all anchorages, good protection from all winds except northeasterlies in outer anchorages. Entrance between Oriel rock and Lucy Point obstructed by two rocks. Several drying rocks lie close off southern shore of Melanie Cove. Entrance to Laura Cove obstructed by several detached rocks. Anchorage area = 35.

Excellent views from outer anchorage up Homfray Channel to mainland mountains (Fig 31, p. 158). Area visible is highest for any anchorage in study area - 21.8 sq. miles (4.9 water, 16.9 land). Scenic tidal lagoons and sparsely wooded islets provide interesting exploring (Figure 32, p. 160).

Beachcombing is very good with abundant oysters, accessible shoreline and mudflats for clam-digging at heads of Melanie and Laura Coves, and south of Copplestone and Eveleigh Islands. Low degree of pollution at present but interior of many of small islands are filled with garbage dumped ashore by boaters.

A small freshwater lake is located less than ½ mile south of main anchorage at approximately 300 feet above sea level, but there is no access due to thick underbrush. Small streams drain into Melanie and Laura Coves.

(2) Moderate wilderness quality due to high use and presence of deserted homesteads. Overgrown orchard in Melanie Cove, with disused trail penetrating a few hundred yards into the woods. Several 'No Fire' signs.
Prideaux Haven is the most popular, undeveloped anchorage in the study area with 37 mentions in Q(25) and an 'X' score of 179.

Prideaux Haven ranked first in number of '0's (128) but second in Index of Attractiveness (.70). The degree of crowding is fairly high with an index of 5.1 (Figure 33, p.164).
Map 26. Areas Visible from Prideaux Haven
Figure 31. View of Mainland Mountains from Outer Anchorage, Prideaux Haven
Figure 33. Aerial View, Prideaux Haven
TENEDOS BAY

(1) Excellent protection in NW side of bay, 1 mile fetch from SW in eastern section of bay. Entrances to western and northern sections of bay are obstructed by drying rocks. A drying rock lies near the head of the eastern bay. The several coves provide good anchorage in depths from 1 to 7 fathoms. Anchorage area = 26 (Figure 34, p.164).

Good viewpoints are accessible on cliffs surrounding the bay. Good views of Unwin Lake (see Figure 13, p. 34). Very low area of visibility due to high cliffs surrounding the bay - 2.9 sq. miles (.1 water, 2.8 land).

Poor beachcombing due to cliffs, lack of mudflats

Lake Unwin is reached by a 5 minute walk from the eastern anchorage via a good trail (Figure 13, p. 34). The stream which drains this lake is also accessible and provides ready made showers from a few small waterfalls.

(2) No development except for trail to Unwin Lake and a few 'No Fire' signs. An overgrown orchard and disintegrated shack is located in eastern anchorage.

(3) Tenedos Bay is fairly popular - 6 mentions Q(25) and 'X' score of 127; a '0' score of 112 and the highest index of attractiveness in the study area (.88). The degree of crowding index is moderately high (4.9).
Map 27. Areas Visible from Tenedos Bay
Figure 34. Quiet Anchorage in Tenedos Bay
SQUIRREL COVE

(1) Very good shelter from seas in inner (north) cove behind Protection Island, poor in outer cove which is exposed to SE (6 mile fetch), E (2 mile fetch) and NE (2 mile fetch). Moderate protection from winds due to low surrounding topography. Anchorage area = 50 in depths from one to 6 fathoms. Passage north of Protection Island is foul.

The summits of East Redonda Island and the mainland are visible from the landlocked inner cove due to the low surrounding topography. Area visible is fairly high - 14.5 sq. miles (.1 water, 14.4 land).

Very good beachcombing with accessible shoreline, abundant mud flats for clam digging and oysters.

Squirrel Lagoon can be reached by dinghy from the north arm of the cove (Figure 35, p. 167).

(2) Small Indian community in outer cove (Figure 24, p. 67), habitations at terminus of Cortes Island road - south end of cove. Road and trail access to Whaletown and ferry to Vancouver Island. Little development in inner cove.

Government wharf with moorage for 6 boats, post office, store.

(3) Squirrel Cove is fairly popular - 'X' score of 112, 6 mentions in Q(25), but considered only moderately beautiful - 'O' score of 41, index of .37. Degree of crowding is very low - 2.0 due to large anchorage area.
Map 28. Areas Visible from Squirrel Cove
Figure 35. Squirrel Cove
CORTES BAY

(1) Excellent protection from seas with small exposure to east, 1 mile fetch. Moderately exposed to SE winds due to low topography.

The narrow entrance is encumbered by a drying rock, with safest passage between rock and southern entrance point. Good anchorage in depths from 5 to 8 fathoms. Anchorage area = 20.

Poor scenic views due to enclosed, but low nature of surrounding topography. Views toward mainland, Copeland Islands are possible from northern end of anchorage. Area visible is moderately low - 6.0 sq. miles (.6 water, 5.4 land).

Poor beachcombing due to pollution, development (privately owned property).

Two freshwater lakes are located 1 mile west of Cortes Bay, 3 miles by road. One of these lakes has a white sand beach due to its location in the area of Pleistocene sand and gravel deposits (see Map 3, p. 16).

(2) Commercial marina operation with fuel, groceries and water supply. Government wharf. Moorage for 14 boats. Road access to Whaletown. Low wilderness quality due to fair number of cottages which surround bay (see Figure 17, p. 58).

(3) Cortes Bay is fairly popular - 'X' score of 75 with 5 mentions in Q(25), low index of attractiveness - .21 and 'O' score - 16. The degree of crowding is fairly low - 2.5.
Map 29. Areas Visible from Cortes Bay
MINK COVE

(1) Excellent protection in inner anchorage from seas, 2 mile fetch from E in outer anchorage. Nature of topography tends to funnel and increase SE winds blowing into inner anchorage. Good anchorage in 2 to 3 fathoms behind small island at head of cove. Poor anchorage in outer part of cove (over 10 fathoms). Low anchorage area = 6.

Fair scenic views towards mainland mountains. Scenic trails lead to interior of island. Fairly high area of visibility - 13.1 sq. miles (2.3 water, 10.8 land).

Very good beachcombing with gravel-mudflats and abundant oysters behind island at head of cove. Sparse underbrush increases accessibility of shoreline (Figure 37, p. 172). No freshwater lakes.

(2) Fairly high wilderness quality, a few 'No fire' signs.

Disintegrated shack at head of cove.

(3) Fairly high popularity - 14 mentions in Q(25), 'X' score of 65, high index of attractiveness -.69 and 'O' score - 45. Very high index of crowding - 11.1 (Figure 36, p. 172).
Map 30. Areas Visible from Mink Cove
(1) Good protection behind Gorges Islets and in False Passage. Three mile fetch from south inter main anchorage. Limited anchorage area = 8 in depths from 3 to 10 fathoms.

Enclosed scenery with views down Waddington Channel. Area visible = 4.6 sq. miles (.8 water, 3.8 land).

Beachcombing is good on Gorges Islets, poor on mainland. Oysters abundant, no clams. No lakes or freshwater access.

(2) No development, high wilderness quality.

(3) Walsh Cove is moderately popular - 'X' score of 43 and considered fairly beautiful with an index of attractiveness of .63 and a '0' score of 27. The degree of crowding is moderately high with an index of 5.4.
Map 31. Areas Visible from Walsh Cove
ROSCOE BAY

(1) Excellent protection in inner anchorage, 1 mile fetch from east in outer anchorage. Access to inner bay is restricted by a bar of boulders which is awash at low water. Very good anchorage near head of bay in depths of 2 to 8 fathoms. Anchorage in outer bay is too deep. Anchorage area = 15.

Views out of bay to Mt. Addenbroke on East Redonda Island. Area visible = 5.6 sq. miles (.1 water, 5.5 land).

Fair beachcombing, hindered by thick underbrush along southern shoreline. Mudflats for clam digging only at tidal narrows, centre of bay; since mudflats at head of bay have been polluted by logging debris.

Black Lake is accessible by a 5 minute walk along logging road from the head of the bay.

(2) Logging camp at head of bay lessens wilderness quality.

(3) Moderately popular - 'X' score of 45, 4 mentions in Q(25), considered moderately beautiful - index of .51 'O' score of 23. Index of crowding = 3.0.
Map 32. Area Visible from Roscoe Bay
### TABLE XIX

**SUMMARY OF ANCHORAGE ANALYSIS**

*(QUANTITATIVE PARAMETERS)*

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Map 33. Areas Visible from Major Anchorages
ANALYSIS OF MAJOR CRUISING ROUTES

LUND THROUGH LEWIS CHANNEL

(1) Good protection although route aligned NW-SE (orientation of strongest winds). No rocks or shoals, currents weak near Lund and north of Lewis Channel.

Good anchorage in Thulin Passage (Copeland Islands) (Figure 38, p. 181). Moorage in Squirrel Cove, Refuge Cove, Redonda Bay. Shelter in Teakerne Arm, but poor anchorage because of depth.

Map 34 indicates large sectors of viewing up Desolation Sound with fairly enclosed viewing patterns through Lewis Channel. Nevertheless large areas of the mainland and East Redonda Island can be seen. Good views are also possible to the east (outside the study area) and the mountains of Vancouver Island. Area visible is highest for cruising routes in the study area - 188 square miles from 28 view points (6.7 per view point).

Moderate degree of wilderness quality, with buildings and cottages visible at Lund, Turner Bay, Cortes Island, Refuge Cove and Squirrel Cove. Logging activity at Sarah Point, Teakerne Arm, Pulp Mill smoke from Powell River with southeast winds.

(2) High volume of boat traffic (356 to Refuge Cove, 233 in Lewis Channel). Low index of attractiveness (.35 to Refuge Cove, .10 in Lewis Channel)
Map 34. Areas Visible from Lund Through Lewis Channel
Figure 38. Thulin Passage
LUND THROUGH DESOLATION SOUND AND HOMFRAY CHANNEL

(1) Very good protection as route is aligned perpendicular to strongest winds (with exception of Thulin Passage and North Homfray Channel). No major rocks or shoals.

Good anchorage in Thulin Passage, Galley Bay, Mink Cove, Tenedos Bay, Roscoe Bay and Prideaux Haven. Poor anchorage and moorage in Forbes Bay (exposed to northwest).

Desolation Sound provides a variety of views across low hills and islands to the east and up channels and hanging valleys to the north and east (Figure 7, p. 25). Area visible becomes less through Homfray Channel because of steep, enclosing topography - 209 sq. miles visible from 35 points (5.9 per point).

High degree of wilderness quality with virtually no settlement or logging activity visible.

(2) Very high volume of boat traffic in Desolation Sound (333) but low in Homfray Channel (84). High index of attractiveness in Desolation Sound (.89), low in Homfray Channel (.15) (See Figure 1, p. 7; Figure 9, p. 27; Figure 16, p. 55).
Map 35. Areas Visible from Desolation Sound through Homfray Channel
WADDINGTON CHANNEL

(1) Excellent protection, no rocks or shoals. Current may be strong through northern passage into Pryce Channel at spring tides.

Good anchorage in Roscoe Bay, Doctor Bay and Walsh Cove.

Large sectors of land and water visible at Desolation Sound entrance to channel, decreasing as channel becomes steeper to the north. (79 sq. miles visible from 13 points, 6.1 per point).

High degree of wilderness quality due to lack of habitations but marred by logging activity in Pendrell Sound (Figure 15, p. 55) and Doctor Bay.

(2) Fairly high volume of boat traffic (170). Moderately high index of attractiveness (.57).
Map 36. Areas Visible from Waddington Channel
MALASPINA INLET

(1) Fairly good protection. Several rocks and shoals in entrance to inlet. Currents may be strong across shoals (maximum 2 knots).

Several anchorages in inlet, the most protected are: Grace Harbour, Isabel Cove, Thors Cove, Wooton Bay, Theodosia Inlet. Moorage at Okeover Landing.

Low visibility due with steep, but not high, cliffs surrounding inlet to east and low, hilly peninsula to west. Good views possible up Lewis Channel. 57 sq. miles visible from 11 viewing points (5.2 per point).

Low degree of wilderness quality with moderate settlement and cottaging on Malaspina Peninsula and logging activity in Okeover Arm and Theodosia Inlet. Terminus of coast road at Okeover Landing.

(2) Low volume of boat traffic (29) but very high index of attractiveness (1.9) (see p. 102).
Map 37. Areas Visible from Malaspina Inlet
Map 38. Areas Visible from Major Cruising Routes


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