NATURAL RESOURCE CAPABILITY AND USER CHARACTERISTICS
AS A INTEGRATED BASIS FOR OUTDOOR RECREATION
PLANNING: A CASE STUDY OF GALIANO ISLAND

by
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B.L.A., University of Guelph, 1969

A THESIS SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF SCIENCE

in the School
of
Community and Regional
Planning

We accept this thesis as conforming to the
required standard

THE UNIVERSITY OF BRITISH COLUMBIA
April, 1971
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ABSTRACT

In the field of outdoor recreation, the problem of increasing user demand for the use of a limited supply of available and appropriate resources is becoming of growing concern. Furthermore, numerous studies have illustrated that excessive use of recreational resources can cause degradation of the physical resource base and result in decreased user enjoyment of the recreation experience. These conditions indicate the need for effective evaluation and allocation of the supply of recreational resources. This will provide for a sustained optimal flow of recreation benefits, and minimization of degradation of resource quality.

The major premise of the thesis submits that for purposes of outdoor recreation planning for Galiano Island an integrated approach to natural resource evaluation, based on an ecological framework and incorporating consideration of the activity and user characteristics, can be utilized to optimize resource utility and derived user satisfaction.

The methodology of the study include four phases; synthesis of present techniques of natural resource evaluation, identification of the characteristics of the physiographic constituents of the resource base which influence recreational use, assessment of the activity participation and preferences of selected referent recreationist groups, and integration of these elements into a comprehensive approach to outdoor recreation analysis. The natural resource base of Galiano Island, in the British Columbia Gulf Islands, and the recreationists utilizing the island for cottaging, camping and
boating activities are selected for the case study.

The analysis of the resource base indicates that spatial differentiation on the island, on the basis of physiographic characteristics, provides a good means by which to allocate the selected activities. The data provided by the user groups serves to indicate the nature and scope of activities which provide for optimal enjoyment of the recreation experience. On the basis of the findings, a suggested development scheme for Galiano Island is prepared.

The results of the study illustrate that an integrated approach to outdoor recreation planning, incorporating resource, activity and user characteristics, can provide a means by which to enhance and protect outdoor recreation values of the resource base and the recreationists alike.
ACKNOWLEDGEMENTS

Thanks are extended to Professors W.E. Rees and P.O. Roer for their comments and suggestions made during the preparation of the thesis.

The opportunity provided by Dr. H.P. Oberlander to participate in the Gulf Islands Recreation Study, and to utilize data provided by the project is greatly appreciated.

The financial assistance afforded by the Central Mortgage and Housing Corporation, and by the National Parks Service of Canada have made the completion of the thesis possible. Sincere thanks are extended to each of these agencies.

For the patience and moral support given by my wife, Marilyn, during the preparation of the thesis, I extend my deepest appreciation.
TABLE OF CONTENTS

Chapter

1. OUTDOOR RECREATION: THE RESOURCE PROBLEM ........................................ 1
   DemandRequirements vs. Supply Capability ........................................... 1
   Scope and Objectives of the Study ...................................................... 5
   The Resource: Galiano Island .............................................................. 6
   Assumptions of the Study ..................................................................... 9
   Study Methodology ............................................................................. 12
   The Major Study Premise and Hypotheses .......................................... 13

2. ECOLOGICAL PRINCIPLES AND TECHNIQUES OF RESOURCE ANALYSIS .................. 15
   Principles of Ecology as Factors for Resource Evaluation ....................... 15
   Techniques of Natural Resource Analysis ............................................. 20
   The Canada Land Inventory Program .................................................. 27

3. PHYSIOGRAPHIC CHARACTERISTICS OF GALIANO ISLAND: AN EVALUATION OF CAPABILITY FOR OUTDOOR RECREATION 30
   Galiano Island .................................................................................... 31
   Physiographic Land Units .................................................................... 49
   Evaluation of Physiographic Characteristics, and Site Class Capability Classification .................................................. 51
   Site Type Use Suitability ..................................................................... 60
   Site Type Use Feasibility ..................................................................... 62
   Summary .............................................................................................. 62
Chapter

4. THE GALIANO ISLAND RECREATIONIST

The Questionnaire
The Cottager
The Camper
The Boater
Summary of the Questionnaire Analysis

5. RESOURCE, ACTIVITY AND USER INTEGRATION: A SUGGESTED PLAN FOR GALIANO ISLAND

The Study Premise and Hypotheses
A Suggested Plan for Galiano Island
Conclusions and Recommendations

BIBLIOGRAPHY

APPENDIX
<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Canadian weekly work hours and leisure time hours from 1870 - 1970; projections to 2001.</td>
</tr>
<tr>
<td>5.</td>
<td>The energy cycle.</td>
</tr>
<tr>
<td>6.</td>
<td>Monthly mean temperature and precipitation characteristics at Naniamo, as representative of the Coastal Douglas-fir Zone.</td>
</tr>
<tr>
<td>7.</td>
<td>Percentage of annual wind direction - Galiano Island area.</td>
</tr>
<tr>
<td>8.</td>
<td>Typical B.C. government campsite - Galiano Island.</td>
</tr>
<tr>
<td>9.</td>
<td>Activity participation rates of cottagers.</td>
</tr>
<tr>
<td>10.</td>
<td>Cottage lot features.</td>
</tr>
<tr>
<td>11.</td>
<td>Beach features.</td>
</tr>
<tr>
<td>12.</td>
<td>Cottage development changes.</td>
</tr>
<tr>
<td>13.</td>
<td>Activity participation rates of campers.</td>
</tr>
<tr>
<td>15.</td>
<td>Beach features - campers.</td>
</tr>
<tr>
<td>17.</td>
<td>Activity participation rates of boaters.</td>
</tr>
<tr>
<td>18.</td>
<td>Beach features - boaters.</td>
</tr>
<tr>
<td>19.</td>
<td>Major Galiano Island features of all visitor groups.</td>
</tr>
</tbody>
</table>
LIST OF TABLES

Table                                                                 | Page   
---                                                                 | ---     
1. Gulf Island subdivision activity, for lots of two acres or less, 1959 - 1968 | 8       
2. Scoring and classification of the capability of physiographic components to support cottaging in the designated site types | 53      
3. Scoring and classification of the capability of physiographic components to support camping in the designated site types | 58      
4. Scoring and classification of the capability of physiographic components to support boating in the designated site types | 61      
### LIST OF MAPS

<table>
<thead>
<tr>
<th>Map</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Galiano Island - Location Map</td>
<td>32</td>
</tr>
<tr>
<td>2. Galiano Island - Topography</td>
<td>36</td>
</tr>
<tr>
<td>3. Galiano Island - Slope Analysis</td>
<td>37</td>
</tr>
<tr>
<td>4. Galiano Island - Soils and Hydrology</td>
<td>39</td>
</tr>
<tr>
<td>5. Plant hardiness zones</td>
<td>42</td>
</tr>
<tr>
<td>6. Galiano Island - Land Ownership</td>
<td>45</td>
</tr>
<tr>
<td>7. Galiano Island - Present Land Use</td>
<td>47</td>
</tr>
<tr>
<td>8. Galiano Island - Physiographic Site Classes and Site Types</td>
<td>50</td>
</tr>
<tr>
<td>9. Galiano Island - Capability for Selected Recreation Activities</td>
<td>55</td>
</tr>
<tr>
<td>10. Galiano Island - A Suggested Land-Use Plan</td>
<td>89</td>
</tr>
</tbody>
</table>
DEMAND REQUIREMENTS VS. SUPPLY CAPABILITY

Whatever the objective or method of analysis, virtually all recent research in the field of outdoor recreation is permeated with one common concern; ever-increasing user demand for a limited supply of available and appropriate outdoor recreation resources. Outdoor recreation in the sense intended here includes those leisure-time activities which occur predominantly in non-urban undeveloped areas, and are largely dependent on the physical characteristics of the resource base as determinants of the activity types which can occur. Outdoor recreation resources, as defined by the U.S. Congress (1958), include:

- land and water areas and associated resources, which provide or may in the future provide, opportunities for outdoor recreation, irrespective of ownership. .. and shall not mean nor include recreation facilities, programs, and opportunities usually associated with urban development.

With regard to the growing demand for outdoor recreation resources, Brooks (1961) suggests that in Canada:

- factors indicate a demand for recreation space, in the immediate future, which staggers the imagination. In nearly all cases this demand involves availability of special land and water areas in quantity and variety. There is a foreseeable limit to this land. There is no limit to the presently burgeoning demand.

Cahn (1968) has described the national parks dilemma, which would appear to be becoming common to the entire out.-
door recreation function, stating that "every increase in visitor capacity is outmatched by increase in use. It's a case of access vs. excess."

Outdoor recreation analysts have suggested that as a growing population moves into the "age of leisure" with shorter working days, increased mobility, rising standard of living and improved communications, demand for outdoor recreation will increase in exponential fashion (Miller and Robinson, 1963). The changing leisure-time characteristics of Canadians to the present and projections for the future reflect continued growth, as shown in Fig. 1.

Awareness of the phenomena of growing demand is critical to any research related to planning for outdoor recreation. Demand, however, is only one side of the total outdoor recreation function, and is inextricably linked to the many characteristics of supply; i.e. the quantity and quality of resources to facilitate demand. As with any other resource-oriented activity (such as forest production or commercial fishing) which is reliant on a sustained source of supply in order to survive, so must outdoor recreation maintain a supply of natural resources suited to a range of activities with diverse physical requirements. Three initial problems arise in this context: the stock of suitable natural resources is at best fixed in physical terms, and at worst is diminishing as other uses compete for the same resource (Brockman, 1959). Further, the inherent land-extensive nature of many outdoor recreation activities requires that large areas of land and water be provided to accommodate a relatively low user population per unit of area. Finally, readily accessible resources are becoming subject to increasing development pressures in those areas where demand is the greatest (Brooks, 1961).

It follows that the concept of 'place' is central to the outdoor recreation function, and that the physical
Fig. 1  Canadian weekly work hours and leisure time hours from 1870 - 1970; projections to 2001

Sources
Brooks, 1961
Vancouver - Fraser Parks District, 1966
characteristics of the 'place' to a large degree dictate the nature and scope of its recreational utility. Hills (1961) has described the physiographic composition and ecological processes of a resource complex as prime factors in assessing the capability of a resource for outdoor recreation, and has developed a technique by which these characteristics are utilized as a basis for land-use planning. The concept of capability of the resource base is discussed in Chapter 2.

Interacting with the capability of the physical environment to support outdoor recreation is its ability to provide satisfaction to the recreationist population. Wagar (1964) has suggested that consideration of either the natural resource or the resource user in isolation can only provide a partial assessment of resource potential, and an incomplete basis on which to form outdoor recreation management policies. The concept suggests a user-resource feedback in outdoor recreation activity; as the recreationist has an impact on the resource base, so also does the resource affect the recreationist. A compounding effect occurs as the user creates an impact on the physical environment, and the altered environment in turn creates a new impression on the recreationist.

The impact of recreational use on the quality of the physical environment has been the subject of a growing number of studies, all indicating a negative impact through the degradation or depletion of the resource base (Wagar, 1964; LaPage, 1962; Magill and Nord, 1963; Frissel and Duncan, 1965). These studies are concerned primarily with the effects of recreation activities on such soil and vegetative characteristics as soil compaction, water run-off, root constriction and loss of vegetative ground cover.

Resource modifications as a by-product of use are inevitable, the nature and intensity of change being the critical elements to which resource management research must be directed. It has been proposed that in the process of
planning and allocating resources for outdoor recreation:

three lines of investigation are required for an effective evaluation of supply prospects:

a) a present recreational land use inventory,
b) basic research into relationships of natural environment to recreation,
c) a recreation land use capability inventory.

The ultimate objective of this research is the determination of optimal and limiting conditions for various recreation uses that will serve as criteria for evaluation of the resource base for recreation (Baker, 1961).

The National Academy of Sciences (1969) suggests that due to the wide range of environmental and social settings involved in outdoor recreation, research must mainly be done at the local level.

Within the foregoing framework of research needs in the assessment of resources for outdoor recreation, it appears essential that the three elements—resource, activity, user—be recognized as simultaneously interacting. However, it is the resource itself which "hosts" both user and his activities, and therefore must form the analytical foundation on which the other factors are considered.

SCOPE AND OBJECTIVES OF THE STUDY

The potential value of an integrated approach to natural resource planning for outdoor recreation, incorporating the physical aspects of the resource base, the nature of the activities to be accommodated and the characteristics of the user groups provide the theme for this study. The approach is largely exploratory; an examination and application of currently available techniques of recreation resource analysis. As such, the study is an expression of the "present state of the art."

Within the context of a selected case study, the major
objectives of the study are three:

a) to examine the rationale and operative procedures of the present techniques of natural resource evaluation,
b) to determine the characteristics of, and the interactions among the resource base, selected recreation activity types, and the resource user groups,
c) to demonstrate the applicability of an integrated approach to outdoor recreation resource planning as a function of the resource characteristics, the requirements of the activity types and the user characteristics.

The scheme should provide for a sustained optimal flow of utility and user satisfaction to an optimal population of recreationists, while minimizing degradation of resource quality created by user impact. Galiano Island, an outdoor recreation resource complex currently experiencing increased use and pressures for development, has been selected as the case study area for purposes of the study.

THE RESOURCE: GALIANO ISLAND

Galiano Island is one of the chain of Gulf Islands situated off the coast of British Columbia, between the mainland and the southern portion of Vancouver Island. As is the case with several other of the Gulf Islands, Galiano has experienced considerable increase in recreational use during the 1960's and has been subjected to growing pressures for development of private recreational facilities (Capital Regional District Planning Department, 1970).

The Gulf Island chain, including Galiano Island, represents a recreation environment of considerable regional significance. Moreover, the area is of interest to provincial and federal authorities. For example, a recent proposal advocated the creation of a national park encompassing all the Gulf Islands; intending to ensure environmental protection by virtue of federal government control (Vancouver Sun, 1970).
The government of the Province of British Columbia, also concerned with the prospect of degradation of the Gulf Islands natural environment, enacted interim protective legislation in 1969. The legislation, which included Galiano Island within its authority, was intended primarily to prohibit new cottage lot subdivisions until a long-range development plan for the islands was prepared. A minimum lot size of 10 acres for any new subdivision proposal was enforced at that time, and at present is still in effect (Capital Regional District Planning Department, 1970).

The Capital Regional District Planning Department (1970) has recommended that the development plan to be prepared for the islands must provide for management of the Gulf Islands on a long-term, "sustained yield" basis, ensuring protection of the resource as a balanced ecological system. The plan must be based on:

establishing principles and objectives, formulating a management concept, determining the supply of land and sea in relation to its suitability for various purposes, striking a balance between competing uses and needs, and ensuring the provision of a satisfactory level of services.

Cottaging

Much of the concern which has been generated with regard to the Gulf Islands has occurred due to growing development of summer cottages, now generally initiated by land developers on a subdivision basis (Ibid). The increasing number of subdivision lots in the Gulf Islands area, including Galiano Island, is illustrated in Table 1. As shown, while several of the other islands have accommodated a larger number of lots, the number of development areas on Galiano Island is second only to that which has occurred on Saltspring Island.
<table>
<thead>
<tr>
<th>Islands</th>
<th>No. of Lots Subdivided</th>
<th>Total 1959-68</th>
<th>No. Development Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saltspring</td>
<td>122</td>
<td>144</td>
<td>103</td>
</tr>
<tr>
<td>Outer Gulf Islands</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Saturna</td>
<td>84</td>
<td>64</td>
<td>6</td>
</tr>
<tr>
<td>Mayne</td>
<td>29</td>
<td>146</td>
<td>63</td>
</tr>
<tr>
<td>Galiano</td>
<td>30</td>
<td>29</td>
<td>23</td>
</tr>
<tr>
<td>N. Pender</td>
<td>2</td>
<td>28</td>
<td>16</td>
</tr>
<tr>
<td>S. Pender</td>
<td>1</td>
<td>37</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>268</td>
<td>448</td>
<td>215</td>
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</table>

Table 1  Gulf Island subdivision activity, for lots of two acres or less, 1959-1968

Source:
Capital Regional District, 1970
Camping

Growth in participation in organized camping has increased substantially in recent years in British Columbia; a four-fold increase in the number of camper nights spent in provincial government campgrounds between 1958 and 1970 documenting the trend (Fig. 2). Available data of visitor use of government camping facilities on Galiano Island indicate a 15.0% increase in camper nights between 1969 and 1970 summer seasons (Department of Recreation and Conservation, 1970). Macdonald (1970) has determined that camping represents one of the major recreation activities carried out on Galiano Island.

Boating

Pleasure boating in British Columbia has increased substantially during the last two decades (Fig. 3), not only in terms of the absolute number of boats but also proportionally to the population of the province. Specific to the Gulf Islands area, the number of foreign pleasure craft cruising in the area has steadily increased since 1960 (Fig. 4). Data provided by Canada Customs officials in the Gulf Islands area indicate that the majority of the foreign craft are owned by visitors from the United States (Department of National Revenue, 1970).

ASSUMPTIONS OF THE STUDY

For purposes of this study the following working assumptions regarding Galiano Island are made.

a) Galiano Island is primarily an outdoor recreation resource, and other land use activities are of secondary importance to that function. This assumption is based on the development trends recently occurring on the island, and on the importance of recreation considerations given by regional, provincial and federal governments.

b) User demand for each of the selected recreation activity
Fig. 2  British Columbia parks annual attendance, 1958–1970

Dept of Recreation & Conservation
1969 & 1970
Fig. 3  Growth of boat ownership in British Columbia to 1966; projections to 1985

source: Lea, 1966

Fig. 4  Number of foreign pleasure boats entering Gulf Islands area, 1960-70

source: Dept of National Revenue, 1970
types - cottaging, camping, boating - will continue to increase in the future. Increasing area population and a fixed supply of natural resources indicate that future pressures for space on the island will become greater.

c) Summer cottaging, organized camping and pleasure boating will continue to be dominant recreation activities on the island. Trends indicate the substantial growth of each activity will continue.

d) Both public and private interests will continue to be accommodated on the island. Any political decision to acquire the entire island for public park purposes does not appear likely at the present, and such a decision would be beyond the considerations of this study.

e) Present land ownership conditions and development on the island are not constraints to the analytic procedure. The emphasis of the study is based more on considerations of the resource base rather than the existing pattern of land holdings.

f) The restrictive legislation governing development on the island will be replaced by modified land development control measures included in the forthcoming long-range plan being prepared by regional planning authorities.

g) Regional planning authorities have enforcement powers to control both quantitative and qualitative aspects of development on the island; zoning, utilities installation, building standards.

h) The major mode of transportation to the island will continue to be provided by the Province of British Columbia ferry service.

STUDY METHODOLOGY

The analytical framework for this study proceeds through four phases, described as follows.

Review of Resource Evaluation Techniques

The review phase of the study examines some of the
major techniques presently employed in the analysis of recreation resources. It provides an examination of the quantitative aspects of each technique, the components considered in each, and the means of ranking or scoring the assessed resource values. The means by which the qualitative aspects of landscape character are incorporated into each technique is also examined. The salient features of each technique are extracted to form the basis for examination of the Galiano Island resource.

**Analysis of the Physical Resource**

An analysis of the physical and biological characteristics of Galiano Island is undertaken, to assess the physical potential of the land base to support selected recreation activities, on a sustained basis and with regard to adopted development criteria.

**Analysis of the Visitor Questionnaire**

Analysis of a visitor questionnaire specifically directed to cottagers, campers and pleasure boaters on Galiano Island constitutes the phase of the study which assesses the characteristics of the recreationists. The questionnaire examines the reactions of visitors to the island in terms of their activity patterns during the visit, their preferences of recreation facilities, and their impressions of the most attractive features of the resource.

**Integration of Resource, Activity and User Components**

The final phase of the study integrates the findings of the foregoing resource and user analyses, and on the basis of the findings an application of the approach provides a suggested development plan.

**THE MAJOR STUDY PREMISE AND HYPOTHESES**

Since the overall goal of the study is to examine and
integrate factors of three distinct elements - resource, activity, user - which are assessed by different means, it is useful to state explicitly the central premise that:

for purposes of outdoor recreation planning on Galiano Island, an integrated approach to natural resource evaluation based on an ecological framework and incorporating consideration of the activity and user characteristics, can optimize sustained resource utility and derived user satisfaction.

Within this comprehensive framework, three working hypotheses are identified.

a) Variations in the physical and biological characteristics of Galiano Island are of sufficient type and degree as to provide a basis on which distribution of outdoor recreation activity can be designated, to optimize resource utility and minimize adverse impact on the resource base.

b) In expressing their opinions of the most important features of Galiano Island, the responses of all three groups of recreationists - cottagers, campers, boaters - are similarly distributed among natural, man-made and social features.

c) Preferences of the referent groups - cottagers, campers, boaters - utilizing Galiano Island indicate a desirability to maintain the natural resource in a near-natural condition, with development of facilities, utilities and services maintained at minimal levels.
PRINCIPLES OF ECOLOGY AS FACTORS FOR RESOURCE EVALUATION

Much current literature on resource analysis and management practices emphasizes the importance of resource utilization based on ecological principles. Significantly less, however, has been written on the means of applying these principles. Ecological concepts are meaningful to planning for resource use only insofar as they can be adapted and operationalized. Thus it is critical to recognize not only relevant principles of ecology, but also their implications in resource utilization as manifest in the environment.

Ecosystem

Odum (1959) describes an ecological system or ecosystem as:

any area of nature that includes living organisms and nonliving substances interacting to produce an exchange of materials between the living and nonliving parts.

Any ecosystem embodies four essential and interacting constituents. The abiotic substances are those inorganic and organic chemical compounds found in the soil, water and air, plus the physical components which provide the resource setting. Producers are those plants which are able to manufacture food from simple inorganic substances. Consumers in the ecosystem are those heterotrophic organisms which feed
upon other organic and inorganic matter. Decomposers break down the protoplasmic compounds of dead organisms into simple substances usable by producers (Odum, 1959).

Odum (Ibid) stresses the importance of the recognition of the "obligatory relationships, interdependence and causal relationships" between the ecosystem components, indicating that major alteration of the conditions necessary to any one of the groups will necessarily alter the conditions of the other constituents as well. Therefore, utilization of any natural resource requires an understanding of the composition and processes of each of the basic constituents in order to ensure that a balance within the total ecosystem is maintained.

The Concepts of Habitat, Niche, Community and Succession

Several other ecological concepts of consequence to resource evaluation processes include those of habitat, niche, community and succession (Bugslag, 1968). The habitat of an organism is the composite of the abiotic and biotic characteristics of the environment or 'place' in which the organism is found (Odum, 1959). The concept of niche suggests that within any habitat, each organism plays a specific functional role in the overall ecological processes, and is part of the series of relationships existing between components of the ecosystem. The distinction between habitat and niche is indicated by Odum (1959) who states that "it may said that the habitat is the organism's 'address', and the niche is its 'profession', biologically speaking."

All of the organisms found within a habitat collectively constitute the biotic community. Odum (1959) states that the community is the "living part of the ecosystem" and is composed of "any assemblage of populations living in a prescribed area." The characteristics and composition of the biotic community at any point in time are the results of the natural processes of ecological succession occurring within
the micro-habitat. Typically in an ecosystem, community development begins with pioneer stages which are replaced by a series of more mature communities, until a relatively stable community is evolved which is in equilibrium with local physical conditions (Ibid). The concept suggests that natural succession is strongly uni-directional toward a climax state, making prediction of future biotic composition possible.

Population Ecology, Community Energetics and Community Organization

Watt (1968) has described three major fields of study - population ecology, community energetics, community organization and stability - as significant to resource analysis. He suggests that the essential considerations of the population factor are in recognizing that the biological productivity of any resource can remain constant at some optimal level only if the "cropping" of that population does not exceed its regenerative capacity. As defined by Hills (1961),

biological productivity is the ability of land to produce a crop of living organisms.... The biological productivity of an area is dependent not only upon the potential of the land supply matter and energy to the biotic community which it supports, but also upon the ability of the crop organisms to utilize this energy.

In effect, the ability of a resource to provide a sustained yield of some species or crop is dependent on maintenance of some minimum supply. In terms of resource use for outdoor recreation purposes, the population factor is important insofar as it can assist in determining the extent to which resource modification of biological productivity can be made without adversely affecting the overall system.

Community energetics is the study of the flows of energy through an ecosystem from one constituent, or trophic level to another, as illustrated in Fig. 5.
Fig. 5 The energy cycle

Source - Niering 1966
Odum (1959) states that:

The essence of life is the progression of such changes as growth, self-duplication, and synthesis of complex relationships of matter. Without energy transfers, which accompany all such changes, there could be no life and no ecological systems.

Within the flows of energy between constituents of an ecosystem, the optimal or most efficient energy utility is provided by that combination of environmental factors which occur naturally (Watt, 1968). Modification of a resource to conditions other than prevail naturally will result in a decrease of energy utility, and require an input of additional energies from external forces to maintain an optimal level. The community energetics principle thus indicates the desirability of maintaining any natural resource complex in a state closely approximating natural conditions, if sustaining natural characteristics of the resource is a pursued objective.

Watt (Ibid) indicates that community organization will further be maintained, and stability enhanced by retention of all elements normally found within the natural environment of the resource. Odum (1959) has stated that:

any natural enclosed system with energy flowing through it ... tends to change until a stable adjustment, with self-regulating mechanisms is developed. Self-regulating mechanisms are mechanisms which bring about a return to constancy if a system is caused to change from a stable state by a momentary outside influence.

Thus the concept suggests that elimination of significant proportions of one or more constituents of the natural environment, as a result of resource use, leads to decreased stability of the ecosystem.

Ecological Principles in the Natural Resource Analysis Context

The foregoing description of ecological principles
suggests a number of fundamental factors to be recognized in the context of natural resource analysis. These are particularly significant to outdoor recreation if one assumes that retention of the natural characteristics of the resource is a prime objective. Three basic procedural considerations embody most of the foregoing principles.

a) The relationships between components of the ecosystem must be determined in order to utilize the resource in such a manner as will not disrupt those relationships.

b) No change in a natural system is an isolated change, but rather has repercussions on all other constituents in the system. Therefore, it is imperative to recognize the factors which influence any specific system, and to maintain those factors above some minimum level and below some maximum level beyond which system stability is adversely affected.

c) The natural state of any renewable resource complex at any point in time represents the optimal combination of biotic and abiotic constituents, providing the optimal allocation of energy within the system and minimizing the system instability.

TECHNIQUES OF NATURAL RESOURCE ANALYSIS

Numerous approaches to evaluation of natural resource complexes have been developed, the major techniques currently used varying substantially in terms of ecological considerations incorporated in the evaluation and the depth of scientific analysis. While not all techniques have evolved specifically in response to outdoor recreation resource evaluation, all are adaptable to incorporate the outdoor recreation function at some level of analysis.

Steinitz (1970) noted that all landscape resource analysis techniques may be classified within five major categories. In increasing scope and complexity of analysis, the five include:
a) inventory of resource characteristics,
b) inventory for purposes of development of specific use functions,
c) resource analysis linked with demand studies,
d) single sector models which predict the effect of change; consequences of various development policies,
e) simulation models which can interact with other models in a general system for planning.

Since the intent of this study is to consider Galiano Island as a specific outdoor recreation resource complex, and assumes continued high demand for all selected activities, the analysis includes both 'a' and 'b' above. Steinitz (1970) indicated that techniques applicable to both these types of analyses are embodied in the approaches developed by Philip Lewis, Ian McHarg and Angus Hills.

Examination of the three techniques indicates that the approach of Philip Lewis is the least scientific, providing for a rapid survey of patterns of features in the landscape. The technique does not include the ecological processes of the natural resource as major determinants in evaluation, but rather is oriented more to considerations of man-made features in developed areas.

The evaluation technique developed by McHarg is similarly most useful in developed areas, and incorporates man-made and "cultural" aspects in the landscape as important factors in the analysis. McHarg's approach is both more scientific and more detailed than that of Lewis, and ecological considerations of the resource base are included to a greater degree in the evaluation process.

The technique proposed by Hills requires a more scientific analysis than either of the foregoing, and is carried out in considerably greater detail. The approach is predominantly based on analysis of the physiographic characteristics of the
natural resource base, and is most applicable to undeveloped areas. Consideration of man-made features in the landscape are included in the evaluation process, but are of secondary importance to the physiographic determinants of the natural resource.

All three of the techniques described above appear to contain elements which are appropriate to the objectives of this study, and as such are subsequently examined in detail in the thesis.

Philip Lewis

The objective of the approach to resource analysis developed by Philip Lewis is "to identify, preserve, protect and enhance the most outstanding intrinsic values and see that introduced man-made values are developed in harmony with these quality resources" (Landscape Architecture Research Office, 1967). An examination of his approach indicates that:

Lewis has divided recreational resource patterns into those possessing intrinsic values (perceptual qualities of the natural environment) and those possessing extrinsic values (recreational values created by man-made changes, adaptions, and additions to basic natural resources) (Ibid).

The technique was developed primarily for an outdoor recreation resource evaluation in the State of Wisconsin, and is essentially intended as an approach for large-scale area analysis. While detailed inventory of the natural resource features is an integral part of the technique, the objective is ultimately to regroup these elements into broad overall patterns as they occur in the landscape (Bugslag, 1968). The essence of Lewis' technique is the identification of broad recreation "corridors" which are revealed in the natural and man-made landscape (Lewis, 1964).

The analytical process proposed by Lewis, as
summarized by the Landscape Architecture Research Office (1967), includes several sequential steps in resource evaluation. First, the recreational uses to be accommodated, and the physical criteria for those uses are established. Next, the natural and man-made resources of the study area are inventoried, and the findings of these inventories combined to indicate spatial patterns of features in the landscape. Numerical values are assigned to the resource features on the basis of assessed relative importance of each, with the highest values being ascribed to the most significant features. Summation of the values provides an indication of spatial priority areas. Integration of the numerical evaluation of the resource features and the demand factor for the various selected activity types provides a basis for assigning land uses.

Ian McHarg

The conceptual framework for the technique of resource analysis developed by McHarg recognizes that "physiographic determinism" is the basic factor from which considerations of natural resource use must evolve (McHarg and Wallace, 1965). McHarg stresses the necessity of understanding "nature as process", and submits that recognizing the natural processes which created the resource is essential to determining how to optimally utilize it (McHarg, 1969).

The technique proposed by McHarg was not developed expressly for outdoor recreation purposes, but the recreation function has been an integral part of some studies which have utilized the approach. The scope of the technique is more extensive than that of Lewis, incorporating a broader range of factors as part of the evaluation; physiographic, cultural, economic, visual and jurisdictional.

Given a total study area, McHarg proposes that an ecological inventory be carried out as the initial phase of the analysis (McHarg, 1967). As described by the Landscape Architecture Research Office (1967), data is collected sequentially
on climate, historic geology, physiography, hydrology, soils, plant associations and animal life. The order of data collection reflects McHarg's concern for recognizing progressive causal relationships in the natural evolution of the developing resource. In addition to the ecological inventory, present land uses in the study area are also determined.

The positive, neutral or negative implications of the elements of the inventory are considered for a range of potential activity types which could occur in the study area, and a value ascribed on maps for each prospective land use. By examining a series of transparent map overlays, indicating all the assessed values for all potential activities, a combined suitability map showing those areas most suitable for each activity is prepared.

Considerations of economic conditions, visual characteristics, design criteria and jurisdictional factors are examined with reference to the findings of the suitability map. Economic data utilized includes property values and their locations with reference to "spatial requirements of demand" (Landscape Architecture Research Office, 1967). Visual considerations include view characteristics as provided for the viewer, and the visual implications of any particular land use type located in the landscape. Design criteria are evolved as guidelines which optimally integrate the form of the land use types into the landscape. Finally, considerations of the jurisdictional powers required to implement the findings of the analysis, and the resulting plan, provide an essential phase of the overall analytical process (Ibid).

Angus Hills

Similar to the fundamental "deterministic" concept of McHarg, the resource analysis technique developed by Hills is based on the premise that optimal land use planning occurs as a function of the physiographic characteristics of the natural
resource base. The prime objective of Hills' approach is to provide those "responsible for the management of renewable resources with a basis for most land-use planning" (Hills, 1961). The technique was not developed for outdoor recreation resource analysis exclusively, but for any resource-oriented form of land use including agricultural production, forestry, wildlife, recreation and fresh water fishing.

Hills (Ibid) has suggested that effective utilization of the technique requires that five phases of classification be incorporated within the evaluation processes:

a) classification of land based on natural resource characteristics; surface relief, geologic materials, climate and soils,

b) classification of present land use types,

c) use-capability classification; areas rated according to capability of the physiographic characteristics of the natural resource to support various functions,

d) recommended-use classification; use selected for a specific area, chosen from various potential uses,

e) use-programming classification; an indication of scheduling of land use plans, based on economic and sociologic factors.

The sequential processes by which the five phases are carried out are described by the Landscape Architecture Research Office (1967). The "total site" is progressively subdivided into smaller land areas on the basis of physiographic differentiation; climatic factors, landform, geologic composition, soil characteristics and water content. The defined land areas include site regions, land types, site classes, site types and site phases in decreasing order of size and increasing order of analytic detail.

A site region includes any area of broad climatic similarity, normally encompassing from 1000 to 4000 square miles. Landtypes are differentiated within site regions on the
basis of composition and depth of parent material for soils in large-scale land features. A physiographic site class is a subdivision of a landtype, differentiated on the basis of local variations in climatic conditions. The site type is the major land area category used in detailed resource analysis. One smaller land area subdivision, the site phase, is differentiated within the site type if greater detail, such as varying beach conditions along a stretch of shoreline, is necessary (Ibid).

In terms of classification of present land use types, Hills (1961) states that "since land use is dynamic, a series of present uses may be recorded over a period of time. This series, recording the actual uses of specific physiographic types, provides the basis for establishing the use-capability of these types".

In the use-capability classification phase of the resource evaluation process, and in the absence of any specified land use which is to occur on the resource base, a range of potential general land uses is selected, and criteria determined for each. At the broadest level, the generalized land uses include agricultural production, forestry, recreation and wildlife. The use potential of the site types is ranked A to G or 1 to 7 (highest to lowest capability), based on the physiographic characteristics of the resource and the adopted criteria. The ranking is carried out at both the "local" and "community" levels. The evaluation at the local level provides an assessment of the individual site types without reference to the larger resource context in which each occurs. The community level ranking provides a grouping of site types and site phases with similar physiographic characteristics for purposes of comparative evaluation for potential uses.

Hills proposes that in addition to assessment of a natural resource on the basis of physiographic characteristics, evaluation should be carried out of the use suitability and
use feasibility for any particular land uses. Use suitability is an indication of the "degrees of management effort" required to bring the present condition of the resource into a usable form for a particular land use type. Use feasibility represents "the present likelihood or potential of a unit for development under specified socio-economic conditions" (Landscape Architecture Research Office, 1967).

On the basis of resource capability, suitability and feasibility rankings, a specific land use or combination of multiple uses for the land areas is designated.

THE CANADA LAND INVENTORY PROGRAM

The "Resources for Tomorrow" conference held in Montreal in 1961 recognized a need "to complete a country-wide assessment of resource supplies which may be set against long-term assessment of resource needs" (Department of Regional Economic Expansion, 1970). This assessment was to include systematic studies of "problems of resource management and development in all fields; and economic potentials and social needs in all regions" (Ibid).

The Agricultural and Rural Development Act 1963, passed by the Government of Canada, approved establishment of the Canada Land Inventory program. The program was to provide "a comprehensive survey of land capability and use specifically designed as a basis for land-use and resource planning for agriculture, forestry, recreation and wildlife" (Department of Regional Economic Expansion, 1970-a).

In terms of the recreational element of the Canada Land Inventory, the major objective has been stated as:

- to provide an estimate of the quantity, quality and location of outdoor recreational lands in the settled portions of Canada .... The basis of the classification is the quantity of recreational use that a land unit
can attract and withstand without undue deterioration of the resource base (Department of Regional Economic Expansion, 1970).

Land units of the natural resource base are ranked between Class one, indicating very high capability for recreation, and Class seven, which indicates very low capability for recreation purposes (Ibid). Subclass designations indicate those specific recreation activities most suited to the particular qualities of the land unit, in decreasing order of importance. The recreation classification includes 25 different activities and landscape features with recreational appeal, indicated as being "popular" (Department of Forestry and Rural Development, 1967-a).

The cottaging, camping and boating activities are all included in the classification scheme of the recreation sector of the Canada Land Inventory; categorized as lodging, organized camping, and deep water tripping.

The capability rating for the cottaging activity includes numerous factors; topography, drainage, soil characteristics, wind protection, air and water pollution, aspect, vegetative cover, water availability, views, shore access and beach conditions in shoreland areas, and vehicle access capability (Ibid).

The assessed rating for organized camping areas is influenced by factors including surface material, gradient, water availability, vegetative cover for wind and sun protection, vehicle and/or boat access capability (Ibid).

Capability for deep water boat tripping is assessed by analysis of the potential of shoreland characteristics to accommodate moorage, docking and launching requirements. Desirable shoreland characteristics include protection from winds, wave action, currents and icing conditions. Bays, harbours and areas on the leeside of headlands frequently
satisfy these requirements. Additionally, high-ranking deep water boating areas will provide hazard-free conditions amenable to other water-oriented activities such as swimming, fishing, viewing, cottaging, and shoreland service facilities (Department of Forestry and Rural Development, 1967-a).

Thus, a major program of resource supply assessment is presently being undertaken in Canada. The Canada Land Inventory embodies many of considerations discussed in the foregoing examination of evaluation techniques, particularly those of Angus Hills. Analysis of the structure of this program is included in this study in order to assist in development of an approach for examination of Galiano Island.
CHAPTER 3 - PHYSIOGRAPHIC CHARACTERISTICS OF Galiano Island:
AN EVALUATION OF CAPABILITY FOR OUTDOOR RECREATION

A synthesis of the ecological concepts important in renewable resource evaluation and of the evaluation techniques discussed in Chapter 2 provides the analytical framework within which the Galiano Island recreation resource is examined. Elements of the resource evaluation techniques of Hills, McHarg and Lewis are incorporated into the method of analysis, and the details of the classification system as outlined by the recreation sector of the Canada Land Inventory program were adopted for purposes of rating the land units.

Analysis of the physiographic features of Galiano Island follows the sequence below, after McHarg (1969).

Climate
Geological Development
Topography
Hydrology
Soils
Vegetation
Wildlife

Additionally, an inventory of Galiano Island land use, past and present, is carried out.

The spatial distribution and resulting patterns of natural and man-made recreation features on the island are identified as proposed in the technique developed by Lewis.

The capability of the physiographic components of the island to support the selected recreation activities is assessed after Hills (1961), and in the manner adopted by the Canada Land Inventory (Department of Regional Economic Expansion, 1970).
GALIANO ISLAND

Location and Dimension

Galiano Island is located in the Strait of Georgia, approximately 15 miles off the coast of mainland British Columbia and 8 miles east of the shores of Vancouver Island (48°55' north latitude and 123°30' west longitude), as shown on Map 1. Navigable waters separate the island from others in the Gulf Island chain on all sides.

The island has a northwest to southeast orientation, common to several of the islands in the Gulf Islands chain. Galiano is an elongated landform measuring 16 miles from the north end to the southern-most point. It has an average width of approximately 1½ miles, though the southern end of the island measures 3 miles at the widest point.

With 41.5 miles of shoreline, the island encompasses 22.5 square miles, or 14,400 acres (Capital Regional District Planning Department, 1970).

Climate

In terms of Krajina's (1965) biogeoclimatic zonation of British Columbia, Galiano Island is situated in the Pacific coastal mesothermal forest region, within the drier subzone of the Coastal Douglas-fir biogeoclimatic zone. The climate corresponds to the designation by Koppen as a mediterranean subhumid to humid climate (Ibid).

The Gulf Islands area has a mean annual temperature of 49°-51° F. The July mean temperature is 60°-66° F. The area experiences average temperatures of greater than 50° F for 5 to 7 months annually. Climatic conditions at Nanimo, approximately 20 miles northwest of Galiano Island, are shown in Fig. 6. The conditions as indicated are representative for
Fig. 6 Monthly mean temperature and precipitation characteristics at Naniamo, as representative of the Coastal Douglas-fir zone

Source: Krajina 1959

Fig. 7 % of annual wind direction - Galiano Island area

Source: Thomas 1953
much of the Coastal Douglas-fir zone.

Annual precipitation on Galiano Island is 26"-40" as compared with 27"-50" common throughout the rest of the Coastal Douglas-fir zone. Monthly precipitation rates range in extremes from .6" during the driest month, to 10.4" in the wettest month, July and December respectively. The typical annual distribution of precipitation in the Coastal Douglas-fir zone is illustrated in Fig. 6, reflecting the dry summer and wet winter condition pattern common throughout the area. Only 5-10% of the annual precipitation occurs during the summer months (Krajina, 1959).

The area receives approximately 1800 annual bright sunshine hours, as compared with 1600 hours in Vancouver and 1400 hours on the west coast of Vancouver Island. Galiano Island receives 300 sunshine hours during the month of July, as high a rating as any area in Canada (Thomas, 1953).

Wind speed in the Galiano Island area averages 10 m.p.h. during the year. The dominant winds are easterly and southeasterly as shown in Fig. 7, a unique set of conditions in Canada where prevailing westerly winds occur (Ibid).

Geological Development

The Gulf Islands are located within the Georgia Depression, part of a largely submerged trough between the coastal mountains of the British Columbia mainland and the mountain range along the eastern shoreline of Vancouver Island (Forest Soils Committee of the Douglas Fir Region, 1957).

Underlying the Gulf Islands "sediments of upper Cretaceous age have been subdivided into ten formations of alternating conglomerates, sandstones and shale, with an estimated thickness of 10,000 feet" (Williams and Pillsbury, 1958). Where the islands rise above water level, "ridges and peaks
are capped with hard conglomerates and sandstone" (Williams and Pillsbury, 1958).

Williams and Pillsbury (1958) state that the Gulf Islands all have undergone glacial activity with resultant deposits of moraines, boulders, outwash gravel and sand. Glacial scouring action occurred in a general northwest to southeast direction, as evidenced on Galiano Island by many of the linear landform elements such as the ridges, bluffs and depressions which are directionally oriented in that manner.

**Topography**

The land area elevations of Galiano Island rise to nearly 1000 feet above sea level at the highest point near the southeasterly limit of the island, as shown on Map 2. The higher areas of the island generally form a north-south spine down the centre of the island. Two major exceptions to this pattern occur at the extreme north and south limits of the island where flatter expanses of land are found. Isolated low areas also occur at breaks in the ridge pattern in the central portion of the island.

Slope characteristics, as illustrated on Map 3, are such that virtually all portions of the island have in excess of 5% slope, except for the two flatter areas at each end of the island. Areas in excess of 20% slope occur largely in the interior of the island, and in the extreme southeast area. Additionally, extensive stretches of the island shoreline have slopes of greater than 20%. Of the total island shoreline of 41½ miles, 20½ miles have "backland" slopes in excess of 20% (Capital Regional District Planning Department, 1970).

**Hydrology**

Available fresh water supplies both for human consumption and vegetative growth on Galiano Island are limited. As
previously noted, Galiano Island receives less precipitation than is typical for the Coastal Douglas-fir zone. Moreover, this precipitation occurs largely in the winter months, so that meagre summer rainfall can result in insufficient water for vegetative growth (Forest Soils Committee of the Douglas Fir Region, 1957).

There are no standing bodies of potable water on Galiano Island. All supplies for domestic consumption come from underground wells and a limited number of stream sources, as shown on Map 4. Engineering specialists have indicated that groundwater supplies are of good quality, but possibly vulnerable to salt water intrusion (Capital Regional District Planning Department, 1970).

There are presently approximately 110 underground wells on the island and 25 surface water stream sources. In 5 locations on the island groups of property owners have grouped together to create joint waterworks utilities. There are no public watermains existing on the island (Ibid).

Soils

The upper Cretaceous materials previously described provided the major parent material for soils developed on Galiano Island - a product of the interaction of climate, topographic and hydrologic characteristics, organisms and time (Forest Soils Committee of the Douglas Fir Region, 1957).

The soils are classified within the Concretionary Brown Podzolic group, characterized by a medium to strongly acidic reaction and a thin raw humus $A_o$ surface layer (Krajina, 1965).

The soil type covering the major portions of the island is described as "rough stony land" - thinly mantled bare rock, gently to very steeply sloping and with variable drainage
LEGEND:
WATER: WATER WELLS
PUBLIC WATER WORKS UTILITY
SURFACE WATER LICENCE

SOILS:
1. ROUGH STONY LAND
2. ERODED LAND
3. COWICHAN
4. HASLAM
5. PARKSVILLE
6. QUALICUM

GALIANO ISLAND
SOILS AND HYDROLOGY
1971
MAP 4
conditions (Day et al, 1959). The distribution of soil types on Galiano Island is shown on Map 4. In addition to the rough stony land, isolated areas of five other soil types occur on the island. "Eroded land" occurs in very steeply sloping areas, mainly shoreline areas around the perimeter of the island. Cowichan clay loam and Parksville sandy loam are poorly drained soils found in level to depressed areas. Haslam soil is well drained, and occurs on gently to steeply sloping land. Qualicum soil is a gravelly loamy sand with rapid drainage on level to gently sloping areas (Ibid).

Krajina (1971) has stated that soil depth in excess of 3 feet is rarely found on Galiano Island. A typical profile for soils in the Coastal Douglas-fir zone, as shown in Fig. 6, indicates a similar soil depth. Studies in the Coastal Douglas-fir zone illustrate that soil development and depth diminish substantially toward the upper portions of sloped areas and in depressed areas where the water table is near the surface (McMinn, 1960).

Vegetation

The influences of the foregoing factors - climate, geology, topography, hydrology, soils - have given rise to a largely uniform vegetative composition on Galiano Island, dominated by Douglas-fir (Pseudotsuga menziesii). Other tree species include Grand Fir (Abies grandis), Arbutus (Arbutus menziesii), Shore Pine (Pinus contorta), Western Red Cedar (Thuja plicata), and Western Hemlock (Tsuga heterophylla), as described by Krajina (1965).

Dominant shrub growth on the island includes species such as Bearberry (Arctostaphylos uva-ursi), Salal (Gaultheria shallon), Oregon Grape (Mahonia nervosa), Mock Orange (Philadelphus gordonianus) and Winter Current (Ribes sanguineum).

In the drier subzone of the Coastal Douglas-fir zone
in which Galiano Island occurs, Garry Oak (*Quercus garryana*) is more abundant than in other areas. Spillsbury has stated that "the characteristic forest cover consists of Garry Oak and Douglas-fir, with Arbutus occupying the more exposed coastal fringe and shallow rocky soils" (Day et al, 1959).

The climax plant association for the Galiano Island drier subzone consists of Douglas-fir and Oregon Grape (Krajina, 1965). The Douglas-fir develops a strong, fibrous and wide-spreading root system giving the tree excellent support (Department of Northern Affairs and National Resources, 1956). The tree requires a minimum of 2 feet of soil in order to maintain good growth and wind firmness (Forest Soils Committee of the Douglas Fir Region, 1957). The plant climax shrub, Oregon Grape, thrives under shade conditions created by the overhead canopy of the Douglas-fir, and tolerates acidic soils. The evergreen shrub does not normally exceed 2 feet in height (Wyman, 1961).

In studies carried out in the Douglas-fir zone it has been determined that in secondary succession of many logged and burned areas the species characteristic of the undisturbed associations have become re-established. In other areas of the zone, semi-shade tolerant species including Red Alder (*Alnus rubra*) and Broadleaf Maple (*Acer macrophyllum*) have spread into the exposed areas (Krajina, 1965).

The plant community of Galiano Island and the rest of the Gulf Islands area is unique in species composition, not found elsewhere in Canada; the environmental characteristics providing the most favourable habitat conditions possible in the nation. On a plant hardiness zone scale of 1 to 10, with 1 equal to the coldest conditions and 10 equal to the mildest conditions, Galiano Island is ranked 9A, as shown on Map 5. There are no areas ranked 10 in Canada (Ouellet and Sherk, 1967).
Map 5  Plant hardiness zones

legend: 1 - coldest hardiness zone
10 - mildest hardiness zone

source: Ouellet and Sherk 1967
Wildlife

In a description of all the major Gulf Islands, Williams and Pillsbury (1958) have stated that:

larger mammals are gone, except the coast deer. The wapiti, black bear, cougar and wolf cannot remain on small islands where civilized man has settled. At present the principal mammals are coast deer, north-west raccoons, mink and squirrels.

Sea birds are abundant, significantly gulls, cormorants and guillemots. Crows, ravens and eagles nest throughout the islands.

The shoreline of the island provides a habitat for a rich variety of marine animal life; starfish, sea urchins, clams, oysters, crabs, etc. Plant life includes several species of marine algae. During the summer months the difference between high and low tides is as much as 15 feet, thus at low tide the natural abundance is exposed, providing interest and enjoyment for viewers (Ibid).

Studies have indicated that the marine life composition varies depending on water temperature around the islands. Water in-coming from the Strait of Juan de Fuca at a temperature of $58^{\circ}F$ during the summer is as much as $12^{\circ}F$ colder than those waters in the Strait of Georgia warmed by the run-off of the Fraser River (Williams and Pillsbury, 1958). The temperature difference would indicate that waters on the eastern shore of Galiano are considerably warmer than those on the west side.

Land Use - Past and Present

Galiano Island was "discovered" in 1792 by Spanish Naval captain Dionisio Alcala Galiano. At that time the island was inhabited by Coastal Salish Indians of the Cowichan dialect (Williams and Pillsbury, 1958). White settlers, mainly former
prospectors who had been attracted to the gold rush on the west coast, began occupying the island in 1859. In the 1880's, retired British Service Officers moved into the area, planting crops and gardens, and raising cattle and horses. Many of the descendants of these "gentlemen farmers" chose to return to England, and during the 1930's many lands were purchased by prairie farmers forced to relocate by the droughts. During the 1940's several timber areas of Galiano Island were cut to alleviate fuel shortages created by the Second World War. Virtually no reforestation practices were carried out at that time (McCrimmon, 1971).

Agricultural production is no longer carried on as a major land use on the island. Macdonald (1970) has stated that only three farms are presently operated on the island. Present land use on Galiano has now become largely devoted to timber production purposes. The MacMillan Bloedel company own in fee simple some 80% of the total land area of the island (Macdonald, 1970). The company operates the holding on a certified tree farm licence basis which provides for provincial tax abatements if the lands are cropped on a sustained yield basis (McCrimmon, 1970). The distribution of the tree farm holdings on the island are indicated on Map 6.

An authority of the timber company stated that only minimal cutting is being carried out at present on Galiano Island; the company's efforts are directed rather at developing the area for future cropping. Douglas-fir is the dominant tree species utilized in tree planting programs (McCrimmon, 1971). Macdonald (1970) has stated that development of a mature merchantable forest crop on the island will require 40-50 years.

The MacMillan Bloedel company recognizes the importance of the outdoor recreation activity on a natural resource such as Galiano Island, and study is being undertaken to examine the possible reallocation of marginal timber lands for recreation
purposes. Marginal timber lands on Galiano Island are predominantly those areas around the shoreline periphery (McCrimmon, 1971). The quality of land on Galiano Island for timber purposes is rated overall as 100 on a scale from 0 to 140 as prepared by the Province of British Columbia (Ibid). This value represents land quality of medium to poor quality for timber production (Department of lands, Forests and Water Resources, 1967).

Public lands on Galiano constitute 1010 acres, distributed in numerous parcels of land throughout the island as shown on Map 6. The total public acreage is held by the provincial government, designated as dedicated park land, reserve land and other provincial land; 221 acres, 237 acres and 552 acres respectively (Capital Regional District Planning Department, 1970). The public holdings account for 7.0% of the total Galiano island area. Of the 41½ miles of shoreline around the island, 2 1/8 are in public ownership. The public shoreline holdings provide 7/8 mile of sandy beach, 3/4 mile of rock beach and 1/2 mile of shoreline where no beach occurs due to the excessive land slope at the water edge (Ibid).

The remainder of the island is owned in small acreage parcels by private interests; permanent residences, summer cottages, commercial developments.

The pattern of present development is confined almost exclusively to the shoreline areas, except for isolated interior development at the south end of the island, as illustrated on Map 7. The major concentration of residential and commercial development is situated around Sturdies Bay, the site of the major ferry terminal, with smaller development areas occurring mainly along the western shoreline. At North Galiano there is a small concentration of residential development and commercial facilities. A commercial camping area is located near North Galiano. As indicated on Map 7, there is no development of any kind along most of the eastern shoreline of the island.
The two major public park areas on Galiano Island are the provincial Marine Park at Montague Harbour and Bluff Park west of Sturdies Bay. The Montague Harbour park occupies 214 acres and is largely undeveloped except for the organized camping area. The campground facilities provide 31 tent sites for visitors arriving by automobile and/or boat. Bluff Park is a largely undeveloped area of 320 acres, provided with a scenic roadway around a portion of the periphery (British Columbia Historical Association, 1969).

Boat-oriented land use facilities have been developed at numerous points on the island, as shown on Map 7. The facilities provided in Sturdies Bay, Montague Harbour, Retreat Cove, North Galiano and Whaler Bay have been described by Clark (1968). The range of facilities includes moorage, dockage, launching ramps and fuel depots.

Dominant Physiographic and Man-made Recreation Features

The two dominant physiographic features on Galiano Island are the shoreline of the island and the major upland areas, reflected by the topographic conditions previously shown on Map 2. The vegetative features of the island are considered homogeneous throughout its entirety.

The total shoreline of the island provides 4 1/4 miles of sandy beach, and an additional 8 3/4 miles of rock beach. The remaining 28 1/4 miles of shoreline has no beach; areas where cliffs drop vertically to water level, or vegetation grows to the immediate shore (Capital Regional District Planning Department, 1970).

The major upland areas, with elevations up to 1000 feet above sea level, are prominent features possessing attractive visual qualities and providing desirable look-out areas.

Significant man-made recreation facilities on the island
are few. The limited boat-oriented facilities presently existing on the island have been detailed, as shown on Map 7. Commercial food and lodging are provided at Sturdies Bay. A golf course is located in the area to the northwest of Whaler Bay.

In summary, the distribution of natural and man-made recreation occurs largely as a result of the linear configuration of the island, with nodal concentrations of man-made facilities occurring at both ends of the island. The lack of dominant features on the eastern shoreline is evident, except for expanses of sand and rock beach, and is accentuated by the absence of any recreational development or transportation facilities.

PHYSIOGRAPHIC LAND UNITS.

Based on the foregoing analysis of the physiographic characteristics of the natural resource base, site classes and site types, after Hills (1961), are delineated for Galiano Island as shown on Map 8.

In keeping with the definitions of land units as outlined by Hills (Ibid), all of Galiano Island occurs within one site region and one landtype. There are no major macro-climatic, landform or vegetation variations on the island. Similarly, no large-scale differences in soil depth and composition occur.

For purposes of the study, the author has divided the island into two physiographic site classes, based on variations in local climatic conditions. In the absence of detailed climatological data for various sections of the island, available information of wind and sun characteristics has been utilized. The prevailing east to southeast wind direction, and the difference of sun exposure between the northeasterly and southwesterly slopes provides the means of delineation of the two site classes.

Within each of the two designated site classes, three
site types are differentiated, based on variations in soil depth and moisture content, as shown on Map 8. Each of the site types occurs in several locations within each site class, comprising a total of 22 differentiated areas on the island.

The available soils data provided by Day et al (1959), Krajina (1965) and the Forest Soils Committee of the Douglas Fir Region (1957) form the basis for delineation of the site types. As previously discussed, the studies indicate decreasing soil depth and decreasing soil moisture with increased degree of slope of the landform. Demarkation of the site types therefore occurs largely as a function of the slope severity throughout the island. Three major slope categories are differentiated, 0-10%, 10-20% and +20%, as corresponding respectively to site types 1 and 4, 2 and 5, 3 and 6, as indicated on Map 8.

Within each coastal site type land area, a shoreline site phase is identified as indicated on Map 8. The site phase identifies the shoreline characteristics within each site type; sand beach, rock beach or no beach, and the areas where beach backland slopes are in excess of 20%.

EVALUATION OF PHYSIOGRAPHIC CHARACTERISTICS, AND SITE CLASS CAPABILITY CLASSIFICATION

Cottaging

Ten physiographic characteristics are identified as important in evaluation of land areas for cottaging purposes, all of which may be assessed in terms of the foregoing analysis of the Galiano Island natural resource base; soil material for foundation construction, drainage for sewage disposal, slope, fresh water availability, capability for vegetative growth, shelter from winds, capability for vehicle access, aspect, outward view and proximity to a water feature (Department of Forestry and Rural Development, 1967-a).
Slope characteristics are a major determinant in evaluating land areas for cottaging purposes. Areas of moderate slopes, up to 15%, provide conditions for construction in most areas (Department of Forestry and Rural Development, 1967-a). In terms of roadway access Lynch (1962) suggests that grades up to 7% provide no difficulty for easy automobile movement. For purposes of the study, therefore, the three slope categories previously described (0-10%, 10-20%, +20%) may be adopted, representing good, marginal and poor conditions respectively for cottaging. As discussed in Chapter 2, on moderate slopes, 0-10%, the conditions are optimal for soil depth and stability, drainage, fresh water supply and capability for vegetation growth. Each of these conditions becomes less favourable on steeper slopes.

In terms of aspect, areas facing a general south, southwest or west direction are most favourable for receiving sunlight. East, northeast and north facing slopes are least favourable (Lynch, 1962).

With regard to the proximity of the shoreline to the designated site type, three categories are included; areas which are predominantly shoreline oriented, areas with some shoreline, and areas with no shoreline.

The evaluation scoring for each of the physiographic characteristics for cottaging purposes in the designated site types is provided on a 1 to 3 (best to worst) basis, as shown in Table 2. As previously described, the relationships among slope, soil depth and drainage permit grouping of these factors as a unit.

The seven categories shown in Table 2 provide for a minimum score of 7 and a maximum score of 21, indicating the highest to lowest physiographic component capability to sustain cottaging activity.
<table>
<thead>
<tr>
<th>Site Type</th>
<th>1a</th>
<th>1b</th>
<th>1c</th>
<th>1d</th>
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</table>

Table 2  Scoring and classification of the capability of physiographic components to support cottaging in the designated site types
Since the capability rating for any cottaging areas can range from Class 1 to Class 5, as stipulated in the Canada Land Inventory evaluation system, a similar rating system is adopted for this study (Department of Forestry and Rural Development, 1967-a). In order to assign a capability class number to each of the site types, the range of values (7 to 21) is distributed among the Classes (1 to 5) as indicated below.

<table>
<thead>
<tr>
<th>Range of Values</th>
<th>Capability Class for Cottaging</th>
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<tbody>
<tr>
<td>7-9</td>
<td>1 - Good</td>
</tr>
<tr>
<td>10-12</td>
<td>2</td>
</tr>
<tr>
<td>13-15</td>
<td>3 - Marginal</td>
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<tr>
<td>16-18</td>
<td>4</td>
</tr>
<tr>
<td>19-21</td>
<td>5 - Poor</td>
</tr>
</tbody>
</table>

On this basis, the distribution of the resulting capability classes for cottaging within the site types is indicated in Table 2 and on Map 9.

**Camping**

Characteristics identified as important for evaluation of campground areas include "stable but unconsolidated surface materials, extensive areas of low gradients or frequent level terraces, proximity to potable water, tree cover to provide wind and sun shelter, and capability for vehicle access" (Department of Forestry and Rural Development, 1967-a). All of the above have been considered in the range of characteristics analyzed on Galiano Island.

The Parks Branch of the Department of Recreation and Conservation state that:

- Campsites should not be built on areas with other key recreational uses such as picnicking and swimming.
- Instead, the campsites should occupy the uplands with trails leading to the beach area. This provides both the camper with added privacy by eliminating day users from the camping area, and, where space is limited,
provides the day user with a larger area for their activities.

Provision of camping facilities in marine parks such as Montague Harbour is an exception to this policy. In the marine parks, camping provisions are ideally situated adjacent to mooring or docking facilities "in the semi-seclusion of woodland setting similar to those in provincial parks accessible by road" (Department of Recreation and Conservation).

A typical tent site provided in the Montague Harbour campground is illustrated in Fig. 8.

Evaluation and classification of the physiographic characteristics of the site types for camping purposes incorporates considerations similar to those included for cottaging, with the capability for boating access and boating facilities added.

The range of possible total values of the physiographic components is between 8 and 24 (best to worst), and is distributed among the capability classes (1 to 5) on the basis indicated below.

<table>
<thead>
<tr>
<th>Range of Values</th>
<th>Capability Class for Camping</th>
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<tbody>
<tr>
<td>8-10</td>
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<td>11-13</td>
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<td>17-19</td>
<td>4</td>
</tr>
<tr>
<td>20-24</td>
<td>5 - Poor</td>
</tr>
</tbody>
</table>

The results of the evaluation of the physiographic components and the classification of the site types, by capability class for camping, is illustrated in Table 3 and on Map 9.
TYPICAL CAMPSITE LAYOUT

NOTE: Shape of campsite pad to be dictated by terrain and

cover but is approx. 1250 sq. ft. in area or equal to a
circle 40' in diameter.

Pad always on left of spur
because of trailer door location.

CAMPGROUND ROAD

Campsites set between 15' & 25' from the road and a minimum of 100' apart,
connected to the road by a spur with a minimum length of 40' and at the
angle which best suits the terrain.

Fig. 8 Typical B.C. government campsite - Galiano Island

Source
B.C. Dept. of Recreation and Conservation
Plan PS-5-A
Table 3  Scoring and classification of the capability of physiographic components to support camping in the designated site types.
Boating

The physiographic criteria for allocation of boating facilities are of two different types; water features and land features.

Water characteristics important in determining potential for boating include depth, wave action and current conditions. Available data for Galiano Island indicates that water depth immediately adjacent to the shoreline is adequate for all types of pleasure boating craft, varying to some extent with tidal action (Department of Lands and Forests, 1969). The heavy usage of the entire Gulf Islands area by pleasure boaters evidences that wave and current conditions are satisfactory except under adverse weather conditions.

The land-based physiographic characteristics important to provision of boating facilities include protection from winds, suitable shoreland available for development of service facilities, sites for docks and launching ramps, capability for road access and fresh water supply (Department of Forestry and Rural Development, 1967-a). Since shoreland construction and capability for vehicle access are both important considerations, evaluation based on slope characteristics similar to those used for cottaging are adopted (0-10%, 10-20%, +20%).

Clark has indicated the space requirements for a range of land-based boating facilities including launching ramps, docks, gasoline and oil services, and groceries. Each of the above is estimated to require only one acre or less of land (1969).

The assessment of the potential areas for boating purposes is confined to considerations of the shoreline site phase characteristics within each site type. Those site types which contain no shorelands are designated as Class 5 for boating purposes. Each site phase includes enough backland area, as described by Clark (Ibid) to accommodate any required facilities.
The evaluation of the physiographic characteristics and classification of the site phases, within each site type, is illustrated in Table 4 and on Map 9. The assessment of the site phases provides for a possible range of values between 4 and 12, distributed between the capability classes (1 to 5) as shown below.

<table>
<thead>
<tr>
<th>Range of Values</th>
<th>Capability Class for Boating</th>
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<tbody>
<tr>
<td>4-6</td>
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<td></td>
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<tr>
<td>7-9</td>
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<td>4</td>
</tr>
<tr>
<td>10-12</td>
<td>5 - Poor</td>
</tr>
</tbody>
</table>

The assigned capability rating of each of the areas for boating is illustrated on Map 9, along with capability ratings for both cottaging and camping, thus providing a basis for comparative examination.

SITE TYPE USE SUITABILITY

The foregoing classification of site type capability for the selected recreation activities is based solely on the physiographic characteristics of Galiano Island. On this basis, as noted by the Landscape Architecture Research Office (1968):

two units may have equal capability, but because one is already improved (e.g. access roads) or is susceptible to a different form of management ... they may require different degrees of effort to realize the same potential.

As has been illustrated, virtually all improvements and development presently found on Galiano Island are located at the north and south ends of the island, and along the westerly shoreline. The "degrees of effort" which would be required to facilitate similar development on the eastern shoreline of the island would necessarily be greater than would
### Table 4: Scoring and classification of the capability of physiographic components to support boating facilities in the site phases of the site types

<table>
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<th>Physiographic Component</th>
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<td>Capability for</td>
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<td>Vegetation Growth</td>
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<tr>
<td>Capability Class</td>
<td>3 3 5 5 5 5 5 5 5 5 5 5 5 5 5 1 5 5 3 3 5 5</td>
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</tbody>
</table>

Table 4: Scoring and classification of the capability of physiographic components to support boating facilities in the site phases of the site types.
be needed to accommodate expansion in the already developed areas.

Future cottage development in presently undeveloped areas inaccessible by automobile, would require provision of new roadways and hydro utility lines. Any large-scale cottage development may require the provision of a domestic water supply in areas where groundwater deficiencies occur. Similarly, sewage disposal facilities are likely to be required in newly developed areas. The Capital Regional District Planning Department (1970) has stated that with large subdivisions "it would appear advisable to require developers to provide comprehensive sewage disposal systems, particularly where the terrain is rocky and non-permeable."

To a lesser degree, development of new camping and boating facilities on presently undeveloped areas of the island would require provision of basic utilities.

SITE TYPE USE FEASIBILITY

Use feasibility is the "relative advantage of managing or improving a unit, considering its capability and suitability ... under the existing or projected socio-economic climate", as defined by the Landscape Architecture Research Office (1968). The use feasibility of equally capable and suitable site types on Galiano Island is presently higher in those areas where services and utilities are provided (e.g. roads, electric power), but due to assumed increasing demand for outdoor recreation space and the island proximity to major urban populations, all of the island may be considered as equally "feasible" for future development purposes.

SUMMARY

As discussed in Chapter 1, analysis and evaluation of the resource base can provide a major, but still only partial
means toward optimizing natural resource benefits for outdoor recreation purposes. While analysis based solely on physical and biotic considerations provides a valuable perspective and framework to assist in recreation planning, it does not include Wagar's concept of "carrying capacity" as discussed in the first Chapter. Nor does it ask the questions 'What do recreationists want from the natural resource, and are they getting what they want?'

Galiano Island recreationists engaged in the three recreation activities examined in this Chapter - cottaging, camping, boating - were asked questions of this nature in order to obtain a more comprehensive understanding of the interactions among the resource characteristics, the users and their activities on the island. Chapter 4 details these considerations and the recreationists' views of the Galiano Island natural resource; what it is, and what it should be in the future.
CHAPTER 4 - THE Galiano Island Recreationist

THE QUESTIONNAIRE

During the summer of 1970 the author was employed by the School of Community and Regional Planning, University of British Columbia, to participate in the Gulf Islands Recreation Study initiated in 1969. The project has been carried out under the direction of Dr. H.P. Oberlander, and through the sponsorship of the Donner Canadian Foundation.

A significant portion of the study entailed distribution of questionnaires to visitors on their return trip from the major Gulf Island recreation areas; Galiano, Mayne, Saltspring, North Pender, South Pender and Saturna Islands. In four distribution periods during the summer, questionnaires were distributed to visitors returning to the Tsawwassen and Schwartz Bay terminals of the British Columbia government ferry system. The questionnaires were distributed as visitors boarded the ferries, and collection was completed before respondents disembarked. A return of completed questionnaires averaging 85% was obtained during the distribution.

The questionnaire was devised to collect user data within four broad categories; socio-economic characteristics, recreation activity patterns, preferences of the type and scale of development in the Gulf Islands, and impressions of major features of attraction. The questionnaire was predominantly directed to participants engaged in the cottaging and camping activities, known to constitute major groups, as previously described (Appendix).
The portions of the questionnaire which provided data on the activity patterns, development preferences and major features of attraction to the respondents have been utilized in this study.

The questionnaire was designed to assess responses of individual recreationists, so that individuals travelling in groups each provided responses, except for family units. In the case of family groups, the head of the household provided information on behalf of the other members.

In addition to the questionnaire distributed on the ferries, another questionnaire (appendix) was developed specifically to obtain data on the recreationists visiting the islands by private boat. These questionnaires were distributed to visitors at mooring and docking facilities on both Galiano and Saltspring Islands.

This study is confined to Galiano Island, and as such only those questionnaire responses obtained from visitors to that island are included for analysis purposes. Of a total 1444 completed questionnaires, the Galiano responses numbered 216, or 14.9% of the total return. The Galiano Island cottagers, campers and boaters accounted for 173 (80.1%) of the total 216 responses. The questionnaires returned from Galiano Island visitors included 122 cottager responses, 37 camper responses and 14 boater responses. The remaining 43 (19.9%) completed questionnaires were provided by visitors who utilized hotel, lodge, or 'other' facilities on the island.

THE COTTAGER

The sample of cottage visitors was composed of 56 (49.1%) cottage owners and 42 (36.8%) non-owner visitors. The remainder of the responses were provided by 9 (7.9%) visitors who had borrowed a cottage, 5 (4.4%) who had rented a cottage and 2 (1.8%) who used other cottage facilities. Inspection of
the data provided by these groups indicated no substantial differences among responses. Therefore the total sample of cottagers is treated as a unit for purposes of analysis.

**Origin**

The significant attraction of Galiano Island to Lower Mainland and Vancouver Island residents is reflected by the questionnaire sampling of cottaging recreationists. Of the total cottager sample, 107 (87.5%) responses were provided by visitors who originated from those two areas; 90 (73.4%) from Vancouver and the Lower Mainland, and 17 (14.1%) from Victoria and Vancouver Island. The remainder of the visitors originated in other provinces of Canada and United States, accounting for 3 (2.3%) and 12 (10.2%) respectively of the respondents. There were no responses from recreationists originating in other parts of British Columbia.

**Activity Participation**

Ranked on a considerable-some-none scale of participation, 71.3% of the respondents indicated that considerable time during the visit was occupied in activities around the cottage itself, as shown in Fig. 9. Only 18.5% had spent considerable time driving for pleasure during the visit. Other activities including beachcombing, walking/hiking and swimming/sunbathing received considerable participation by 32.7%, 47.9% and 38.6% of the respondents respectively. Additionally, nearly half of the visitors spent some time participating in those activities (48.5%, 48.7% and 45.6%).

The cottage respondents generally indicated a tendency to remain at the cottage site during a substantial portion of the visit. Activities undertaken away from the cottage were predominantly shore-oriented functions which require no man-made facilities to enhance the quality of the activity. Automobile use for pleasure purposes is not an important activity to the group.
Fig. 9  Activity participation rates of cottagers
Cottage Lot Features

As shown in Fig. 10, a "desirability" rating (desirable, indifferent, not desirable) for numerous features of a cottage lot indicated that the cottagers assess large lot size (81.9%), good view (92.2%), waterfront property (86.3%), privacy (87.9%), quietness (91.1%) and road access (74.8%) all as desirable qualities. The large lot category was not defined in terms of specific dimensions. Holling (1971) has determined that cottagers in the Gulf Islands are aware of dimensions of lots less than two acres in area, but do not differentiate dimensions on lots in excess of that area. It is assumed that the respondents indicating the desirability of a large lot are indicating an area of greater than two acres.

Fewer cottage respondents indicated that electric power and wind protection were desirable; 66.3% and 48.4% respectively. Municipal water supply, sanitary sewer facilities and nearness to stores were rated as desirable by only 35.7%, 41.2% and 19.4% of the respondents. Moreover, approximately 44.0% of the respondents were indifferent to provision of municipal water supply and sanitary sewer facilities, and 60.0% indifferent to having stores and services nearby.

Beach Area Features

Figure 11 shows that 81.2% and 91.0% respectively of the respondents rated the abundance of marine life and quietness and solitude as desirable beach features. Good swimming conditions were considered as desirable to 66.4% of the respondents. Easy automobile access to beach areas and provision of nearby stores and services were rated as desirable by only 38.4% and 25.3% respectively. Approximately half the respondents (51.5%) feel that provision of walking trails would be a desirable beach feature.
COTTAGE LOT FEATURES

Fig. 10 Cottage lot features

BEACH FEATURES

Fig. 11 Beach features
Preferences Toward Changes in Development

As illustrated in Fig. 12, only 17.0% of the respondents favour provision of more roads on the island, and only 24.7% feel more stores and services should be provided, on a yes-no response basis. 43.6% favoured provision of more public beaches. Development of cottages on a rental basis and provision of more public boating facilities were considered as favourable by only 32.9% and 32.0% respectively. A majority of cottagers favoured restrictions on the amount of new cottage development permitted (61.1%), and also favoured the establishment of a minimum distance requirement between cottages (84.7%). Similarly, cottagers favoured restriction of cottages to large lots only (79.2%). Raising of building standards was considered as favourable by 40.9% of the respondents.

Major Features of Galiano Island

Responses to an unstructured question, asking respondents to indicate the most significant features of Galiano Island, were grouped into three major categories - natural, man-made, social - as illustrated in Fig. 19. Natural features include those characteristics of the physical and biotic environment which provide an attraction for outdoor recreation. Natural features recorded by the cottager group included scenic beauty, favourable climatic conditions and a pollution-free environment. Man-made facilities include any support services, utilities or facilities developed to enhance the comfort and enjoyment of the user population. Social features largely included qualitative characteristics expressed by the respondents; friendly residents, unhurried pace of life and sense of seclusion.

The cottage owners ranked the natural features of the island as most important (58.8%). Social factors accounted for 35.0% of the responses, the remainder (6.2%) ranking man-made features on the island as most important.
COTTAGE DEVELOPMENT CHANGES

Fig. 12 Cottage development changes
Conclusions From the Analysis of Cottager Responses

The foregoing analysis indicates that cottage-oriented recreationists on Galiano Island value the resource largely because of its relatively undeveloped condition and the sense of being "away from it all" still available at present. Activity patterns and lack of desirability for increased services and utilities illustrates the desire of this group to have Galiano Island retained for "simple" forms of recreation such as beach-combing and walking or hiking. Personal observation has confirmed the prevalence of visitors enjoying a stroll along the shore, an afternoon sunning on the beach or a dig for clams and oysters.

Preferences indicate that desirable cottaging on the island is inherently a shoreline-oriented function; the land-water interface being a fundamental element of the whole cottaging experience. Waterfront property presents the ideal cottaging environment; having a good water-oriented view being the second best alternative.

From the point of view of this group, the results of the questionnaire suggest that extensive future cottage development on the island would detract substantially from the satisfaction derived by the present user population.

THE CAMPER

Origin

The permanent residences of recreationists camping on Galiano Island were predominantly located in the Vancouver-Lower Mainland and Victoria-Vancouver Island areas. Of the total sample of 37 campers, 30 (81.1%) originated from these two areas, 22 (59.5%) and 8 (21.6%) respectively. Only 3 (8.1%) of the campers originated in other provinces, and 4 (10.8%) in the United States. No responses were recorded from visitors coming
from other parts of British Columbia.

Campers included in the sample were reasonably experienced, 89.2% having camped on at least five previous occasions, 21.6% having camped five or more times previously in the Gulf Islands area. For 56.8% of the respondents the trip to Galiano Island was a first visit.

The Montague Harbour Provincial Campground on Galiano Island was the camping site for the majority (78.6%) of the respondents. Only 2.4% of the campers utilized commercial camping areas, and 19.0% camped in "other" locations such as undeveloped properties and beach areas.

**Activity Participation**

The camping respondents were asked to indicate their participation in a range of activities, ranked on a considerable-some-none basis, as shown in Fig. 13. Relaxing around the campsite was the major activity of the sample; 71.4% having spent "considerable" time during the visit at or in the near vicinity of the individual tent site. Beachcombing and walking/hiking were also prevalent activities, with 40.5% and 45.2% respectively of the respondents recording considerable participation. An additional 47.6% and 52.4% respectively spent some time beachcombing and walking/hiking. 38.8% of the respondents spent considerable time swimming and sunbathing, while an additional 45.6% spent some time participating in the activities. While much of the camper's activities were indicated to have taken place in or near the campground, 39.5% of the sample spent considerable time pleasure driving, and another 23.7% spent some time during the visit driving for pleasure.

The above patterns indicate the importance of the campground and its immediate environs to the camper group. Similar to the cottagers, the camper's major activities require minimal man-made development, rather being satisfied by the
Fig. 13 Activity participation rates of campers
natural characteristics of the physical environment. Most activities in which the campers participated occur at short distance from the campsites, except for pleasure driving on the island.

Campground Features

The desirability of a range of campground features, provided on a desirable-indifferent-not desirable ranking scale, indicates that quietness (87.5%), protection from wind (87.2%) and presence of trees and shrubs adjacent to the tent site (82.5%) are most desirable to the camper group, as illustrated in Fig. 14. Nearness to the drinking water supply and toilet facilities are of somewhat lesser importance, with 71.8% and 64.1% of respondents respectively indicating the desirability of nearby utilities. Within the individual tent site, the presence of grass growth on the ground surface, an outward view and ease of vehicle parking were considered as being of somewhat less concern to the respondents; 48.7%, 45.0% and 37.8% respectively indicating these conditions as being desirable.

Beach Area Features

The most desirable characteristics of a beach area, as indicated by the Galiano Island campers were quietness and solitude, and an abundance of marine life, registered by 87.8% and 82.0% of the group respectively. Although only 28.2% of the respondents had participated considerably in swimming and sunbathing during the visit, 77.5% indicated that good swimming conditions were a desirable feature of any beach area. Boating facilities, such as launching areas and dockage were considered as desirable by 51.3% of the group. Good hiking trails along beaches were rated as desirable by 63.1% of the respondents.

Less than half of the respondents indicated that easy automobile access and the provision of stores and concessions were desirable beach features, registered by 45.7% and 28.2%. 
Fig. 14. Campground features

Fig. 15. Beach features

Legend:
- not desirable
- indifferent
- desirable
Preferences Toward Changes in Campground Development

Provision of additional campgrounds on Galiano Island was considered favourable by 60.0% of the camper respondents, as shown in Fig. 16. Within existing camping facilities, improvement of utilities was indicated as favourable by 67.6% of the sample, and less than half the group (44.8%) indicated that spacing the tent sites at distances greater than the standard 100 feet was needed. Planting of additional trees and shrubs around tent sites was indicated as favourable by only 35.5% of the campers. In the foregoing section, assessing desirability of campground features, 82.5% of the respondents expressed the desirability of trees and shrubs around the tent site; indicating that the vegetation characteristics presently found in the camping areas are adequate in the opinion of most campers.

Positive reaction to the provision of electricity in the campground was indicated by only 12.9% of the respondents. Similarly, provision of paving around heavy foot-traffic areas at the tent sites and construction of wooden decking for use under tents were considered favourable by only 9.4% and 10.3% of the campers respectively.

Major Features of Galiano Island

The dominant features of Galiano Island as expressed by the camper group combined in the same manner as was done for the cottager sample; natural features, man-made features, social features. Natural features including scenic beauty, climate and pollution-free environment were considered most important on Galiano Island for 63.1% of the sample group. Social features including sense of seclusion, freedom and friendly residents accounted for the remaining 36.9% of the group. Within the camper sample, no respondents indicated that man-made elements on Galiano Island were the most important features. The "features" data provided by the group is summarized in Fig. 19.
CAMPGROUND CHANGES

Fig. 16 Campground development changes
Conclusions From the Analysis of Camper Responses

The responses of the camper group clearly indicate the importance of the natural characteristics of the island, as well as the desirability of a secluded recreation experience. A largely undeveloped environment is important to enjoyment of the camping area itself, and to the activities in which this group of recreationists participate. Similar to the responses of the cottager group, the campers place emphasis on the importance of quietness, solitide and privacy as essential to enjoyment of the visit.

Ancillary facilities which are desired ideally serve only to enhance a "natural" experience in camping, and do not to any extent change the character of the experience itself. Only minimal improvements to existing conditions in the organized camping areas are desired, the major proposed change being for the provision of more camping areas.

In terms of facilities to accommodate the activities of the camper group, essentially nothing is required or desired; retention of existing natural values being the important consideration. In essence, the natural environment in its largely undisturbed form is the most essential "facility" of any. Other than the activities around the campsite itself, shore-oriented activities are the dominant attractions for the camper group. The importance of campground location in close proximity to the water feature is evident.

THE BOATER

Origin

The location of permanent residences indicated by the boaters is markedly different than that of either the cottager or camper group. Of the boater respondents, 7 (50.0%) of the respondents were from the United States, and 5 (35.7%) from the
Victoria-Vancouver Island area. Vancouver and the Lower Mainland visitors accounted for only 2 (14.3%) of the sample. The total boater sample provided by the Gulf Islands Recreation Study which included visitors to Saltspring Island as well as Galiano Island indicated a similarly high (72.5%) proportion of United States visitors.

The boater respondents included 70.0% who utilized the boat for sleeping quarters during their visit to Galiano Island, with the remaining 30.0% having camped in that portion of the Montague Harbour camping area set aside for the use of the boating recreationists.

None of the boater respondents owned property on Galiano Island.

Activity Participation

Beachcombing and walking/hiking accounted for the most activity participation on Galiano Island by the boater respondents, as shown on Fig. 17, with 50.0% and 44.0% respectively participating a considerable amount in each. In each case, all the remaining respondents participated some in these activities. Only 10.0% of the boaters did considerable swimming/sunbathing during the visit, with an additional 70.0% participating "some". Considerable participation in fishing was pursued by 22.2% of the group, with another 27.8% undertaking some participation.

Beach Area Features

Quietness and solitude, and an abundance of marine life were rated as desirable by 100% of the respondents. Provision of marina facilities was considered desirable by 90.0% of the group. Only slightly less emphasis was given to beach walking trails, public moorage facilities and good swimming conditions, each rated as desirable by 80.0%, as shown in Fig. 18.
Fig. 17 Activity participation rates of boaters

Fig. 18 Beach features

**ACTIVITY**

**BEACH FEATURES**

Legend:
- none
- some
- considerable

Legend: not desirable indifferent desirable
The boater group was largely indifferent (70.0%) to the provision of boat launching facilities. Personal observation by the author of the type of large craft used by most respondents showed that normal ramp-type launching facilities could not be used in any event.

None of the respondents favoured the provision of commercial docking facilities in beach areas. Similarly, no responses indicated that easy automobile access was desirable.

**Major Features of Galiano Island**

The natural features of the island, as described in the foregoing cottager and camper sections of the study, provided the major attractions for 57.1% of the boater respondents. Social factors were recorded as the major features for 28.5% of the group. Additionally, 14.3% rated man-made features as most important, specifically the provision of good boating services and facilities, as shown on Fig. 19.

**Conclusions From the Analysis of Boater Responses**

The sample of boaters who made Galiano Island their major stop-over point during the trip was too small to provide definitive conclusions about the boater population as a whole. However, the sample does provide a general indication of activity patterns, island development preferences and major features of attraction.

The responses of the group largely reflect the self-interests of the boat-oriented recreationists. To the group, the island is considered predominantly as only one stop among many during the boating trip, rather than as a final destination as is the case with most cottagers and campers.

The activities in which the boaters participate are largely shore-oriented such as beachcombing and walking/hiking
Fig. 19  Major Galiano Island features of all visitor groups
which require no man-made facilities. Service and moorage provisions for the boat itself are important requirements however, and the responses indicate the desirability of these features as basic to the enjoyment of the boating trip.

SUMMARY OF THE QUESTIONNAIRE ANALYSIS

The overall results of the questionnaire indicate an expressed desire by all groups to have Galiano Island retained as a largely undeveloped natural resource, maintaining the user population at low levels and providing only basic required services and utilities. In terms of the major features of attraction on the island, the responses of all three groups were similarly distributed among the natural, man-made and social elements (Chi-square; 1% level of significance).

A major element of the recreationists' enjoyment of the resource is "getting away from it all", leaving behind temporarily the urban environment from which most originated. The results suggest that substantial increase in the numbers of recreationists using the island or major changes in the nature and scope of development will detract from the ideal recreation environment for the present referent groups.

The shoreline-orientation of all recreationist groups and virtually all of their activities indicates that dominance of the land-water interface as the major physical element of the resource. The interior and upland areas of the island presently function to a large degree only as a back-drop or setting for the shoreline feature. This attraction to the shoreline expressed by all groups significantly suggests that any potential problems of over-crowding and use conflicts will predominantly occur around the perimeter of the island. The satisfaction of the desires of any one group of recreationists may inherently embody potential dis-satisfaction of another. While many of the preferences and impressions are similar among the three groups - cottagers, campers, boaters - the specific needs of each vary.
If it is accepted that interests of all recreationist groups presently utilizing the island are to be continued in the future, then minimization of potential conflicts must be ensured, and optimal integration of common land use functions must be provided for.
CHAPTER 5 - RESOURCE, ACTIVITY AND USER INTEGRATION:
A SUGGESTED PLAN FOR GALIANO ISLAND

THE STUDY PREMISE AND HYPOTHESES

The foregoing analysis of the natural resource components, activity characteristics and user preferences on Galiano Island has largely substantiated the overall premise of this thesis. Consideration of the physiographic and biological characteristics, in conjunction with the characteristics of the recreationists as they interact with the resource base, can provide for a more comprehensive understanding by which optimal utility and minimal degradation of the resource can be achieved. The results of the resource analysis phase of the study illustrate that there are definitive limitations to the potential distribution of recreation activity types on Galiano Island, based on natural resource capability to support use on a sustained basis. Additionally, consideration of the referent recreationist groups illustrates that optimal "user carrying capacity" of the resource is very dependent on retention of certain island characteristics. In effect, resource capability and resource capacity are not necessarily synonymous on Galiano Island. Realization of maximum capability of the island for recreation purposes will result in substantial decrease in user satisfaction unless spatial distribution and design characteristics of development reflect concern for both resource quality and recreationist satisfaction.

The study hypothesis suggesting that user impressions of major features of Galiano Island are similarly distributed among the three referent groups has been substantiated. The
findings indicate that while retention of natural values on the island is of major importance to visitors, the man-made and social elements also play a role in enhancing the quality of the outdoor recreation activities. Planning for outdoor recreation should incorporate considerations of all three aspects in order to optimize conditions for the recreation experience.

Analysis of characteristics of the three referent groups substantiates the second hypothesis as described in Chapter 1. All groups largely favour retention of "natural values" in a largely undeveloped landscape, and desire only the minimal level of services and utilities necessary to make the visit comfortable.

The third hypothesis which suggests that variations in the physiographic and biological components of Galiano Island are of sufficient type and degree as to provide a basis on which outdoor recreation activity distribution can be allocated has also largely been substantiated. The analysis in Chapter 3 illustrates that "physiographic determinism" in the utilization of the Galiano Island natural resource does provide a basis on which optimization of resource utility and minimization of resource degradation can be ensured. Any pattern of use and development on Galiano Island based on considerations which do not include the natural resource characteristics would appear to increase the prospect of resource degradation and user dis-satisfaction.

A SUGGESTED PLAN FOR GALIANO ISLAND

In the light of the analysis provided in the study, integration of the characteristics of the three elements of recreation on Galiano Island - resource, activity, user - can provide for a comprehensive recreation resource evaluation on which to base planning decisions.

The land use capability classification developed in
Chapter 3 provides a basis for spatial allocation of the natural resource base for selected activities on Galiano Island. The technique incorporates considerations of potential physical impacts of recreational use on the environment, but does not explicitly embody the preferences recreationists may have about the nature of development which can occur. The analysis of questionnaire responses from the three referent groups has endeavoured to provide this element through an assessment of user characteristics, their activities, preferences and impressions of the natural resource.

A suggested integrated land use plan, based on the analyses of the resource base and the referent user groups is illustrated on Map 10.

**Cottaging**

Cottage development is recommended to occur predominantly at the north and south ends of the island, with smaller areas designated in the central portion of the island on both sides of the central spine. Designated areas are generally confined to those areas which possess moderate slope characteristics, as well as adequate soil and water conditions. In these areas hazards of soil instability and inadequate drainage for septic sewage disposal are minimized. Capability for vegetation growth is optimal in these areas, and is unlikely to be adversely affected as a result of development (e.g. soil compaction, drainage impedement).

Furthermore, in keeping with sentiments expressed by the cottage visitors, proposed cottage areas are separated spatially throughout the island with extensive areas of park lands and managed forests. Most designated cottage areas are shoreline-oriented, or located such that a waterfront view may be obtained. The proximity of the shoreline will permit continued participation by the cottaging group in the water-oriented activities expressed as important in the questionnaire analysis.
Within each area designated for cOTTaging purposes, it is suggested that a minimum lot size of 2 acres be established. The adaption of this criterion would not only provide the privacy and sense of freedom expressed as important by respondents, but in respect to minimizing required utilities would also provide an adequate area for field drainage of septic sewage (Douglass, 1969). Furthermore, a minimum lot size of 2 acres would permit retention of most vegetation on any property, thus complementing the expressed desire of maintaining natural values of the resource.

It is noted that the areas designated for cottage development, based on the physical capability analysis, include virtually all those areas presently devoted to this function (e.g. site type numbers 1a, 1b, 2b, 5b, 6a, 6b). The similarity between the cottaging areas suggested by the analysis, and existing development areas indicates that cottaging has occurred largely as a function of the physiographic factors described in this study. Furthermore, a map produced in a recent computer-based study of the Gulf Islands, unpublished at present, indicates cottaging suitability on Galiano Island as closely corresponding to the areas designated by this study (Holling, 1971).

Camping

The suggested allocation of public camping facilities provides for two areas on the island, as shown on Map 10. The existing Montague Harbour camping area, rated as Class 1 for camping in the Chapter 3 capability analysis, is maintained. Development is suggested of an additional camping area in the central portion of the island, located as shown on Map 10. Portions of this designated area are public lands presently held by the Province of British Columbia.

It is suggested that public lands in which the camping areas are designated be expanded to include the land areas between the northeast and southwest shorelines, thus linking
the opposite sides of the island for walking and hiking activity, expressed as important to the camping recreationists. Provision of the linkage across the island would also provide ease of access to all major bays and harbours which occur in the central portion of the island.

Further, in order to enhance the natural camping experience for this group of recreationists, it is suggested that an adequate buffer zone of vegetation be maintained between the camping areas and those areas within the private tree farm holdings. The dimensions of the buffer zone would be subject to a detailed analysis of vegetation density and its ability to screen sound and sight nuisance factors in the adjoining lands.

Within the designated camping areas, it is suggested that tent site spacing be carried out at not less than the present 100 feet standard, considered acceptable to the majority of camper visitors in the questionnaire sample. Additionally, maximum vegetation retention should be exercised. These measures will serve to satisfy the desire for quietness, abundance of tree and shrub growth and wind protection expressed by most campers.

**Boating**

The capability rating of physiographic characteristics amenable for boating facilities on Galiano Island indicates few suitable sites for development. It is suggested that existing facilities be maintained, and that minimal provisions for boat launching and short-term docking and mooring be provided in those areas designated as public park lands, thus permitting boating visitors to utilize the areas. It is suggested that over-night moorage and docking facilities be confined to the protected waters on the southwestern shore of the island where wind conditions are more favourable.
Shoreline Use

The importance of the shoreline to all considerations of outdoor recreation on Galiano Island is clearly indicated by the study. It is the shoreline areas of the island which have been shown to provide the dominant feature of attraction on the resource base, and the location of virtually all recreation activity. It is proposed therefore that public possession of several stretches of the island shoreline be provided, as indicated on Map 10. In this manner, in addition to public access being provided along the shoreline between the high and low tide levels, public access can be assured in those areas where no beach occurs, and provide for uninterrupted access around much of the island perimeter.

CONCLUSIONS AND RECOMMENDATIONS

The study has largely confirmed that natural resource planning for outdoor recreation on Galiano Island which embodies an integrated approach utilizing resource, activity and user characteristics should provide a means to plan for the optimal conditions for enjoyment of the experience, and simultaneously ensure that natural resource quality is maintained. It is concluded that this approach could be utilized for similar analysis purposes on any natural resource complex for outdoor recreation purposes.

Utilization of a composite technique embodying elements proposed by Hills, Lewis, McHarg and the Canada Land Inventory program provides a comprehensive basis on which to superimpose the user and activity characteristics. It is concluded that recreation resource analysis as provided by a synthesis of these techniques can provide for an optimization of natural resource carrying capacity, incorporating the recreationists' points of view and ensuring optimal user satisfaction.

It is recommended that any pursual of the evaluation
of the Galiano Island resource, or similar resources elsewhere, should be done on the basis of more detailed physiographic data than is currently available; soils, hydrologic characteristics and patterns of vegetation distribution specifically. Furthermore, study of the environmental impact caused by the various recreation activities on the resource base would provide a valuable addition to planning considerations.

The addition of characteristics of the user element to the recreation resource analysis provides a valuable insight. It is concluded from the results obtained from the visitor sample, that a questionnaire distribution similar to that included as part of this study provides a satisfactory partial assessment of the user element, but a larger sample of all recreationist groups would make conclusions about each more substantive.

Finally, while integration of the resource, activity and user factors in the analysis of a particular natural resource can serve to optimize conditions for outdoor recreation, so also should the resource be considered as an integral part of the larger physical, social and economic whole in which it occurs. This thesis examined Galiano Island in isolation from the others in the Gulf Islands chain in order to examine and apply a methodology within a confined case study area. However, Galiano Island is only one element in the broader whole of the Gulf Islands natural resource, and while detailed analysis of this one specific area is important in endeavouring to optimize its specific utility, inclusion of a yet broader view of the resource may also serve to achieve that objective. Extended study within an ecological framework on a basis similar to that undertaken in this thesis may provide a means of optimizing future use and benefits for the entire Gulf Islands natural resource.
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APPENDIX

Gulf Islands Recreation Study Visitor Questionnaire

Gulf Islands Recreation Study Boater Questionnaire
The School of Community and Regional Planning, U.B.C., asks your participation in a recreation study of the Gulf Islands. Your visit has shown you that the area is unique in many aspects. It is felt that this attractive setting will become increasingly popular as a vacation and recreation area.

In order to best plan for the future, it is important to know something of the people who are using the Islands, and how they are using them. Your completion of the attached questionnaire will provide this information and assist in the future planning of this important recreational resource.

Please return the questionnaire to us before leaving the ferry. All information will be kept confidential and used by the University for research purposes only. Thank you.
<table>
<thead>
<tr>
<th></th>
<th>Question</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Where is your permanent residence?</td>
<td>City/Town, Province/State</td>
</tr>
<tr>
<td>2</td>
<td>How many days did you stay on the Islands?</td>
<td>1, 2, 3, 4, 5, 6, week +</td>
</tr>
<tr>
<td>3</td>
<td>How many people are in your group?</td>
<td>1, 2, 3, 4, 5, 5+</td>
</tr>
<tr>
<td>4</td>
<td>How did you travel to the Islands?</td>
<td>BC Ferries, Private boat, Other (specify)</td>
</tr>
<tr>
<td>5</td>
<td>Where did you board this ferry?</td>
<td>Fulford Harbour, Long Harbour, Montague Harbour, Otter Bay, Saturna, Sturdies Bay, Village Bay</td>
</tr>
<tr>
<td>6</td>
<td>What was your prime means of travel on the Islands?</td>
<td>Automobile, Motor bike, Bicycle, Walking, Driving for pleasure, Golf</td>
</tr>
<tr>
<td>7</td>
<td>Did you take an automobile to the Islands with you?</td>
<td>Yes, No</td>
</tr>
<tr>
<td>8</td>
<td>How many times have you visited the Islands?</td>
<td>1, 2, 3, 4, 5, 5+</td>
</tr>
<tr>
<td>9</td>
<td>Do you intend to visit the Islands again?</td>
<td>Yes, No</td>
</tr>
<tr>
<td>10</td>
<td>What was the main purpose of your trip?</td>
<td>To go to the cottage, go camping, to visit friends or family, for business or employment, to consider purchasing property, other (specify)</td>
</tr>
<tr>
<td>11</td>
<td>Do you own a cottage or home on the Islands?</td>
<td>Yes, No, Other (specify)</td>
</tr>
<tr>
<td>12</td>
<td>If you stayed one or more nights on the island, what type of accommodation did you have?</td>
<td>Hotel, Lodge, Hotel, Campground, Cottage, Private Home, other (specify)</td>
</tr>
<tr>
<td>13</td>
<td>Did you and your group participate in any of the following activities?</td>
<td>Beachcombing, Walking/Hiking, Swimming/Sunbathing, Boating/Fishing, Camping, Picnicking, Activities around the home (growing, repairs, etc.), other (specify)</td>
</tr>
<tr>
<td>14</td>
<td>Rank the following activities, according to your participation in it during your visit to the Gulf Islands.</td>
<td>1 considerable participation, 2 some participation, 3 no participation</td>
</tr>
<tr>
<td>15</td>
<td>Rank in order of desirability each of the following features which make a beach area enjoyable to you.</td>
<td>Boating facilities: Launch area, deck, Easy automobile access, Quietness and solitude, Abundance of marine life, Walking trails provided, Nearness of stores/concessions, Good swimming conditions, Other (specify)</td>
</tr>
<tr>
<td>16</td>
<td>Please indicate the appropriate age category for yourself and any others in your group who are not personally completing a questionnaire.</td>
<td>Age Group: 0-1, 2-5, 6-10, 11-15, 16-23, 26-50, 51-65, 65+</td>
</tr>
<tr>
<td>17</td>
<td>Please circle the appropriate category to indicate your occupation type.</td>
<td>Managerial, Professional, Sales personnel, Clerical, Construction, Labor, Manufacturing, Fishing, Lumbering, Mining, Farming, Housewife, Student, Other (specify)</td>
</tr>
<tr>
<td>18</td>
<td>Please indicate YOUR total income (before taxes) per annum ($) Canadian.</td>
<td>0 - 2,500, 2,501 - 5,000, 5,001 - 7,500, 7,501 - 10,000, 10,001 - 12,500, 12,501 - 15,000, 15,001 +</td>
</tr>
<tr>
<td>19</td>
<td>Person who CAMPED during their visit to the Gulf Islands please answer Section 19.</td>
<td></td>
</tr>
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### 19. CAMPERS

<table>
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<th>A</th>
<th>Indicate which Island you camped on.</th>
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<tbody>
<tr>
<td>Galiano</td>
<td>a</td>
</tr>
<tr>
<td>Salt Spring</td>
<td>b</td>
</tr>
<tr>
<td>Mayne</td>
<td>c</td>
</tr>
<tr>
<td>North Pender</td>
<td>d</td>
</tr>
<tr>
<td>South Pender</td>
<td>e</td>
</tr>
<tr>
<td>Saturna</td>
<td>f</td>
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<tr>
<td>Other (specify)</td>
<td>g</td>
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<table>
<thead>
<tr>
<th>B</th>
<th>Where did you camp on that Island?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provincial Government Campground</td>
<td>a</td>
</tr>
<tr>
<td>Commercial Campground (state name)</td>
<td>b</td>
</tr>
<tr>
<td>Other (specify)</td>
<td>c</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>C</th>
<th>What camping facilities did you use?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tent</td>
<td>a</td>
</tr>
<tr>
<td>Tent Trailer</td>
<td>b</td>
</tr>
<tr>
<td>Truck Camper</td>
<td>c</td>
</tr>
<tr>
<td>Trailer</td>
<td>d</td>
</tr>
<tr>
<td>Other (specify)</td>
<td>e</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>D</th>
<th>Have you ever gone camping anywhere before? Yes No</th>
</tr>
</thead>
<tbody>
<tr>
<td>If Yes, how often have you camped?</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>E</th>
<th>How many camping trips have you made to the Gulf Islands?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>5+</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>F</th>
<th>Rank in order of desirability each of the following features you consider when selecting a 'tent space'.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Desirable</td>
<td>2 Indifferent</td>
</tr>
<tr>
<td>View from tent space</td>
<td>1 2 3</td>
</tr>
<tr>
<td>Protection from wind</td>
<td>1 2 3</td>
</tr>
<tr>
<td>Quietness</td>
<td>1 2 3</td>
</tr>
<tr>
<td>Shade from sun</td>
<td>1 2 3</td>
</tr>
<tr>
<td>Nearness to toilet</td>
<td>1 2 3</td>
</tr>
<tr>
<td>Nearness to water supply</td>
<td>1 2 3</td>
</tr>
<tr>
<td>Presence of trees &amp; shrubs</td>
<td>1 2 3</td>
</tr>
<tr>
<td>Grass growth on ground</td>
<td>1 2 3</td>
</tr>
<tr>
<td>Ease of parking vehicle</td>
<td>1 2 3</td>
</tr>
<tr>
<td>Other (specify)</td>
<td>1 2 3</td>
</tr>
</tbody>
</table>

### 20. COTTAGERS

<table>
<thead>
<tr>
<th>A</th>
<th>Please indicate which Island you cottaged on.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Galiano</td>
<td>a</td>
</tr>
<tr>
<td>Salt Spring</td>
<td>b</td>
</tr>
<tr>
<td>Mayne</td>
<td>c</td>
</tr>
<tr>
<td>North Pender</td>
<td>d</td>
</tr>
<tr>
<td>South Pender</td>
<td>e</td>
</tr>
<tr>
<td>Saturna</td>
<td>f</td>
</tr>
<tr>
<td>Other (specify)</td>
<td>g</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>B</th>
<th>Please indicate the appropriate category below.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Own cottage</td>
<td>a</td>
</tr>
<tr>
<td>Borrowed cottage</td>
<td>b</td>
</tr>
<tr>
<td>Visited with owners of cottage</td>
<td>c</td>
</tr>
<tr>
<td>Rented cottage</td>
<td>d</td>
</tr>
<tr>
<td>Other (specify)</td>
<td>e</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>C</th>
<th>How many times have you 'cottaged' in the Gulf Islands?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>5+</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>D</th>
<th>Rank in order of desirability each of the following features you consider when selecting a lot for a cottage.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Desirable</td>
<td>2 Indifferent</td>
</tr>
<tr>
<td>Road access to property</td>
<td>1 2 3</td>
</tr>
<tr>
<td>A large lot</td>
<td>1 2 3</td>
</tr>
<tr>
<td>Wind protection</td>
<td>1 2 3</td>
</tr>
<tr>
<td>View from lot</td>
<td>1 2 3</td>
</tr>
<tr>
<td>Property on waterfront</td>
<td>1 2 3</td>
</tr>
<tr>
<td>Electric power</td>
<td>1 2 3</td>
</tr>
<tr>
<td>Municipal water supply</td>
<td>1 2 3</td>
</tr>
<tr>
<td>Sewer facilities</td>
<td>1 2 3</td>
</tr>
<tr>
<td>Privacy from neighbours</td>
<td>1 2 3</td>
</tr>
<tr>
<td>Quietness</td>
<td>1 2 3</td>
</tr>
<tr>
<td>Nearness to stores and services</td>
<td>1 2 3</td>
</tr>
<tr>
<td>Other (specify)</td>
<td>1 2 3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>E</th>
<th>Rank each of the following activities according to your participation in it during your visit to the Gulf Islands.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Considerable Participation</td>
<td>2 Some Participation</td>
</tr>
<tr>
<td>Around cottage (gardening, repairs, relaxing, etc.)</td>
<td>1 2 3</td>
</tr>
<tr>
<td>Beachcombing</td>
<td>1 2 3</td>
</tr>
<tr>
<td>Walking/hiking</td>
<td>1 2 3</td>
</tr>
<tr>
<td>Swimming/sunbathing</td>
<td>1 2 3</td>
</tr>
<tr>
<td>Driving for pleasure</td>
<td>1 2 3</td>
</tr>
<tr>
<td>Other (specify)</td>
<td>1 2 3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>F</th>
<th>Indicate your opinion toward the following changes which could make cottaging in the Gulf Islands more enjoyable.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provide more roads on Island</td>
<td>Yes No</td>
</tr>
<tr>
<td>Provide more public docks and boat launching areas</td>
<td>Yes No</td>
</tr>
<tr>
<td>Provide more public beaches</td>
<td>Yes No</td>
</tr>
<tr>
<td>Permit cottages on large lots only</td>
<td>Yes No</td>
</tr>
<tr>
<td>Provide more stores and services</td>
<td>Yes No</td>
</tr>
<tr>
<td>Raise building standards</td>
<td>Yes No</td>
</tr>
<tr>
<td>Establish a minimum distance between cottages</td>
<td>Yes No</td>
</tr>
<tr>
<td>More cottages for rent</td>
<td>Yes No</td>
</tr>
<tr>
<td>Restrict number of new cottages</td>
<td>Yes No</td>
</tr>
<tr>
<td>Other (specify)</td>
<td>Yes No</td>
</tr>
</tbody>
</table>
What do you consider to be the outstanding feature(s) of the Gulf Islands?


Please add comments on any aspect of the Gulf Islands which you feel may be of value to the study.


THANK YOU FOR YOUR CO-OPERATION. PLEASE RETURN THE COMPLETED QUESTIONNAIRE TO ONE OF THE RESEARCH TEAM, IDENTIFIABLE BY THE 'GULF ISLANDS RECREATION STUDY' BADGE, EITHER ON OR BEFORE YOU LEAVE THE FERRY.
The School of Community and Regional Planning, UBC, asks your participation in a recreation study of the Gulf Islands. Since you are using your boat as the base for your activities, you are likely to have a different perspective of the Islands from that of the land-based visitor.

Your trip has shown you that this area is unique in many aspects and trends indicate that it will become increasingly popular. In order, therefore, to best plan for the future, it is important to know something of the people who are using the Islands and how they are using them. Information about yourself and your impressions of the Islands will thus provide valuable data.

Please return the questionnaire to one of the research team, identifiable by the "Gulf Islands Recreation Study" badge, as soon as possible after you have completed it; OR, please return it to us by mail: fold and seal the questionnaire appropriately, so that the address on the back page is visible. If mailed in Canada, no stamp is necessary — postage will be guaranteed by us.

All information will be kept confidential and used by the University for research purposes only. Thank you for your co-operation.
GULF ISLANDS RECREATION STUDY

Boaters' Questionnaire

PLEASE CIRCLE THE APPROPRIATE ANSWER, PLACE A TICK OR WRITE THE ANSWER IN THE SPACE PROVIDED.

1. Where is your permanent residence? (City/Town: State/Province)

2. How long is your visit to the Islands?
   1 day, 2 days, 3 days, 4 days, 5 days, 6 days, week, week +

3. How many people are in your group?
   1 2 3 4 5 5+

4. Which island is your major stopover point?
   Galiano a  Saltspring e
   Mayne b  Saturna f
   North Pender c  Other (specify) g
   South Pender d  ...................

   If possible, please specify the area of the island

5. Does your visit include stops at more than one island?
   Yes      No

   If yes, which island/islands?
   Galiano a  Saltspring e
   Mayne b  Saturna f
   North Pender c  Other (specify) g
   South Pender d  ...................

6. How many times have you visited the Islands?
   1 2 3 4 5 5+

7. Do you intend to visit the Islands again?
   Yes      No

8. What is the main purpose of your trip?
   Sightseeing cruise a
   To go fishing b
   To go to the cottage c
   To visit friends and/or family d
   To purchase property e
   Other (specify) f
9. Do you own property on the Islands?

Yes  No

If yes, on which island?

Galiano  a  Saltspring  e
Hayne  b  Saturna  f
North Pender  c  Other (specify)  g
South Pender  d  ....................

10. What type of accommodation did you have during your visit?

Stayed on your own boat  a
Hotel, hotel, lodge  b
Campground  c
Cottage, private home  d
Other (specify)  e

11. Rank each of the following activities according to your participation in it during your visit to the Gulf Islands.

1 - considerable participation
2 - some participation
3 - no participation

Beachcombing (including digging of clams, etc.; collecting driftwood, rocks, etc.)  1  2  3
Swimming  1  2  3
Sunbathing  1  2  3
Shore fishing  1  2  3
Boat fishing  1  2  3
Picnicking  1  2  3
Walking/hiking  1  2  3
Camping  1  2  3
Other (specify)  1  2  3

12. Rank in order of desirability each of the following features which make a beach area enjoyable to you.

1 - desirable
2 - indifferent
3 - not desirable

Public boat launching areas  1  2  3
Public mooring facilities  1  2  3
Commercial dockage areas  1  2  3
Marina facilities (Groceries, gas, etc.)  1  2  3
Public camping for boaters  1  2  3
Easy automobile access  1  2  3
Quietness and solitude  1  2  3
Abundance of marine life  1  2  3
Walking trails provided  1  2  3
Good swimming conditions  1  2  3
Other (specify)  1  2  3
13. Please indicate the appropriate age category for yourself and any others in your group who are not personally filling out a questionnaire.

<table>
<thead>
<tr>
<th>Age Category</th>
<th>Yourself</th>
<th>Others in Group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M.</td>
<td>F.</td>
</tr>
<tr>
<td>0-1 years</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6-10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16-25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>26-50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>51-65</td>
<td></td>
<td></td>
</tr>
<tr>
<td>65+</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

14. Please circle the appropriate category to indicate your occupation type.

Managerial, professional, private businessman a
Sales personnel, clerical b
Construction, labor, manufacturing c
Fishing, lumbering, mining, farming d
Housewife e
Student f
Other (specify) g

15. Please indicate your total income (before taxes) per annum.

<table>
<thead>
<tr>
<th>Income Range</th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>e</th>
<th>f</th>
<th>g</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 2,500</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2,501 - 5,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5,001 - 7,500</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7,501 - 10,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10,001 - 12,500</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12,501 - 15,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15,001+</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

16. What do you consider to be the outstanding feature(s) of the Gulf Islands?

---------------------------------------------------------------------------------
---------------------------------------------------------------------------------
---------------------------------------------------------------------------------
---------------------------------------------------------------------------------

17. Please comment on any aspect of the Gulf Islands which you feel may be of value to the study.

---------------------------------------------------------------------------------
---------------------------------------------------------------------------------
---------------------------------------------------------------------------------
---------------------------------------------------------------------------------

THANK YOU!
SCHOOL OF COMMUNITY AND REGIONAL PLANNING,
UNIVERSITY OF BRITISH COLUMBIA,
VANCOUVER 8,
B.C.

Gulf Islands Recreation Study