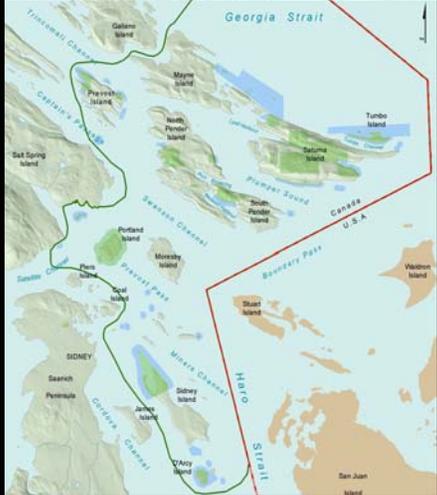


FINAL REPORT

GULF ISLANDS NATIONAL PARK RESERVE: CONSERVATION ASSESSMENT REVIEW



June 2004

PREPARED FOR
PARKS CANADA



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**Prepared for:
Gulf Islands National Park Reserve of Canada
Parks Canada
Sidney, BC**

**Prepared by:
AXYS Environmental Consulting Ltd.
Sidney, BC**

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1 Introduction

1.1 Background

The Gulf Islands National Park Reserve (GINPR) was established in May 2003. It consists of 26 'park parcels', representing 2588 ha of land on 16 islands and 30 islets, and 3328 ha of intertidal and subtidal areas, distributed throughout the southern Gulf Islands region (Figure 1-1)¹. Three provincial parks, one Capital Regional District park, two ecological reserves, and multiple Crown Land parcels were transferred to the federal government, and comprise approximately half of the GINPR lands (Golumbia 2003). The remainder of the GINPR is made up of lands that have been purchased since 1995 under the Pacific Marine Heritage Legacy (PMHL) program (Golumbia 2003), and intertidal and subtidal zones designated as 'submerged land protected areas. These submerged land protected areas generally extend out to 200 m below the high tide line². These areas are associated with all park parcels that are adjacent to the marine environment.

The GINPR is within the Strait of Georgia Lowlands Natural Region. The Strait of Georgia Lowlands is one of the most disturbed landscapes in Canada as a result of rapid population and economic growth (Parks Canada 1993). Two-thirds of the population of British Columbia is found in this 9360 km² area, and as much as 90% of the area is considered already impacted by human development and activities (Parks Canada 1993).

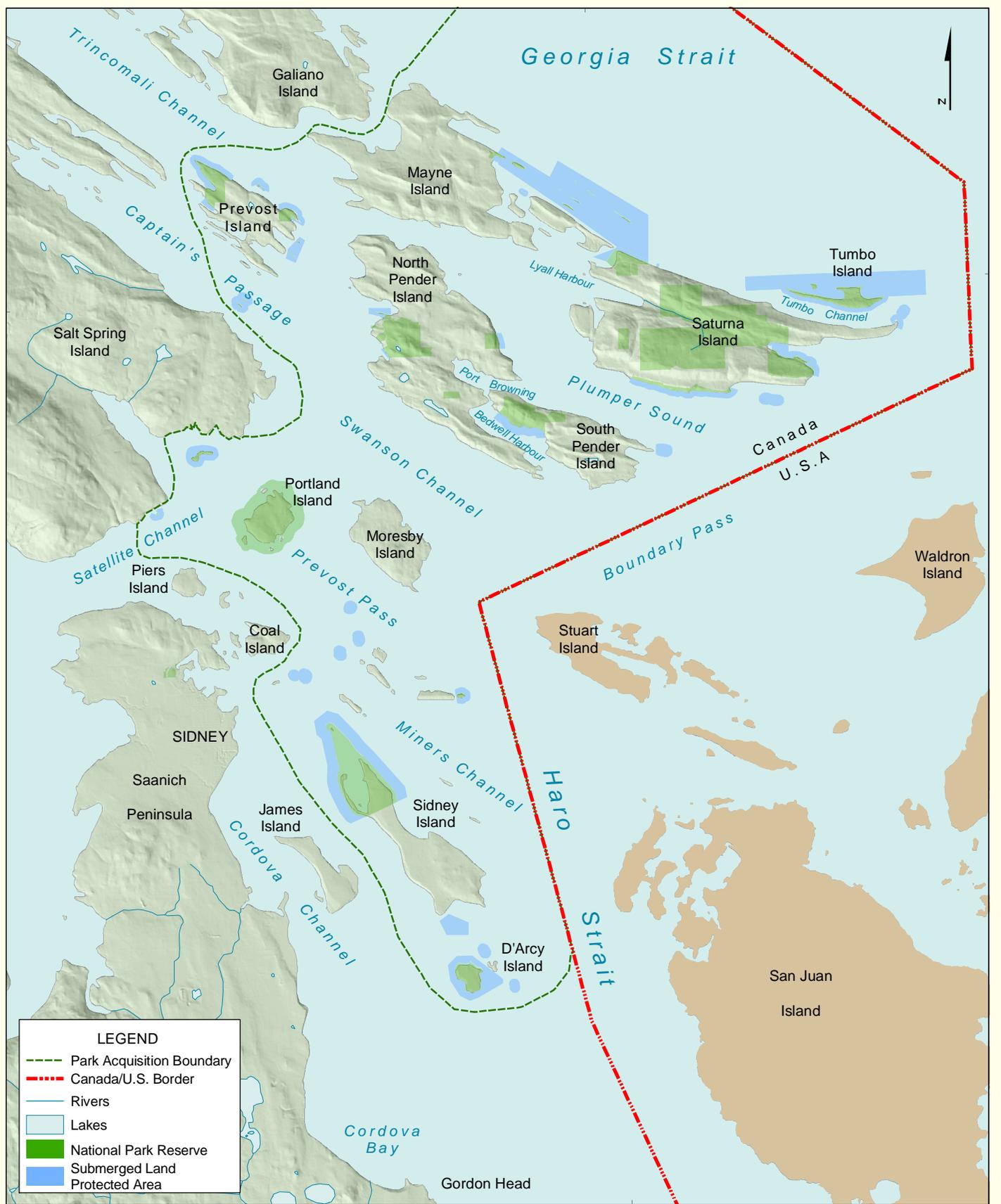
The key objectives for the GINPR are to ensure the long-term integrity of the ecological and cultural values within the park; protect a representative example of the Strait of Georgia Lowlands; protect small island ecosystems, as well as representative examples of headlands, shorelines and uplands of larger islands; protect and commemorate the rich cultural heritage of both the First Nations and the area's pioneering immigrants; provide opportunities for the public and school groups to learn about the natural and cultural values within the park in a low-impact manner; complement the unique way of life of the Gulf Islands communities; and maximize protection of the ecological and cultural values through a continuing land assembly program (Parks Canada 2002).

Parks Canada is developing Interim Management Guidelines for the GINPR to direct management and operational decisions prior to the approval of a long-term Park Management Plan. In order to ensure that ecological integrity is given appropriate consideration in this initial planning process and in subsequent management decisions, a review and assessment of the issues related to the conservation of natural and cultural values is essential.

This conservation assessment review was initiated to address conservation issues related to the natural resources of the GINPR and will provide detailed context for the management planning program.

¹ Greenburne Lake on South Pender Island has recently been added to the GINPR (T. Golumbia, pers. comm., April 2004) – this park parcel is not included in this report.

² Some park parcel boundaries vary in their distance from shore.



**Figure 1-1
Gulf Islands
National Park Reserve**



Data Sources:
Parks Canada
Ministry of Sustainable Resource Management
Projection: BC Albers



BC1234
Gulf Islands NPR
June 4, 2004

1.2 Objectives

Specifically, the objectives of this conservation assessment review were to:

- Develop an Ecosystem Conceptual Model appropriate to the GINPR;
- Develop an Ecological Vision Statement appropriate to the GINPR;
- Review the scope of existing information on natural resources of the park parcels within the GINPR;
- Identify knowledge gaps related to the natural resources of the GINPR;
- Identify conservation issues within the southern Gulf Islands and GINPR;
- Identify site-specific conservation issues within the GINPR;
- Identify a set of 'Key Conservation Issues' for the GINPR; and
- Develop a management direction to address the identified Key Conservation Issues.

2 Methodology

Three methods, a literature review, a questionnaire directed at people with relevant local expertise, and a workshop, were used to address the objectives described for this project in Section 1.2. These approaches are described in more detail in the following sections.

2.1 Literature Review

A literature review of published and unpublished documents was conducted to assist with the identification of conservation issues applicable to the Gulf Islands as a whole, and specific to the GINPR and the individual park parcels within it. This process included a search of provincial and federal government files, and refereed journals and other published or web-based information sources. For former provincial parks, information was also compiled from the BC Parks Protected Areas Catalogue, which identifies conservation values and issues for these protected areas. BC Parks' annual park management plans (AMPs) were also reviewed. Information for lands acquired through the Pacific Marine Heritage Legacy (PMHL) program, and unoccupied crown lands transferred to the GINPR, was acquired from material associated with the PMHL and through local knowledge.

2.2 Questionnaire

Additional information on existing knowledge, conservation issues within the GINPR and the southern Gulf Islands as a whole, and perceived knowledge gaps was generated from a questionnaire (Appendix A) distributed to knowledgeable people from key conservation groups, including non-government organizations based in the Gulf Islands, government agencies (Parks Canada, Fisheries and Oceans, BC Parks, Islands Trust, local government representatives), and First Nations. Questionnaire recipients were identified in consultation with Parks Canada staff. Fifty-one questionnaires were distributed and seventeen responses were received (Section 9.1).

2.3 Workshop

A two-day workshop was conducted on February 24 and 25, 2004 in Sidney, BC. The intent of the workshop was to review and finalize the products of the specific objectives outlined in Section 1.2. Workshop participants included representatives from resource management and research agencies, stewardship groups, and First Nations (Appendix B). The input received at the workshop has been incorporated into Sections 3 through 8 of this report.

3 Ecological Integrity Vision

3.1 Background

The Ecological Integrity Vision for the Gulf Islands National Park Reserve was developed within the context of national park legislation and policies, which place ecological integrity as the first priority in national park management. This vision will serve as a starting point for future park management plans, to ensure that ecological integrity remains the main priority for park management initiatives within the GINPR.

3.2 Policy Context

While national parks encompass highly significant areas and protect them through national park legislation and regulations, many of the values within these protected places face significant pressures from both inside and outside park boundaries. These pressures include: habitat loss and fragmentation, loss of large carnivores, air pollution, pesticides, exotic species, and over-use (Government of Canada 2000a).

This recognition led to the formation of the Panel on the Ecological Integrity of Canada's National Parks in 1998. The Panel's report confirmed the loss of important natural components from national parks and included 127 recommendations, with the aim to ensure that ecological integrity would become the main priority of Parks Canada (Government of Canada 2000a, 2000b).

Parks Canada responded to this challenge in its Corporate Plan with a number of initiatives, such as revising its legislation and policy, incorporating ecological integrity into planning processes, improving research and monitoring, preparing recovery plans for species at risk, and building partnerships (Parks Canada 2002).

The *Canada National Parks Act* states that the:

“Maintenance or restoration of ecological integrity, through the protection of natural resources and natural processes, shall be the first priority of the Minister when considering all aspects of the management of parks.”

The Act defines ecological integrity, with respect to a park, as:

“...a condition that is determined to be characteristic of its natural region and likely to persist, including abiotic components and the composition and abundance of native species and biological communities, rates of change and supporting processes.”

Parks Canada's Corporate Plan (Parks Canada 2004) firmly establishes the agency's commitment to ecological integrity with their mandate:

“...to maintain or improve the ecological integrity of national parks, [and] the sustainability of national marine conservation areas...”

Performance expectations in this regard are that all national parks will have fully functioning ecological integrity monitoring and reporting systems by 2008, and that aspects of the state of ecological integrity will be improved in each of Canada's national parks by 2014 (Parks Canada 2004).

3.3 Ecological Integrity Vision for the Gulf Islands National Park Reserve

3.3.1 Vision Statement

The Gulf Islands National Park Reserve is the meeting place for a myriad of contrasting, complementary and competing forces, nestled at Canada's gateway to the Pacific Ocean. Traditional practices and spiritual values meet 21st century development. The eastern Vancouver Island rain shadow and the influx of nutrient-rich marine waters converge near the mighty Fraser River outflow. Delicate meadow flowers face the rocky intertidal zone. Introduced species jostle up against sensitive habitats. And yet, in the midst of these linked and overlapping elements, the Gulf Islands National Park Reserve remains a true island paradise – islands of protected area persist in a terrestrial sea, molded by humanity, on islands shaped by glaciers and seismic forces, that rise above a vibrant and powerful marine landscape.

3.3.2 Vision Context

The Gulf Islands National Park Reserve is intended to protect and restore the ecological integrity of a small part of the spectacular mosaic of islands and marine environments that are unique to the southern Gulf Islands and Strait of Georgia region. The designation of this park is timely given the highly fragmented nature of the regional landscape and intensive development pressures that have put many native species and ecosystems at risk.

The terrestrial, marine and coastal interface ecosystems supported within the park are, themselves, supported (and affected) by the greater environment beyond the park boundaries. It is essential that the park be managed in the context of the socio-culturally and biophysically complex environment that encompasses it (Figure 3-1). For example:

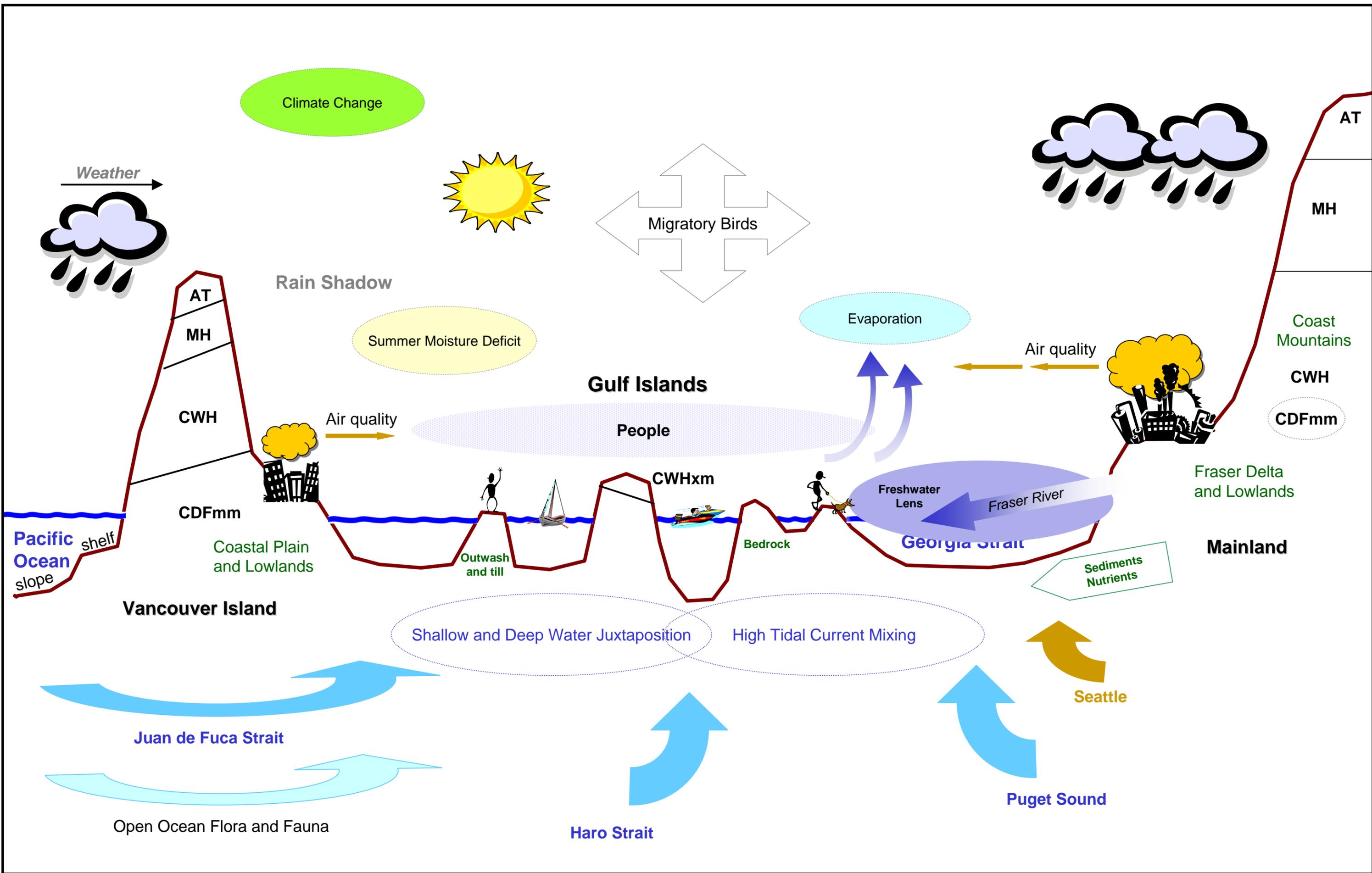
- The waters of the southern Gulf Islands region exhibit dramatic tidal currents and mixing, acting as a gateway between the nutrient-rich oceanic waters of Juan de Fuca and Haro Straits, and the more estuarine waters of the Georgia Strait;
- The region's Mediterranean climate – mild, dry summers under the rain shadow of the mountains of Vancouver Island, elevates the importance of issues related to fire occurrence and suppression; and
- The southern Gulf Islands region is adjacent to several large population centres, which presents both a challenge for the maintenance of ecological integrity, and opportunities for partnership and collaboration.

The park can protect and maintain intact ecosystems, and their suite of processes, species and habitat elements, so that they continue to function and evolve naturally. However, in some parts of the park, the mitigation of impacts caused by human activities and facilities, habitat restoration, and reintroduction of natural ecosystem processes will be necessary to restore ecological integrity.

Opportunities to learn about and enjoy the park will focus on the richness of the natural setting – Douglas-fir forests, Garry oak woodlands, rocky sea-side bluffs, meadows with spectacular spring wildflower displays, sand beaches, sculpted sandstone formations, wetlands, and biologically rich intertidal and subtidal zones; but, will not neglect the importance of the human element, both past and present. These opportunities will be

provided in ways that minimize impacts and build commitment and support for maintaining that ecological integrity.

Strong relationships locally and regionally help to ensure that the Gulf Island National Park Reserve's ecological integrity is maintained in perpetuity while maintaining local community values. These partnerships reflect the commitment of Canadians, through their stewardship actions and lifestyle choices, to protect the small and sensitive ecosystems that make this park a unique jewel in Canada's national parks crown.



4 Ecosystem Conceptual Model

4.1 Background

A conceptual model that describes the ecosystem structural and functional relationships specific to the southern Gulf Islands was based on existing models described in Chapin et al. (1996) and Evenden et al. (2002), and further developed from ideas presented in Manley et al. (1999), Gross (2003) and Puget Sound Nearshore Project (2003), and generated during the workshop.

The intent of this model is two-fold – it provides a context for the Ecological Vision Statement (Section 3), and it functions as a guiding framework for the development and implementation of management plans within the park (Section 8).

4.2 Model

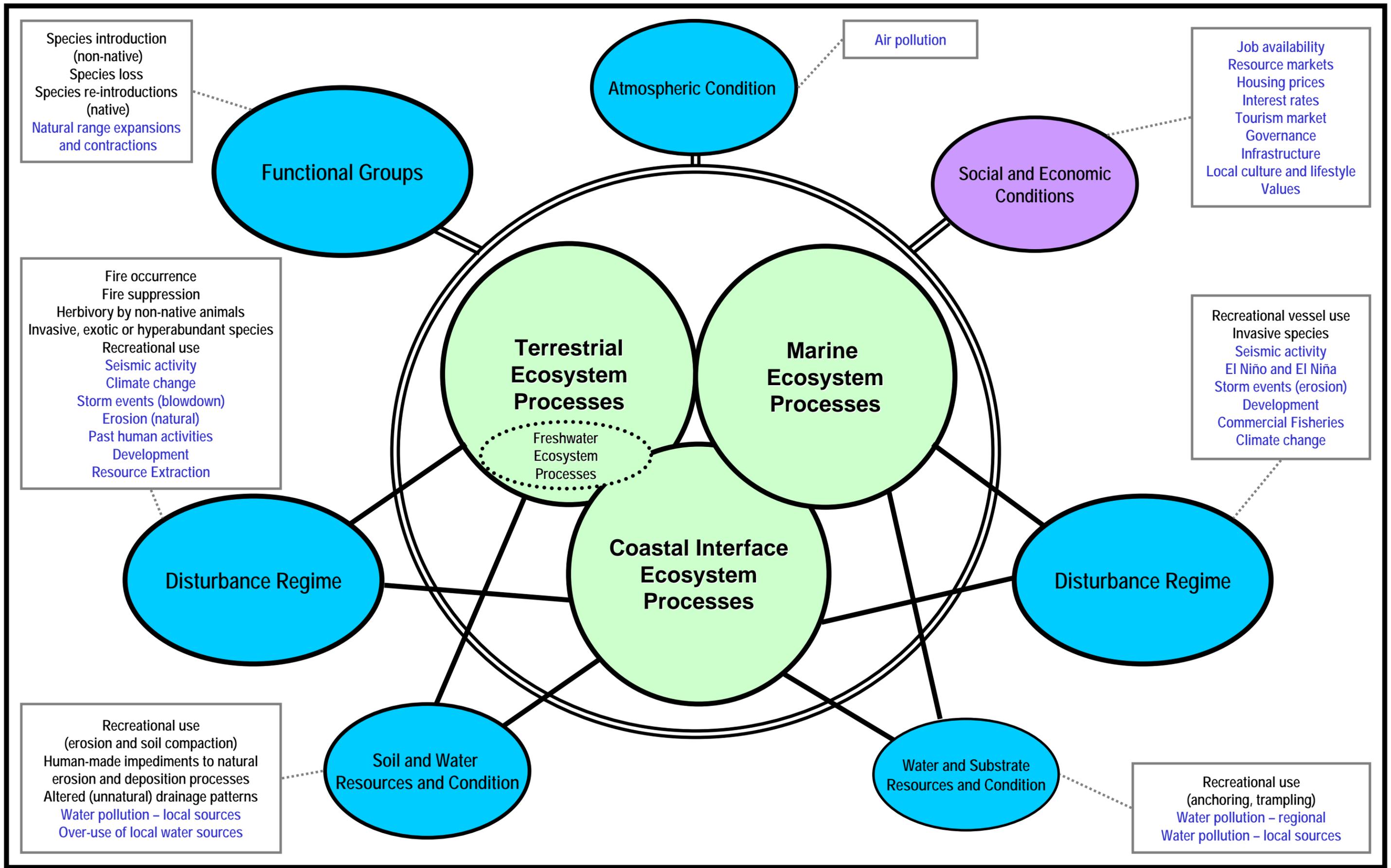
The Ecosystem Conceptual Model is presented in Figure 4-1. It is essential to remember that the model functions in a complex context influenced by significant biophysical and human elements, as illustrated in Figure 3-1.

At the center of the model are the four ecosystem processes integral to the GINPR (green circles). These are the terrestrial, freshwater, marine and coastal interface ecosystem processes. Freshwater ecosystem processes are shown embedded within the terrestrial ecosystem processes because they are so closely linked, a linkage that is manifested particularly clearly in riparian zones. All four processes interact at the coastal interface.

The first order effects (blue ovals) act on the ecosystem processes. These first order effects are: functional groups (e.g., species), disturbance regime (either natural or human-made), atmospheric condition, water and substrate resources and condition (marine), and soil and water resources and condition (terrestrial/freshwater). The relative size of the first order effects ovals is an indication of the relative influence of these effects within the GINPR – functional groups and disturbance regime, are considered to have the greatest effects on the park. Some first order effects act on all processes collectively (e.g., atmospheric condition), while others are more specific in influence.

Social and economic conditions (purple oval), differs from the other first order effects in not being traditionally recognized as a part of ecosystem structure and function. The human element is, however, becoming increasingly recognized as an integral consideration in ecosystem conceptual models (Manley et al. 1999).

The boxes linked to each first order effect list the effectors that are significant within the GINPR. The effectors indicated in black are those that are localized in scope, and have the potential to be managed by Parks Canada, alone or in cooperation with other groups or agencies. The effectors indicated in blue are those that are regional in scope, and are either unmanageable (e.g., seismic activity) or require cooperation between Parks Canada and other agencies to manage (e.g., commercial fisheries).



Species introduction (non-native)
 Species loss
 Species re-introductions (native)
 Natural range expansions and contractions

Functional Groups

Air pollution

Atmospheric Condition

Job availability
 Resource markets
 Housing prices
 Interest rates
 Tourism market
 Governance
 Infrastructure
 Local culture and lifestyle
 Values

Social and Economic Conditions

Fire occurrence
 Fire suppression
 Herbivory by non-native animals
 Invasive, exotic or hyperabundant species
 Recreational use
 Seismic activity
 Climate change
 Storm events (blowdown)
 Erosion (natural)
 Past human activities
 Development
 Resource Extraction

Disturbance Regime

Recreational vessel use
 Invasive species
 Seismic activity
 El Niño and El Niña
 Storm events (erosion)
 Development
 Commercial Fisheries
 Climate change

Disturbance Regime

Terrestrial Ecosystem Processes

Marine Ecosystem Processes

Freshwater Ecosystem Processes

Coastal Interface Ecosystem Processes

Recreational use (erosion and soil compaction)
 Human-made impediments to natural erosion and deposition processes
 Altered (unnatural) drainage patterns
 Water pollution – local sources
 Over-use of local water sources

Soil and Water Resources and Condition

Water and Substrate Resources and Condition

Recreational use (anchoring, trampling)
 Water pollution – regional
 Water pollution – local sources

5 Conservation Assessment Review: Existing Information

5.1 Ecosystem Representivity

5.1.1 Terrestrial Environment

The Islands Trust Ecosystem Mapping (ITEM) project identified 29 natural ecosystem units and 19 modified ecosystem units in the southern Islands Trust region. Sixteen of the natural ecosystem units and 11 of the modified ecosystem units are represented in the GINPR (Tables 5-1 and 5-2)^{3,4}. The 13 natural ecosystem units that are not found in the park are: Old Forest: conifer and Old Forest: mixed; Woodland: broadleaf; Riparian: low bench, Riparian: medium bench, Riparian: high bench, and Riparian: fringe; Wetland: bog, Wetland: fen, Wetland: shallow water, and Wetland: wet meadow; and Cliff: coastal cliff and Cliff: inland cliff.

The vast majority of the park area is comprised of the Young Forest ecosystem class (Table 5-1, Figure 5-1). There is approximately nine times as much of this unit as the next most common natural ecosystem classes, Mature Forest and Woodland (Figure 5-1). The least common natural ecosystem classes in the park are Lacustrine⁵ and Riparian (Figure 5-1). Besides Young Forest, the most common modified ecosystem class in the park is Rural (Figure 5-1). This Rural class is split approximately equally between the Park and Rural Residential subclasses (Table 5-2).

In addition to the natural ecosystem units that are not represented in the park, there are six natural ecosystem units that are underrepresented in the park (i.e., where $\leq 5\%$ of the unit's total area in the southern Islands Trust region occurs in the GINPR) (Table 5-1). These units are: Herbaceous: mixed; Lacustrine: lake⁶ and Lacustrine: pond; Mature Forest: mixed; Riparian: gully; and Wetland: swamp.

Conversely, Over 80% of the Herbaceous: shrub unit area present in the southern Islands Trust area occurs in the GINPR, and almost all (99.5%) of the Herbaceous: dunes unit is found within the park (Table 5-1).

³ McDonald Park was not included in this mapping product.

⁴ The legend for the Islands Trust ecosystem classes and subclasses is present in Appendix C.

⁵ Note that Roe Lake was not included as a unit in ITEM.

⁶ Again, note that Roe Lake was not included as a unit in ITEM.

Table 5-1 Area (ha) of Islands Trust Ecosystem Mapping Natural Ecosystem Classes and Subclasses in the GINPR

Park Parcel	Herbaceous						Lacustrine		Littoral		Mature Forest		Riparian	Woodland	Wetland	
	cs	du	mx	sh	sp	vs	la	pd	be	mu	co	mx	gu	mx	ms	sp
D'Arcy Island Marine Park	2.2					4.9								0.8		
Sidney Spit Marine Park		15.4		1.6	6.1				40.0	119.7					22.9	
Isle de Lis Marine Park	1.4													1.8		
Brackman Island						0.3										
Princess Margaret Marine Park	7.5					10.5			3.6		0.1			11.0		
Russell Island																
James Bay and Selby Cove	1.6		0.3			0.4			0.4	0.1	55.6			15.4		
Portluck Pt. and Richardson Bay	0.3													2.6		
South Otter Bay and Roesland	6.5						<0.1 ¹		<0.1		158.6	0.9	2.6	3.8	1.0	1.9
Prior Centennial Park																
East N. Pender Is. (Hooson Rd.)																
Beaumont Marine Park and Mt. Norman Park	1.0									<0.1				68.7		
Taylor Point			0.6			2.2			<0.1	<0.1				15.0		
Narvaez Bay			0.9						0.1	<0.1				5.9		
Tumbo Island Park	1.2					5.0			0.7	0.5				17.4	11.9	
Cabbage Island Marine Park ²	0.4					0.5									1.6	

Table 5-1 Area (ha) of Islands Trust Ecosystem Mapping Natural Ecosystem Classes and Subclasses in the GINPR cont'd

Park Parcel	Herbaceous						Lacustrine		Littoral		Mature Forest		Riparian	Woodland	Wetland	
	cs	du	mx	sh	sp	vs	la	pd	be	mu	co	mx	gu	mx	ms	sp
Mount Fisher														6.0		
Brown Ridge, Saturna ER, Mt. Elford, Mt. David, and Lyall Creek park parcels combined			21.8					2.4	0.2	0.1	1.4			46.6	5.8	3.0
Winter Cove Marine Park ³						1.8		0.3	1.2						0.5	
Georgeson Island									0.5					2.2		
Campbell Point and Bennett Bay									0.1							
Blunden Islet	1.1													1.2		
Java Islets	1.7															
Imrie Islet	1.1															
Reay Islet	1.1															
Greig Islet						0.3										
Sallas Rocks	0.9					0.7										
Dock Island	0.2															
Little Group	1.0															
Red Islet	1.4					<0.1										
Channel Islets						<0.1								1.4		
Bright Islet	0.5															

Table 5-1 Area (ha) of Islands Trust Ecosystem Mapping Natural Ecosystem Classes and Subclasses in the GINPR cont'd

Park Parcel	Herbaceous						Lacustrine		Littoral		Mature Forest		Riparian	Woodland	Wetland	
	cs	du	mx	sh	sp	vs	la	pd	be	mu	co	mx	gu	mx	ms	sp
Belle Chain Islets						1.2										
Hawkins Islet														1.2		
Isabella Islets	0.9															
Unit Rocks						0.2										
Islet NW of Little D'Arcy	0.6															
Boiling Reef						0.7										
Islet off Samuel Is.	0.6															
Islet off Mayne Is.						0.1			<0.1							
Anniversary Islet	1.8													1.6		
Islets off Samuel Is. (includes Crown Lot 65) ⁴	0.4					0.2								2.2		
Total area (ha) in GINPR	35.7	15.4	23.6	1.6	6.1	29.1	<0.1	2.7	47.0	120.3	215.7	0.9	2.6	204.9	43.6	4.9
Percent of total area mapped for the southern Islands Trust Area	17.9	99.5	5.0	81.0	15.5	13.2	<0.1	5.4	23.5	30.8	7.8	0.1	1.9	10.2	35.8	4.3

Notes: Shaded cells indicate which park parcel contains the greatest area of each ecosystem unit. Refer to Appendix C for the ecosystem unit legend.

¹ Roe Lake was not included as a unit in ITEM – it is 2.0 ha in area; ² Includes Pine Islet; ³ Includes Russell Reef park parcel to east of main park parcel; ⁴ There are also 2.5 ha of the modified ecosystem unit Young Forest: conifer on these islets.

Table 5-2 Area (ha) of Islands Trust Ecosystem Mapping Modified Ecosystem Classes and Subclasses in the GINPR

Park Parcel	Agriculture		Developed			Rural		Young Forest			
	cf	co	sz	uc	ur	pk	rr	cc	co	fc	mx
D'Arcy Island Marine Park									77.2		
Sidney Spit Marine Park			0.9			22.6			28.9		65.4
Isle de Lis Marine Park									1.9		
Brackman Island									4.5		
Princess Margaret Marine Park	2.0	1.1	<0.1				0.1	4.8	65.4		132.1
Russell Island											13.4
James Bay and Selby Cove	3.5	1.4							22.3		
Portluck Pt. and Richardson Bay	<0.1		<0.1						23.0		0.5
South Otter Bay and Roesland	<0.1			0.9	2.6		9.6		38.1		
Prior Centennial Park							1.0		15.1		
East N. Pender Is. (Hooson Rd.)							0.1		31.2		
Beaumont Marine Park and Mt. Norman Park			<0.1				2.0		74.1	17.3	0.4
Taylor Point	0.6										36.0
Narvaez Bay							3.9		119.3		
Tumbo Island Park							4.0		81.5		

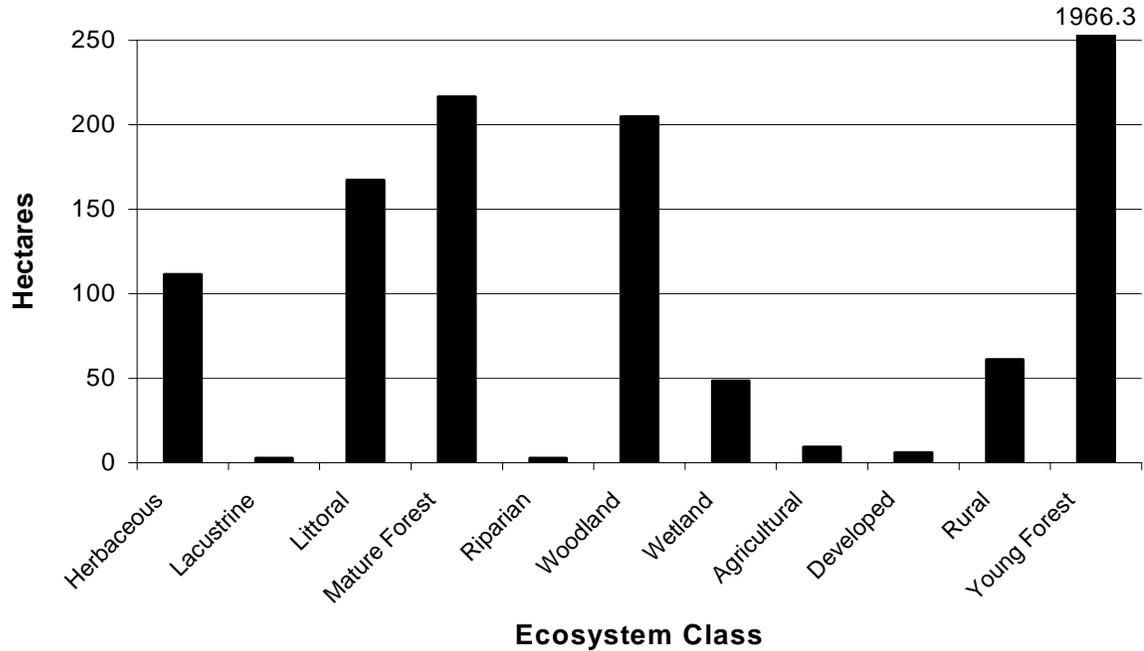
Table 5-2 Area (ha) of Islands Trust Ecosystem Mapping Modified Ecosystem Classes and Subclasses in the GINPR cont'd

Park Parcel	Agriculture		Developed			Rural		Young Forest			
	cf	co	sz	uc	ur	pk	rr	cc	co	fc	mx
Cabbage Island Marine Park									2.2		
Mount Fisher									26.5		
Brown Ridge, Saturna ER, Mt. Elford, Mt. David, and Lyall Creek park parcels combined	0.6			1.6			10.9		544.0		460.9
Winter Cove Marine Park ¹						5.2	<0.1		10.5		55.4
Georgeson Island									4.4		
Campbell Point and Bennett Bay						1.3	0.4				7.6
Total area (ha) in GINPR	6.8	2.5	1.0	2.5	2.6	29.1	32.0	4.8	1172.7	17.3	771.5
Percent of total area mapped for the southern Islands Trust Area	0.3	12.5	1.7	1.9	1.4	54.9	0.7	0.4	12.7	2.0	18.4

Notes: Shaded cells indicate which park parcel contains the greatest area of each ecosystem unit. Refer to Appendix C for the ecosystem unit legend.

¹ Includes Russell Reef park parcel to east of main park parcel

Figure 5-1 Total Area (ha) of each Islands Trust Ecosystem Classes Represented within the GINPR



5.1.2 Marine Component

The Physical Shore-Zone Mapping System (Coastal Task Force 1995a) identifies 13 shoreline types and 10 habitat classes within the park acquisition boundary⁷ (Figures 5-2 and 5-3, respectively). Ten of the shoreline types and seven of the habitat classes are represented in the GINPR (Figures 5-2 and 5-3, respectively). The shoreline types found in the park are: Rock cliff; Rock platform; Rock with gravel beach; Rock with sand and gravel beach; Gravel flat; Sand and gravel beach; Sand beach; Sand flat; Sand and gravel flat; and Estuary wetland. The habitat classes found in the GINPR are: Beach; High energy; Marsh or lagoon; Non-vegetated flat; Vegetated flat; Vegetated, low energy, coarse substrate; and Vegetated, low energy, rocky.

The most common shoreline types within the park are rock cliff and rock platform, followed by rock with gravel beach, and rock with sand and gravel beach (Figure 5-2). The least common shoreline types within the park are gravel flat, estuary wetland, and sand and gravel beach (Figure 5-2). The most common habitat classes within the park are vegetated, low energy, rocky, and vegetated, low energy, coarse substrate (Figure 5-3). The least common habitat classes within the park are Marsh or lagoon, and Non-vegetated flat (Figure 5-3).

Each shoreline type present in the GINPR represented more than 10% of the total length available for those types within the park acquisition boundary (Figure 5-2). Over 70% of the total lengths of two shoreline types (Estuary wetland and Sand flat) available within

⁷ See Figure 1-1 for the location of this boundary.

the boundary were found in the GINPR (Figure 5-2). Three shoreline types present within the park acquisition boundary were not represented in the GINPR: Rock with sand beach, Mud flat, and Man-made (Figure 5-2).

Each habitat class present in the GINPR represented more than 20% of the total length available for those types within the park acquisition boundary (Figure 5-3). Over 70% of the total length of the Marsh or lagoon habitat class available within the boundary was found in the GINPR (Figure 5-3). Three habitat classes present within the park acquisition boundary were not represented in the GINPR: Non-vegetated, low energy, coarse substrate, Undefined, and Vegetated anthropogenic (Figure 5-3).

Figure 5-2 Length (km) of each Shoreline Type within the GINPR, and within the Park Acquisition Boundary

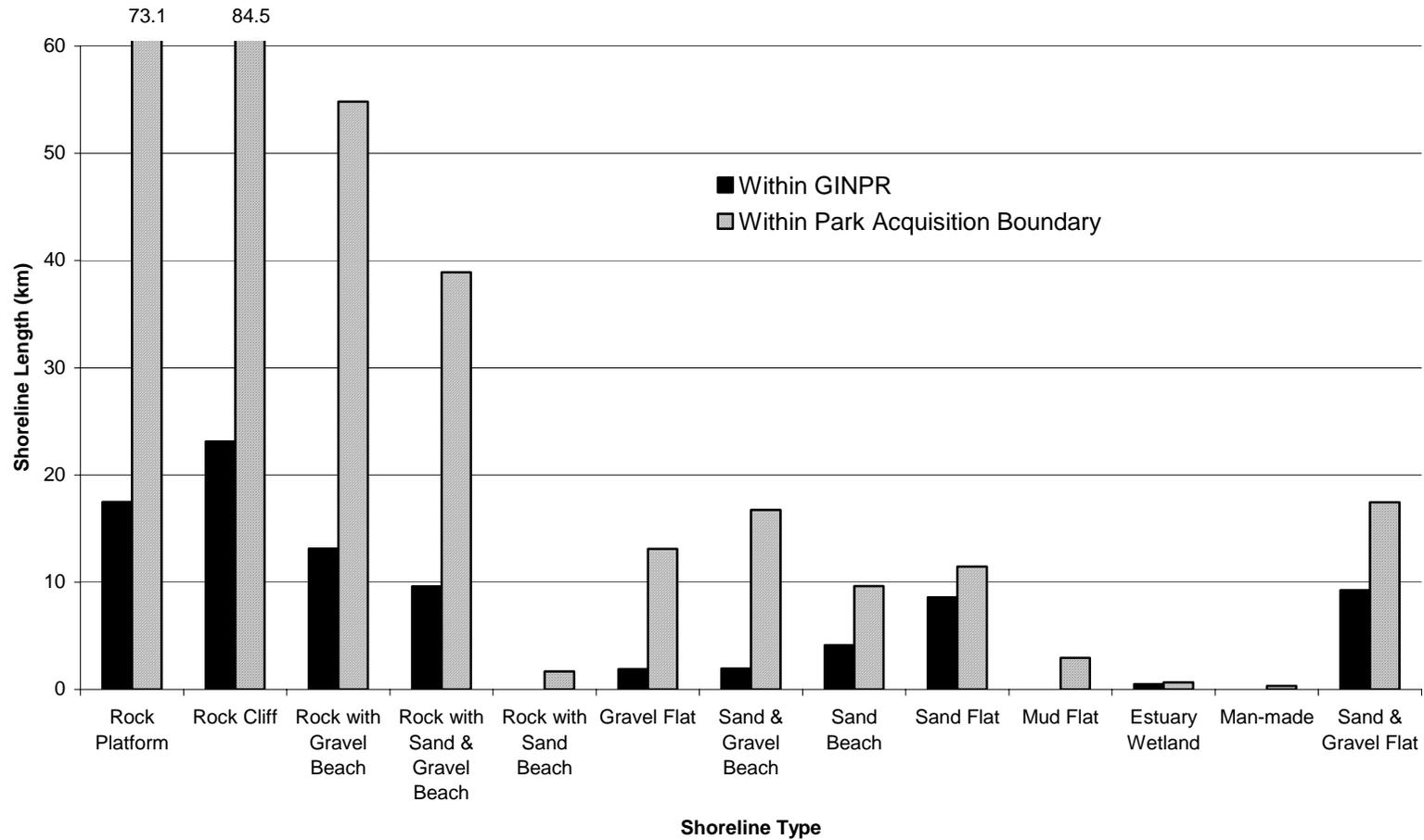
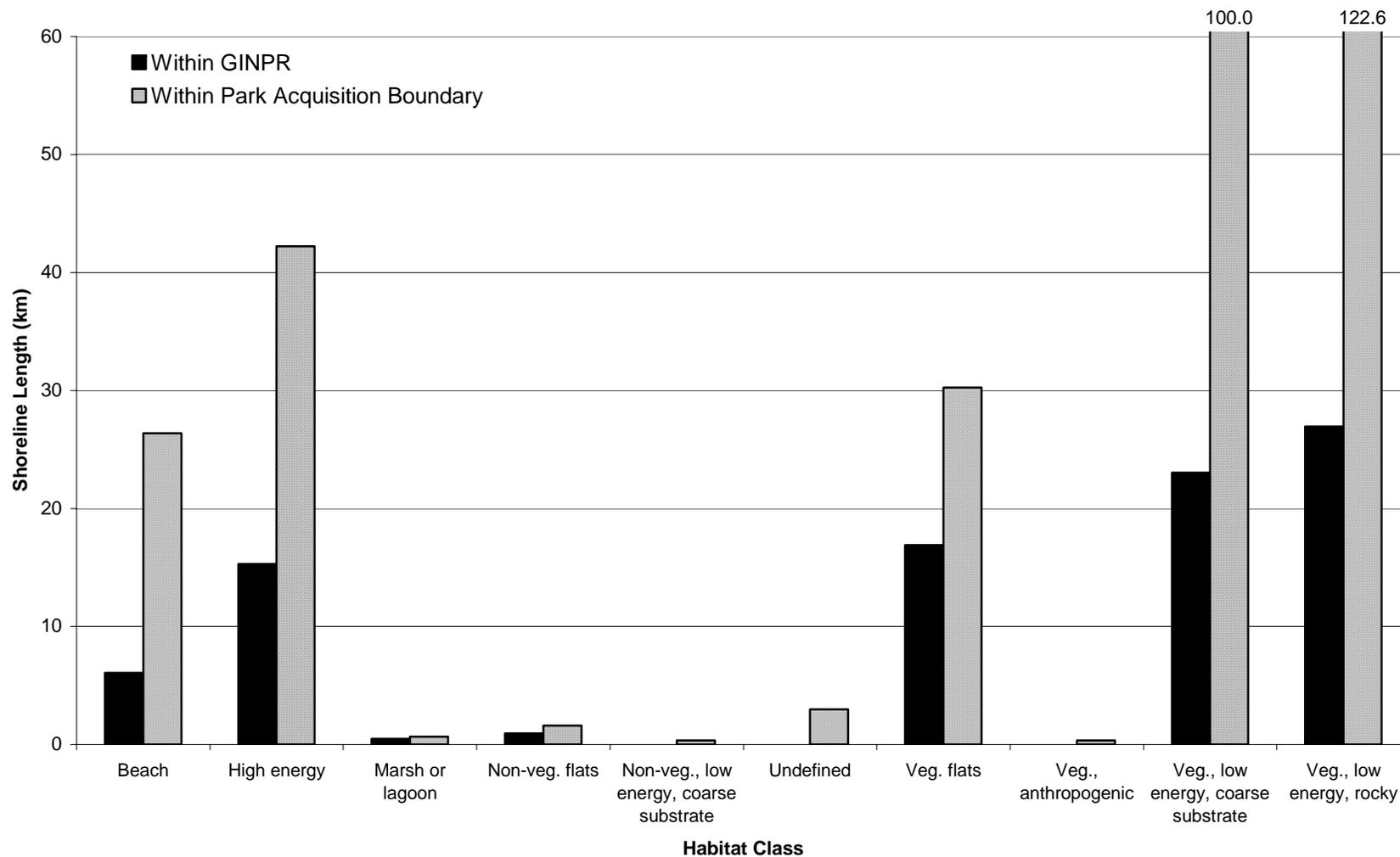


Figure 5-3 Length (km) of each Habitat Class within the GINPR, and within the Park Acquisition Boundary



5.2 Pre-existing Planning Documents

Sixteen of the GINPR park parcels have pre-existing planning documents. These documents contributed to the identification of conservation issues within the GINPR (Section 7.1), particularly those that are site-specific (Section 7.2).

The pre-existing planning documents are:

- Saturna Island Ecological Reserve: BC Parks, Saturna Island Ecological Reserve Annual Management Plan, 2002.
- Winter Cove Marine Park: BC Parks, Winter Cove Provincial Park Master Plan, 1994; BC Parks, Winter Cove Provincial Park Annual Management Plan, 2002.
- Tumbo Island: BC Parks and Parks Canada, Cabbage Island Provincial Marine Park and Tumbo Island Protected Area, Management Direction Statement, 1999.
- Cabbage Island Marine Park: BC Parks and Parks Canada, Cabbage Island Provincial Marine Park and Tumbo Island Protected Area, Management Direction Statement, 1999; BC Parks, Cabbage Island Marine Park Annual Management Plan, 2002.
- Bennett Bay and Campbell Point: BC Parks and Parks Canada, Bennett Bay Protected Area, Management Direction Statement, 1999.
- Prior Centennial Park: BC Parks, Prior Centennial Provincial Park Annual Management Plan, 2002.
- South Otter Bay and Roesland: BC Parks and Parks Canada, South Otter Bay Protected Area, Management Direction Statement, 1999.
- Beaumont Marine Park: BC Parks, Beaumont Provincial Marine Park Annual Management Plan, 2002.
- Mt. Norman Park: Capital Regional District Parks, Mt. Norman Regional Park Management Plan, 1992.
- Prevost Island properties: BC Parks and Parks Canada, Prevost Island Protected Area, Management Direction Statement, 1999.
- Russell Island: BC Parks and Parks Canada, Russell Island Protected Area, Management Direction Statement, 1999.
- Princess Margaret Marine Park: BC Parks, Princess Margaret Provincial Marine Park Master Plan, 1986; BC Parks, Princess Margaret Provincial Marine Park Annual Management Plan, 2002.
- Brackman Island Ecological Reserve: BC Parks, Brackman Island Ecological Reserve Annual Management Plan, 2002.
- D'Arcy Island Marine Park: BC Parks, D'Arcy Island Provincial Marine Park Annual Management Plan, 2002.
- Isle-de-Lis (Rum Island): BC Parks, Gulf Islands Marine Parks Video Management Plan, BC Parks Sept. 1989; BC Parks, Isle-de-Lis Provincial Park Annual Management Plan, 2002.

- McDonald Park: BC Parks, McDonald Provincial Park Annual Management Plan, 2002.

5.3 Data Sources

While a general lack of knowledge regarding the natural resources of the GINPR is universally recognized as an issue of concern (see Sections 6 and 7), there are a number of data compilations, bibliographies, and summary reports on the natural resources of the southern Gulf Islands that provide a general baseline. One of the earliest efforts to compile such information was the Natural Areas Inventory (Benn 1975). An annotated listing of more recently completed (or ongoing) data sources is presented in Table 5-3.

Table 5-3 is not an exhaustive listing – for example, other more site-specific data collections may be available from local naturalist groups or private landowners. Although lands within the park are not necessarily included in some of these data sources at present, there are numerous opportunities for cooperation and expansion of existing programs.

Table 5-3 Annotated Listing of Recent Data Sources on the Natural Resources of the Southern Gulf Islands

Data Source	Sites within the GINPR that are covered	Description
Parks Canada Species at Risk Assessment for the GINPR	Throughout	First priority is federally listed species, but will likely be expanded to include provincially listed species and ecosystems. ¹ Project being completed under the direction of B. Reader (Parks Canada).
Sensitive Ecosystems Inventory (SEI)	Throughout	Spatial database that maps the distribution of seven sensitive ecosystem units for eastern Vancouver Is. and the Gulf Islands. Recently revised to reflect disturbance that has occurred in the last 10 years. Riparian zone mapping has also been expanded, and further ground-truthing has been conducted. Available on-line. ¹⁷
Islands Trust Ecosystem Mapping (ITEM)	Throughout (except MacDonald Park)	Spatial database that expands on the SEI for the southern Gulf Islands region. Islands Trust initiative. See Section 5.1.1.
Canadian Parks and Wilderness Society Atlas ¹³	Throughout (non-marine)	Covers terrestrial component of the southern Gulf Islands. Printed version available September 2004, web-based version likely to follow. ²
Trust Fund Inventory of Special Areas and Features ³	Throughout	Islands Trust initiative. Database includes biophysical and socio-economic features. Maps now available in a digital format. Includes the Islands Trust Special Features Mapping System.
CRD Natural Areas Atlas	Throughout	Compilation of data from various sources. Overview information, no detailed data. Available on-line. ⁴
Environmental Information Management System (EIMS)	Limited	Islands Trust initiative. Compilation of existing information.
GOERT	Unknown	Descriptions of 18 new Garry oak ecosystems sites. One site is located on Saturna Island in the Brown Ridge area but its extent into the park is unknown.
Garry oak searchable bibliography	Includes southern Gulf Islands	Garry oak and associated topics. Available on-line. ⁵
Wildlife Tree Stewardship Atlas	Throughout	Database of known wildlife trees on Vancouver Island (includes information on productivity). This database is a product of the Wildlife Tree Stewardship (WiTS) initiative. This initiative is an expansion of the non-defunct Bald Eagle Nest Tree Inventory project. Available on-line. ⁶
Christmas Bird Count	Likely: McDonald Park, locations on North and South Pender Island, Saturna Island, and Mayne Island	Multi-year compilation of December bird surveys. Need to determine extent of 'count' circles; contact local organizers directly for each island – only Pender Island was included in the on-line database. Database available on-line. ¹⁴
BC Coastal Waterbird Survey	Sites throughout the GINPR	Annual counts. Database available on-line. ¹⁶

Table 5-3 Annotated Listing of Recent Data Sources on the Natural Resources of the Southern Gulf Islands cont'd

Data Source	Sites within the GINPR that are covered	Comments
Waterbird Watch Collective	Possibly Russell Island	Data collection on the eelgrass beds around Salt Spring Island.
BC Nocturnal Owl Survey	Unknown	41 coastal routes – need to determine whether any of these routes are within the GINPR. Database not available on-line.
The Reef Environmental Education Foundation (REEF)	Limited number of sites in GINPR	Database available on-line ⁷ for marine fish and invertebrates.
Pacific Marine Life Surveys ⁸	Several sites within the GINPR	Subtidal and intertidal records collected over 30 year period. Database may be available on line. There is a cost associated with obtaining this data.
Haegle Eelgrass Digital Database ⁹	Possibly Prevost Island	Location of eelgrass beds. Contact sricher@hfx.eastlink.ca for information about the web-based product.
Shellfish Culture Capability Appraisal for the Gulf Islands Region ¹¹	Sites throughout the GINPR, north of Coal Island.	Spatial database that assesses the region's potential for the culture of three shellfish species. Includes site-specific data collected on physical oceanographic and beach (intertidal) characteristics.
Pacific Coastal Resources Atlas	Throughout	Database includes biophysical and socio-economic features. Available on-line. ¹⁵
Sanitary Shellfish Growing Water Survey	Winter Cove	Environment Canada water quality initiative. ¹⁰
Provincial Marine Protected Areas in British Columbia ¹²	Winter Cove Marine Park, Princess Margaret Marine Park, Brackman Island ER	Summary of marine ecosystems within protected areas, and valued marine environments or features (including recreation values, presence of marine vegetation and wildlife, commercial and recreational fisheries and closures). Data based on existing information not park-specific inventories. Web-based document, which will be periodically updated.

Notes: ¹ C. Webb, pers. comm., Feb. 2004; ² D. Repard, pers. comm., Feb. 2004; ³ Jacqueline Booth and Associates 1995; ⁴ <http://www.naturalareasatlas.ca>; ⁵ http://www.fs.us/pnw/olympia/silv/publications/oak/bibliography/quercus_garryana.htm; ⁶ <http://www.shim.bc.ca/wits2/witsloginscreen.htm>; ⁷ <http://www.reef.org>; ⁸ Contact: dgibbs@surfknaked.ca; ⁹ Geostreams Consulting 2003; ¹⁰ www.pyr.ec.gc.ca/EN/Shellfish/index.shtml; ¹¹ Blyth et al. 1999; ¹² DSS 2002; ¹³ www.cpawsbc.org/atlas; ¹⁴ www.audubon.org/bird/cbc; ¹⁵ http://www.shim.bc.ca/coastal/Coastal_public.htm; ¹⁶ <http://www.bsc-eoc.org/regional/bccwsdata.jsp>; ¹⁷ <http://srmwww.gov.bc.ca/sei/van-gulf/index.html>

5.4 Status of Existing Information within the GINPR

As discussed previously, there is a general lack of baseline data on the natural resources of the GINPR. The available information tends to be limited in scope – that is, either general in nature for the entire region or focused on specific sites within the GINPR. Tables 5-4 (terrestrial and freshwater components) and 5-5 (marine component) present a summary of this existing information within the GINPR, according to a number of subject areas (e.g., geology, birds, hydrology, human disturbance⁸). A subjective assessment of knowledge ‘quality’, and a simple indication of the knowledge coverage for the GINPR (i.e., complete vs. incomplete) were made. Quality was considered fair to good if there was detailed systematic information and/or if information has been collected on repeat occasions, quality is limited if only certain elements of a subject area were assessed (e.g., if data on livestock impacts, and not logging, is available, when considering human disturbance), if information is of a more anecdotal or reconnaissance level nature, or if information is not available for the past ten years⁹.

⁸ For the purposes of these summary tables the subject area ‘human disturbance’ includes the impacts of introduced plant and animal species.

⁹ Applies to species inventory data.

Table 5-4 Status of Existing Knowledge for the Terrestrial and Freshwater Components of the GINPR

Area Name		Geology and Soils	Hydrology	Plant Species and Communities	Birds	Mammals	Freshwater Fish, Reptiles and Amphibians	Invertebrates	Natural Disturbances	Human Disturbances
Saturna Island and Environs	Existing Knowledge	Good general and site-specific info ¹	Fair general info ³ ; Good site-specific info: Lyall Creek ²⁹ ; Limited site-specific info: Saturna ER ⁵	Limited general info ²⁸ ; Good site-specific info: Brown Ridge, Saturna ER, Winter Cove [fungi] ^{6, 27, 31}	Limited site-specific info: Saturna ER ⁷	Limited site-specific info: Saturna ER ⁸	Good site-specific info: Lyall Creek ²⁹	Limited site-specific info: Saturna ER ⁹	Limited site-specific info: Saturna ER ¹⁰	Limited general info ¹³ ; Fair site-specific info: Saturna ER ^{4, 11} ; Limited site-specific info: Narvaez Bay ³⁰
	Coverage	Complete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete
Mayne Island and Environs	Existing Knowledge	Good general and site-specific info ¹	Nil	Limited site-specific info (from previous park management plans)	Limited site-specific info (from previous park management plans)	Limited site-specific info (from previous park management plans)	Nil	Nil	Nil	Limited general info ¹³
	Coverage	Complete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete
Pender Islands and Environs	Existing Knowledge	Good general and site-specific info ¹	Limited	Limited site-specific info (from previous park management plans)	Limited site-specific info (from previous park management plans)	Limited site-specific info (from previous park management plans)	Nil	Limited (PICA)	Nil	Limited general info ¹³
	Coverage	Complete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete
Portland Island and Environs	Existing Knowledge	Good general and site-specific info ^{2, 33}	Nil	Fair site-specific info: Russell Island; Good site-specific info: Brackman Island, Portland Island ¹²	Limited site-specific info: Portland Island ²²	Limited site-specific info (from previous park management plans)	Nil	Nil	Nil	Limited general info ¹³
	Coverage	Complete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete

Table 5-4 Status of Existing Knowledge for the Terrestrial and Freshwater Components of the GINPR cont'd

Area Name		Geology and Soils	Hydrology	Plant Species and Communities	Birds	Mammals	Freshwater Fish, Reptiles and Amphibians	Invertebrates	Natural Disturbances	Human Disturbances
Prevost Island and Environs	Existing Knowledge	Good ¹	Nil	Limited site-specific info (from previous park management plans)	Limited site-specific info (from previous park management plans)	Limited site-specific info (from previous park management plans)	Nil	Nil	Nil	Limited general info ¹³
	Coverage	Complete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete
Sidney Island and Environs	Existing Knowledge	Good general and site-specific info ²	Nil	Good site-specific info: Sidney Spit ³²	Good site-specific info: Sidney Spit ²³ ; Limited site-specific info: Isle de Lis ^{22,34}	Limited site-specific info (from previous park management plans)	Fair site-specific info: Sidney Spit ²⁵	Limited	Fair but limited [erosion] site-specific info: Sidney Spit ²⁶	Limited general info ¹³ ; Good site-specific info: Sidney Spit ^{24,32}
	Coverage	Incomplete (no data for MacDonald Park)	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete
Crown Islets	Existing Knowledge	Good site-specific info for most islets ^{1,2}	Not applicable ¹⁵	Good site-specific info ¹⁴	Nil general info ¹⁷ ; Good but limited site-specific info ³⁴	Nil ¹⁸	Not applicable ¹⁵	Nil ¹⁹	Poor ²⁰	Fair but limited (introduced wildlife) general and site-specific info ²¹
	Coverage	Incomplete	Not applicable ¹⁵	Incomplete	Incomplete	Incomplete	Not applicable ¹⁵	Incomplete	Incomplete	Incomplete

Table 5-4 Notes:

¹ 1:20,000 scale soil mapping (Kenney et al. 1988); ² 1:20,000 scale soil mapping (van Vliet et al. 1991); ³ Allen and Suchy (2001); ⁴ Feral goats (Geist 1960); ⁵ One ephemeral stream (drains into Lyall Cr.); a few marsh areas that are wet during rainy periods; nearest pond 1/2 mile from western boundary of ER (Guest 1974); ⁶ Sullivan (1979) conducted a detailed ecological description of the old-growth Douglas-fir on the reserve in the summer of 1972. This was the first plant community study in the CDF zone in the Gulf Islands (Sullivan 1979). An IBP survey of the area was completed in 1968; ⁷ Savard (n.d.): study site was 17.5 ha in the lower section (more northerly section on map) of the reserve. Used spot mapping and point count methods in June 1989; ⁸ A number of population and behavioural studies were conducted on deer mice in the late 1970s that were studied in situ or captured for laboratory observations from the area of the reserve (e.g., Sullivan 1977; Halpin and Sullivan 1978; Halpin 1981); ⁹ Ring, R., Dept of Biology, University of Victoria, 1974 and 1975 insect surveys (BC Parks files); ¹⁰ Sullivan (1979) indicates there are veteran Douglas-fir scattered through the forest - most of which show evidence of fire damage; he also found traces of burnt logs and wood distributed over the reserve; ¹¹ Past logging evident on extreme eastern part of the reserve (Sullivan 1979); ¹² Vegetation descriptions for the former Ecological Reserve (e.g., Roemer 1984), and more extensive surveys by Gonzales 2004; ¹³ Census data for the Gulf Islands has been compiled by Islands Trust, GIS data related to adjacent land uses is available but requires interpretation (as per Islands Trust). ¹⁴ Systematic plant surveys have been conducted on many of the islets as part of a research project on the impacts of herbivory in the GINPR (e.g., Gonzales 2004); ¹⁵ No freshwater habitats present; ¹⁶ There is a general understanding of communities expected within the CDF; some information from SEI; some recent systematic plant surveys available for several islets (e.g., Gonzales 2004); ¹⁷ Diversity presumed to be low but no systematic terrestrial bird surveys available; ¹⁸ Diversity presumed to be low but no systematic terrestrial mammal surveys available; ¹⁹ No systematic terrestrial invertebrate surveys available; ²⁰ No studies available on natural disturbance regimes; ²¹ Human use effects presumed to be same as observed in similar habitats on large islands; no inventory or assessment of level of recreational impacts at present; preliminary survey of the occurrence of introduced Canada geese on islets in the Gulf Islands has been completed (D. Fraser, pers. comm., Feb. 2004), also research on impacts of herbivory on vegetation in the GINPR is underway (e.g., Gonzales 2004); ²² Zannette, L., letter and Progress Report on Song Sparrow study (sites on Rum and Portland islands) to Chris Kissinger, BC Parks. Research on causes for global declines in songbird abundance. Nov. 25, 2001 (BC Parks files); ²³ For example, there is 9 years of data collected by CWS (R. Butler, pers. comm., Feb. 2004); ²⁴ Large body of fallow deer information: for example, CWS data and LGL Ltd. study (R. Butler, pers. comm., Feb. 2004), Moody 1994, and BC Parks monitoring program (e.g., Palmer 1988); ²⁵ CWS data (R. Butler, pers. comm., Feb. 2004); ²⁶ Erosion assessment (Holden 1990); ²⁷ Annual inventories of fungi were begun in 1997 (e.g., Janszen 1997); ²⁸ Plant list for Saturna Island (Janszen 1977); ²⁹ Local stewardship initiative (T. Rutherford, pers. comm., Jan. 2004); ³⁰ Logging roads and trails mapped by Parks Canada (T. Golumbia, pers. comm., March 2004); ³¹ Vascular plant list for South Saturna Bluffs (Janszen 2000); ³² Recreation impact on vegetation and soils at Sidney Spit (Thompson and Hignett 1991); ³³ P. Johnstone, a graduate student at SFU, is conducting a detailed study of the geology of the southernmost Gulf Islands (from Russell Island to Sidney Island) and he adjacent Saanich Peninsula; ³⁴ There has been considerable research by UBC on songbird behaviour and evolution – centered on Mandarte Island but including surrounding islands (e.g., Dock Island).

Table 5-5 Status of Existing Knowledge for the Marine Component of the GINPR

Area Name		Geology	Intertidal and Subtidal Communities ¹	Seabirds	Marine Mammals	Fish	Natural Disturbances	Human Disturbances
Saturna Island and Environs	Existing Knowledge	Limited general info ¹⁰	Fair site-specific info ^{8,9} ; Limited general ¹³	Good general info ²	Good but limited [orcas] general info; Limited site-specific info: Tumbo Island ³	Good but limited [rockfish] general info ¹¹ ; Fair site-specific info ⁸	Nil	Anecdotal
	Coverage	Complete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete
Mayne Island and Environs	Existing Knowledge	Limited general info ¹⁰	Fair site-specific info ^{8,9} ; Limited general ¹³	Good general info ²	Good but limited [orcas] general info	Good but limited [rockfish] general info ¹¹ ; Fair site-specific info ⁸	Nil	Anecdotal
	Coverage	Complete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete
Pender Islands and Environs	Existing Knowledge	Limited general info ¹⁰	Fair site-specific info ^{8,9} ; Limited general ¹³	Good general info ²	Good but limited [orcas] general info	Good but limited [rockfish] general info ¹¹ ; Fair site-specific info ⁸	Nil	Anecdotal
	Coverage	Complete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete
Portland Island and Environs	Existing Knowledge	Limited general info ¹⁰	Fair site-specific info ^{8,9} ; Good site-specific info: Portland and Brackman ¹² ; Limited general ¹³	Good general info ²	Good but limited [orcas] general info	Good but limited [rockfish] general info ¹¹ ; Fair site-specific info ⁸	Nil	Anecdotal
	Coverage	Complete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete
Prevost Island and Environs	Existing Knowledge	Limited general info ¹⁰	Fair site-specific info ^{8,9} ; Limited general ¹³	Good general info ²	Good but limited [orcas] general info	Good but limited [rockfish] general info ¹¹ ; Fair site-specific info ⁸	Nil	Anecdotal
	Coverage	Complete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete

Table 5-5 Status of Existing Knowledge for the Marine Component of the GINPR cont'd

Area Name		Coastal Geology	Intertidal and Subtidal Communities ¹	Seabirds	Marine Mammals	Fish	Natural Disturbances	Human Disturbances
Sidney Island and Environs	Existing Knowledge	Limited general info ¹⁰	Limited site-specific info ⁸ ; Limited general ¹³	Good general info ² ; Good site-specific info: Sidney Spit ⁴	Good but limited [orcas] general info	Good but limited [rockfish] general info ¹¹ ; Fair site-specific info ⁸	Nil	Anecdotal
	Coverage	Complete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete
Crown Islets, including the adjacent submerged land area	Existing Knowledge	Limited general info ¹⁰	Limited site-specific info ⁸ ; Limited general ¹³	Fair but limited general info ⁶	Good but limited [orcas] general info; Limited site-specific info ⁷	Good but limited [rockfish] general info ¹¹ ; Fair site-specific info ⁸	Nil	Anecdotal
	Coverage	Complete	Incomplete	Incomplete (no data for Blunden Islet)	Incomplete (no data for Blunden Islet, and islets near Salt Spring, Prevost, Sidney and D'Arcy islands)	Incomplete	Incomplete	Incomplete

Notes: ¹ Includes invertebrates, algae and associated fish species; ² Historic data compiled on wintering marine birds (Campbell 1977), plus ongoing seabird counts in Puget Sound and the Strait of Georgia (R. Butler, pers. comm., Feb. 2004); ³ Very limited historical data compiled on northern sea lion haul-outs (Campbell 1977); ⁴ CWS has detailed data on herons and shorebirds plus annotated lists of other species (R. Butler, pers. comm., Feb. 2004); ⁵ CWS data on eelgrass and fish (R. Butler, pers. comm., Feb. 2004). ⁶ Historic data compiled on seabird colonies (Campbell 1977), thesis research on oystercatchers (R. Butler, pers. comm., Feb. 2004); ⁷ Limited historic data compiled on harbour seal haul-outs (Campbell 1977); ⁸ Pacific Marine Life surveys, contact: dgibbs@surfnaked.ca; ⁹ shellfish site appraisal database (Blyth et al. 1999); ¹⁰ Physical Shore-Zone Mapping System (Coastal Task Force 1995a); ¹¹ DFO rockfish data (e.g., Yamanaka and Lacko 2001); ¹² subtidal habitat classification prepared for Portland and Brackman islands (Swanson and Shaughnessy 1991), surveys of artificial reef off Portland Island (Subsea Enterprises 1994); ¹³ Biological Shore-Zone Mapping System (Coastal Task Force 1995b).

6 Conservation Assessment Review: Knowledge Gaps

Knowledge gaps related to the natural resources of the GINPR were identified based on the summaries of existing knowledge presented in Section 5.4 (Tables 5-4 and 5-5), questionnaire responses, and a general review of the literature. The knowledge gaps are presented for three categories: general, terrestrial and freshwater environment, and marine environment. More specifically, for the terrestrial, freshwater and marine environment categories, the gaps are summarized by subject area (e.g., geology, birds, human disturbance).

General

- General lack of adequate inventories for terrestrial, freshwater and marine ecosystems and species
- General lack of information on the submerged land protected area component of the GINPR
- Lack of a standard methodology for collecting information on the location of species of conservation concern
- No assessment of the 'health' of ecosystems (i.e., monitoring)
- Lack of information on the historic and current condition of native species and resources on individual park parcels
- Limited understanding of the requirements for restoration of habitats and ecosystems within the park (e.g., how much area is required, what were the original characteristics of the habitats of concern)
- Lack of credible information on local adaptation and genetic identity of native plant and animal resources in the Gulf Islands, as a basis for restoration
- Lack of scientifically rigorous and defensible restoration objectives and plans
- Limited understanding of how to maintain coastal Garry oak meadows and other native ecosystems in the context of fragmented landscapes and climate change

Terrestrial and Freshwater Environment

Geology and Soils:

- Available data tends to be large scale, and thus the level of detail, particularly related to soils, is likely to be inadequate for site-specific applications in most cases

Hydrology:

- General lack of information on surface water for the entire GINPR, although some site-specific information is available (e.g., Lyall Creek)
- General lack of information on groundwater for the entire GINPR, although some information is available for Saturna Island.

Plant Species and Communities:

- No compilation of existing local survey data

- Limited mapping available for the rare plant communities
- Limited forest cover information available

Birds:

- No compilations of existing local survey data
- General lack of information on species distributions and population sizes for the entire GINPR
- Lack of information on critical habitat for migratory shorebirds

Mammals:

- General lack of information on species distributions and population sizes for the entire GINPR
- No complete accounting of 'likely-to-occur' wildlife species

Freshwater Fish, Reptiles and Amphibians:

- General lack of information on fish, reptiles and amphibians for the entire GINPR, with the exception of Lyall Creek (salmonids)

Invertebrates:

- General lack of information on invertebrates for the entire GINPR, although there is some site-specific survey information (butterflies)

Natural Disturbances:

- General lack of information on natural disturbance history and processes for the entire GINPR, although some research has recently been initiated (M. Pellatt, pers. comm., Feb. 2004)

Human Disturbances:

- Limited understanding of the scope and intensity of human impacts within the GINPR
- Limited information on recreation use patterns and the location of impacted sites
- Lack of spatial data on official and unofficial trail locations

Marine Environment

Coastal Geology:

- No gaps identified, level of information available is appropriate for park-related applications

Intertidal and Subtidal Communities:

- Lack of fine scale intertidal and shallow subtidal biophysical inventories for the entire GINPR

Seabirds:

- Limited information available on habitat status and disturbance effects within the GINPR

Marine Mammals:

- Limited information available on population monitoring, and disturbance effects within the GINPR, although available data on whales (orcas) is considerably better than that available for pinnipeds

Fish:

- Limited information on population sizes and trends, particularly for non-commercial species, for the entire GINPR

Natural Disturbances:

- General lack of information on natural disturbance history and processes for the entire GINPR

Human Disturbances:

- Lack of systematic surveys or data compilations designed to assess the level of human impacts within the GINPR

7 Conservation Assessment Review: Key Conservation Issues

7.1 Identification of Conservation Issues in the Southern Gulf Islands

A list of conservation issues was compiled from the questionnaire responses; from a review of the existing management plans and AMPs that were available for the provincial and CRD parks that now form part of the GINPR; and from discussions during the workshop. These issues fall under three broad categories: general issues that are applicable to both the terrestrial and marine environments of the southern Gulf Islands, and those issues that are specific to the terrestrial environment, and those that are specific to the marine environment. Very specific or detailed issues provided by some respondents often overlapped with the broader issues that were identified; therefore, these more specific issues are presented as sub-headings of the appropriate broader conservation issue.

The conservation issues identified for the southern Gulf Islands are listed below. Issues that are presented in italics were identified as being specific to the GINPR rather than to the southern Gulf Islands as a whole.

General Issues:

- Potential and realized loss of rare, endangered or sensitive ecosystems and species
 - Garry oak ecosystems and associated species
 - Coastal bluffs
 - Arbutus/open grassland habitats
 - Old-growth forests and associated habitats and species
 - Wetlands and riparian habitats
 - Ungrazed islets
 - Undisturbed beaches, mudflats and eelgrass beds
 - Photic zone habitat
 - Southern resident pod of orcas
 - Rockfish
 - Areas of particularly high marine biodiversity (e.g., Boiling Reef)
- Species at Risk Act
 - *Critical habitat within GINPR*
- Lack of extensive and intensive up-to-date systematic surveys of terrestrial and marine plants, animals and habitats
- Lack of baseline data (for monitoring programs)
- Lack of public awareness regarding conservation values in the southern Gulf Islands

- *Lack of public familiarity with the boundaries of the GINPR*
- *Over-use and inappropriate activities by park users*
 - Trampling and disturbance in the intertidal zone
 - Impacts of anchors and fishing gear in the shallow subtidal zone
 - Increased use by recreational boaters and kayakers
 - Harvest of native plants
 - Unregulated fires and wildfire risk
 - Ecosystem degradation
 - Lack of control regarding public use of the GINPR
 - Unregulated camping and fires
 - Off trail hiking and proliferation of trails
 - Wildlife disturbance
 - Trampling and disturbance in the intertidal zone
 - Impacts of anchors and fishing gear in the shallow subtidal zone
 - Increased use by recreational boaters and kayakers
 - Introduction of invasive plant species (users as seed vectors)
- Terrestrial-intertidal-marine interface (e.g., saltmarsh)
- *Lack of information on the submerged lands area within the GINPR*
- *Inadequate size of the GINPR with respect to adequate representation and integrity of ecological processes and structures*
- *Lack of connectivity within the GINPR*
 - Network analysis of protected areas and conservation covenants

Terrestrial and Freshwater Issues:

- Invasive exotic plant species
 - Scotch broom, holly, gorse etc.
 - Exotic grasses
 - New species (e.g., burweed, cordgrass)
 - Effects of climate change
 - Role of Canada geese in the spread of exotic plant species
- Maintenance and restoration of native vegetation
 - Lack of knowledge regarding the disturbance regimes and other habitat requirements that support native vegetation
 - *Impacts of past human activities (e.g., farming, logging) within the park parcels*
- Integrity of freshwater habitats and associated organisms
 - Stream health

- Water withdrawal and lake health
- Fragmentation of forest ecosystems
- Availability of shorebird feeding habitat
- Integrity of small islets
- Integrity of natural abiotic processes (e.g., erosion, deposition, drainage)
- Fire exclusion in Garry oak and Douglas fir ecosystems
- *Fire hazard at the suburban-park interface*
- *Adjacent land use*
 - Impacts of subdivisions, vineyards, logging on lands outside the park parcels
- Impacts of non-native wildlife
 - Slugs
 - Feral sheep and goats
 - Fallow deer
 - Canada geese
- Continued, although infrequent, presence of large carnivores (e.g., black bear, wolf, cougar)

Marine Issues:

- Marine water pollution
 - Impacts of upland biocides, fertilizers, storm drains on the intertidal zone
 - Impacts of boat sewage, anti-fouling paint, boat engine oil, and bilge cleaners on the shallow subtidal and intertidal zones
- Siltation from installation of the GSX pipeline
- Introduction of exotic species into the marine environment
 - Japanese oysters
- Over-exploitation of marine fish and invertebrates through legal and illegal harvest
 - Depressed fish stocks
 - Rockfish, lingcod, local salmon runs and herring
 - Intertidal organisms (shellfish)
- Recreational and commercial vessel use
 - Wake impacts on coastal interface
 - Water pollution
 - Noise pollution and disturbance of wildlife

7.2 Site-Specific Conservation Issues in the Gulf Islands National Park Reserve

A list of conservation issues that are site specific, rather than broadly applicable (Section 7.1), within the GINPR was compiled from questionnaire responses; from a review of the existing management plans and AMPs that were available for the provincial and CRD parks that now form part of the GINPR; and from discussions during the workshop.

The site-specific conservation issues identified within the GINPR are:

Saturna Island and Environs

- Integrity of high current areas such as Boat Pass in Winter Cove, and Boiling Reef off East Point (Saturna Island)
- Feral goats on Saturna Island
- Lyall Creek¹⁰
- Root rot at Cabbage Island
- Inappropriate facilities siting (i.e. pit toilets on a midden) at Cabbage Island
- Impacts on the marine environment from heli-pad located at Winter Cove

Mayne Island and Environs

- Major modification of Bennett Bay upland due to past human activity (farming)
- Fire hazard risk associated with Bennett Bay upland area
- Erosion of steep slopes on south side of Campbell Point as the result of park users' activities

The Pender Islands and Environs

- Post-logging restoration required at Mt. Norman
- Roe Lake Conditional Water license (South Otter Bay park parcel)
- Restoration of natural drainage patterns required at Prior Centennial campground
- Negative impacts on the isthmus at Beaumont Marine Use Area from high levels of visitor use
- Trampling and garbage at South Otter Bay

Portland Island and Environs

- Root rot at Princess Margaret
- Access to Brackman Island (former ecological reserve)

Prevost Island and Environs

- Potential for negative impacts on natural vegetation communities by farm animals from adjacent private lands (James Bay – Selby Cove park parcel)

¹⁰ Only stream with a salmon run in the entire GINPR, also has a resident population of cutthroat trout, and is the target of a successful stream restoration project (T. Rutherford, pers. comm., February 2004).

- Restoration of orchard area
- Fire hazard in camping area

Sidney Island and Environs

- Fallow deer on Sidney Island (e.g., enclosure monitoring, population management)
- Disturbance of shorebirds and diving ducks at Sidney Spit and lagoon
- Impediment of natural erosion and deposition processes at Sidney Spit
- Condition and maintenance of the log piles and groins installed by BC Parks to prevent spit erosion between 1968 and 1972 (Sidney Spit Marine Park)
- Root rot at McDonald campground
- Mountain bike over-use at McDonald Campground
- Areas with wave exposed biota (e.g., D'Arcy Island)
- Impact of black-tailed deer herbivory on D'Arcy Island

Crown Islets

- Harvesting of Rocky Mountain juniper for the carving trade¹¹
- Loss of rockfish populations at small reefs
- Canada geese grazing, grubbing, and introducing exotic plant species, and their unknown affect on native breeding birds (e.g., black oyster-catchers)

Submerged Land Area

- Lack of information on the submerged land area within the GINPR

7.3 Key Conservation Issues in the Gulf Islands National Park Reserve

The conservation issues identified for the southern Gulf Islands, and for specific sites within the GINPR, are numerous and varied, and are often overlapping or linked. Table 7-1 indicates the process undertaken to refine these into a single set of Key Conservation Issues that are considered high priority within the GINPR. The designation of a conservation issue as a high priority for the GINPR was based on the comments of the questionnaire respondents; discussions during the workshop; the scope of issues under consideration (i.e., GINPR-wide versus site-specific issues); and on the frequency which various conservation issues were cited in existing planning documents.

Twelve Key Conservation Issues were identified (Table 7-1). Additionally, any site-specific issues identified in Section 7.2, were noted in this table in relation to the appropriate generalized conservation issue.

There is a general lack of knowledge regarding the natural resources of the GINPR and southern Gulf Islands region. This arose repeatedly as an issue of concern in Section 7, and was also readily apparent from the list of knowledge gaps presented in Section 6. This limited knowledge base has not, however, been identified as a Key Conservation

¹¹ This problem has increased in last five years. The juniper is not rare but it is part of a rare ecosystem (J. Kirkby, pers. comm., February 2004).

Issue as it is more aptly considered as part of the context under which the twelve Key Conservation Issues exist¹². Given the prominence of this concern it is obvious that an underlying management goal for the GINPR is to increase the general and specific knowledge base on natural resource values and human use patterns in all environments within the GINPR. An obvious initial management strategy to address this goal is to implement a broad-based baseline inventory program in collaboration with a variety of government, academic and local community agencies and groups. In addition, it is important to fully explore and develop relationships and cooperation with the data sources referenced in Table 5-3 (Section 5.3).

In summary, the following twelve Key Conservation Issues were identified for the Gulf Islands National Park Reserve:

1. Loss of Rare, Endangered and Sensitive Ecosystems and Species
2. Invasive Exotic Plant Species
3. Over-use and Inappropriate Activities by Park Users
4. Exploitation of Marine and Terrestrial Resources
5. Integrity of Small Islets
6. Recreational and Commercial Vessel Use
7. Size and Connectivity of Protected Areas
8. Impacts of Introduced and Hyper-Abundant Wildlife
9. Marine Pollution
10. Lack of Public Awareness
11. Adjacent Land Uses
12. Large Carnivores

Note that these issues are all considered high priority and are numbered only to facilitate identification in Section 8, rather than as an indication of relative rank.

¹² Thus, issues related to a lack of information, as identified in Section 7.1, are not included in Table 7-1.

Table 7-1 Identification of Key Conservation Issues for the GINPR

Conservation Issue Identified for southern Gulf Islands (Section 7.1)	Identified as High Priority in the GINPR?	Site-specific issues identified (Section 7.2)	Identified as Key Conservation Issue?	Key Conservation Issue
Loss of rare, endangered and sensitive ecosystems and species	Yes	High current areas (e.g., Boat Pass); high marine diversity areas (e.g., Boiling Reef); areas of wave-exposed biota (e.g., D'Arcy Is.)	Yes	Loss of Rare, Endangered and Sensitive Ecosystems and Species
Species at Risk Act			Species at Risk Act included as part of loss of rare, endangered and sensitive ecosystems and species conservation issue	
Integrity of freshwater habitats and associated organisms		Roe Lake Conditional Water license (South Otter Bay park parcel); Lyall Creek (Saturna Is.)	Integrity of freshwater habitats and associated organisms issue included as part of the broader loss of rare, endangered and sensitive ecosystems and species conservation issue	
Availability of shorebird feeding habitat		Sidney Spit Lagoon	Availability of shorebird feeding habitat issue included as part of the broader loss of rare, endangered and sensitive ecosystems and species conservation issue	
Integrity of natural abiotic processes (e.g., erosion, deposition, drainage)		Disruption of natural drainage patterns at Prior Centennial Park; impediment of natural erosion and deposition processes at Sidney Spit Marine Park; condition and maintenance of structures in place to prevent spit erosion at Sidney Spit Marine Park	Integrity of natural abiotic processes issue included as part of the broader loss of rare, endangered and sensitive ecosystems and species conservation issue	
Terrestrial-intertidal-marine interface			Terrestrial-intertidal-marine interface issue included as part of the broader loss of rare, endangered and sensitive ecosystems and species conservation issue	
Maintenance and restoration of native vegetation		Bennett Bay park parcel upland area modification from past farming (associated fire hazard); past logging in Mt. Norman Park	Maintenance and restoration of native vegetation issue included as part of the broader loss of rare, endangered and sensitive ecosystems and species conservation issue	
Fire exclusion in Garry oak ecosystems			No, Likely less of an issue in the GINPR than in the southern Gulf Islands as a whole. Smaller islands in this area were typically not sites for camas harvest and have a lower probability of lightning strikes (M. Fuchs, pers. comm., Jan. 2004)	--

Table 7-1 Identification of Key Conservation Issues for the GINPR cont'd

Conservation Issue Identified for southern Gulf Islands (Section 7.1)	Identified as High Priority in the GINPR?	Site-specific issues identified (Section 7.2)	Identified as Key Conservation Issue?	Key Conservation Issue
Over-use and inappropriate activities by park users	Yes	Mountain bikes at McDonald Park; disturbance of shorebirds and diving ducks at Sidney Spit lagoon; unauthorized access to Brackman Island ER; inappropriate facilities siting at Cabbage Island Marine Park; slope erosion at Campbell Point; impacts on isthmus at Beaumont Marine Park; heli-pad at Winter Cove Park	Yes	Over-use and Inappropriate Activities by Park Users
Integrity of small islets	Yes		Yes	Integrity of Small Islets
Overexploitation of marine fish and invertebrates through legal and illegal harvest	Yes	Rockfish at small reefs	Yes	Exploitation of Marine and Terrestrial Resources
		Harvest of Rocky Mountain juniper from islets	The harvest of native plants in general was identified as a concern under inappropriate uses by park users, but was included here under the more specific exploitation of marine and terrestrial resources conservation issue	
Lack of public awareness regarding conservation values in the southern Gulf Islands			Yes	Lack of Public Awareness
Lack of public familiarity with the boundaries of the GINPR	Yes		Yes	
		Root rot: McDonald Park; Cabbage Island Marine Park; Princess Margaret Marine Park	No	--
Invasive exotic plant species	Yes		Yes	Invasive Exotic Plant Species
Marine water pollution	Yes		Yes	Marine Pollution
Siltation from installation of GSX pipeline			No	--

Table 7-1 Identification of Key Conservation Issues for the GINPR cont'd

Conservation Issue Identified for southern Gulf Islands (Section 7.1)	Identified as High Priority in the GINPR?	Site-specific issues identified (Section 7.2)	Identified as Key Conservation Issue?	Key Conservation Issue
Lack of connectivity within the GINPR	Yes		Yes	Size and Connectivity of Protected Areas
Inadequate size of GINPR	Yes		Yes	
Fragmentation of forest ecosystems			Forest fragmentation issue included as part of size and connectivity of protected areas conservation issue	
Impacts of non-native wildlife	Yes	Feral goats on Saturna Is.; fallow deer on Sidney Island; black-tailed deer on D'Arcy Island	Yes	Impacts of Introduced and Hyper-abundant Wildlife
Introduction of exotic species into the marine environment			Although not specifically identified as a high priority issue in the GINPR, this issue is encompassed by the impacts of introduced and hyper-abundant species.	
Adjacent land uses		Impacts from farm animals adjacent to James Bay-Selby Cove park parcel	Yes, although not generally identified as a high priority at present this issue will become increasingly important within in the GINPR over time	Adjacent Land Uses
Fire hazard at the suburban-park interface	Yes		This is a major concern, and has been included as part of the adjacent land uses conservation issue.	
Continued, although infrequent, presence of large carnivores	Yes		Yes	Large Carnivores
Recreational and commercial vessel use	Yes		Yes	Recreational and Commercial Vessel Use

8 Management Direction for Key Conservation Issues

8.1 Management Summaries

This section presents a management summary for each of the twelve Key Conservation Issues identified in Section 7.3. As discussed previously, in addition to its socio-cultural and biophysical context, the management of the GINPR must also be considered in the context of a limited knowledge base, which manifests itself most clearly in the list of knowledge gaps that are included in each management summary.

The proposed management summaries include the following:

Scope: A brief description of the issue scope with respect to the GINPR itself and the southern Gulf Islands region as a whole. In general, the Key Conservation Issues are intended to be park-wide in scope but for some issues there is a greater focus on some park parcels than others. Also some issues, or components of issues, are more regional in scope and management must be considered in this broader context.

Model Sphere(s): This links each issue back to the Ecosystem Conceptual Model (Section 4.2) with respect to its influence on any or all of the three ecosystem processes – Terrestrial, Marine and Coastal Interface.

First Order Effects Category(ies): This categorizes each issue as belonging to one or more of the six first order effects identified in the Ecosystem Conceptual Model (Section 4.2) – Disturbance Regime; Functional Groups; Atmospheric Condition; Soil and Water Resources and Condition (terrestrial and coastal interface); Water and Substrate Resources and Condition (marine and coastal interface); and Social and Economic Conditions.

Knowledge Gaps: A list of issue-specific knowledge gaps (Section 6).

Management Goal(s): A list of the issue-specific management goals established for the GINPR. These goals were derived from existing planning documents for any of the park parcels that were formerly under provincial or municipal jurisdiction, suggestions provided by questionnaire respondents, and input from workshop participants.

Management Strategies: A list of the strategies designed to meet the management goals established for the GINPR with respect to each issue. These strategies were derived from existing planning documents for any of the park parcels that were formerly under provincial or municipal jurisdiction, suggestions provided by questionnaire respondents, and input from workshop participants. In general, the strategies are intended to be GINPR-wide in scope but for some issues there are specific strategies identified for (or already in progress in) certain park parcels.

Performance Indicators: As presented here, performance indicators are measures used to monitor the progress or success of management goals and strategies. Based on the input from workshop participants, potential performance indicators were identified for the management goals and strategies associated with each Key Conservation Issue.

Linked Key Conservation Issue(s): A list of other Key Conservation Issues that are closely linked to the Key Conservation Issue under consideration.

Key Conservation Issue 1: LOSS OF RARE, ENDANGERED AND SENSITIVE ECOSYSTEMS AND SPECIES

Scope:

This issue is a major concern, within a local context, throughout the GINPR and southern Gulf Islands region. This issue is especially acute for Garry oak ecosystems and their associated species, and for all species and plant communities of provincial and federal conservation concern. This issue also includes a variety of sensitive habitats and habitat features that may or may not be ranked as provincial or federal conservation concerns, but are considered important within the GINPR and surrounding regions. These include: shorebird feeding habitats, coastal Douglas-fir forests, arbutus/open grasslands habitats, mature forest with old-growth attributes; coastal bluffs, ungrazed islets, wetlands and riparian habitats, seal and sea lion haul-outs, seabird colonies, undisturbed beaches, mudflats, and eelgrass beds, photic zone habitat, the terrestrial-marine interface, and spiritual sites.

Model Spheres:

- Terrestrial, Marine and Coastal Interface Ecosystem Processes

First Order Effects Category:

- Functional Groups

Knowledge Gaps:

- Rare, endangered, and sensitive plant and animal species and communities, in both the terrestrial and marine environments, have not been inventoried or mapped adequately in the GINPR.
- No fine scale biophysical inventory of the intertidal and shallow subtidal zones.
- Lack of information on critical habitat for migratory shorebirds.
- Lack of information on the original (historic) and current condition of the natural resources within the GINPR.
- Lack of information on the role of fire on the ecosystems in the southern Gulf Islands.
- Lack of knowledge on the effects of climate change on ecosystems (e.g., Garry oak meadows) within the GINPR.
- No assessment of ecosystem 'health' available (i.e., monitoring).
- Limited knowledge on effective restoration measures for various ecosystems.
- Lack of credible information on local adaptation and genetic identity of native plant and animal resources in the region (as a basis for restoration).
- Lack of scientifically rigorous and defensible restoration objectives and plans.
- Lack of knowledge on the effects of fragmentation on ecosystems within the GINPR.

Management Goals:

1. *To protect and recover existing rare, endangered and sensitive ecosystems and species in the marine and terrestrial environments.*

2. *To describe, maintain and restore natural processes (e.g., succession, erosion, fire) within rare, endangered and sensitive ecosystems in the marine and terrestrial environments, where feasible in the context of other GINPR management plans (e.g., fire suppression).*
3. *To restore damaged rare, endangered and sensitive ecosystems, and reintroduce rare, endangered and sensitive species, where appropriate, in the marine and terrestrial environments.*

Management Strategies:

- Implement inventory and monitoring programs for provincially and federally listed species and ecosystems¹³.
- Work within the park first and then turn to the broader region. Develop management priorities that reflect this approach, that is, the first priorities are ‘common’ sensitive species, critical habitats (as per SARA), and plant species with disjunct distributions that occur within the GINPR.
- Develop management strategies for rare, endangered and sensitive species based on an understanding of their habitat requirements, to ensure their protection.
- Define and identify ‘sensitive’ species, ecosystems and habitat features in a park-specific context to enable their protection or restoration.
- Where appropriate, co-operate with and support conservation and recovery strategies developed by other agencies (e.g., Rockfish Conservation Areas [DFO], Garry Oak Recovery Plan [GOERT]).
- Identify areas for habitat restoration and undertake restoration initiatives. This may include the reintroduction of ecosystem processes.
- Employ an experimental and incremental approach to the reintroduction of ecosystem processes.
- Assess the feasibility of reintroducing extirpated species (e.g., Island Marble butterfly).
- Maintain a full suite of successional stages (that reflect the natural regime), in perpetuity, in all operational plans related to the protection or restoration of habitats, in particular, targeting the large areas of young or even-aged forest types within the GINPR.
- Initiate research on the role of fire as a part of the natural disturbance regime of ecosystems in the southern Gulf Islands.
- Continue research on the effects of past and present climate change on the ecosystems of the southern Gulf Islands.
- Assess the status of previously identified site-specific issues¹⁴ and implement actions where required.
 - Rehabilitate Bennett Bay upland to natural condition;
 - Maintain a natural water level regime at Roe Lake to protect the riparian ecosystems;
 - Allow natural erosion and deposition processes to occur unimpeded at Sidney Spit; and
 - Assess the condition and desirability of maintaining the log piles and groins installed by BC Parks to prevent spit erosion at Sidney Spit.
- Acquire additional park parcels for the GINPR, targeting underrepresented ecosystems, critical habitats and connectivity of existing protected areas.
- Develop a public education program that highlights the uniqueness and diversity of the Park’s natural resources and explains park-specific concerns related to sensitive species and ecosystems.

¹³ Focus on NatureServe global and provincial rankings, rather than COSEWIC, for management direction, as COSEWIC is currently overwhelmed and these rankings are more current (D. Fraser, pers. comm., Feb. 2004).

¹⁴ From existing planning documents prepared by BC Parks and the CRD.

- Provide demonstration sites, as a component of the park interpretation programs, which showcase ecosystem restoration.

Performance Indicators:

- Recovery of sensitive species (e.g., population size, area/boundary of distribution, identification of critical habitat).
- Recovery of sensitive ecosystems and habitats (e.g., total area).
- Species diversity index.

Linked Key Conservation Issues:

- Key Conservation Issue 2: Invasive Exotic Plant Species
- Key Conservation Issue 7: Size and Connectivity of Protected Areas
- Key Conservation Issue 8: Impacts of Introduced and Hyper-abundant Wildlife

Key Conservation Issue 2: INVASIVE EXOTIC PLANT SPECIES
--

Scope:

This issue is a major concern, within a local context, throughout the GINPR and southern Gulf Islands region. This issue was noted as a key conservation issue for all park parcels. Invasive plants can have a negative effect in the displacement of native species and also may result in structural simplification of the habitat to the disadvantage of native species.

Model Sphere:

- Terrestrial

First Order Effects Categories:

- Functional Groups, Disturbance Regime

Knowledge Gaps:

- Invasive, non-native plant species have not been inventoried or mapped adequately in the GINPR.
- Lack of information on the original (historic) and current conditions within the GINPR.
- Limited knowledge on effective restoration measures for various ecosystems.
- Lack of credible information on local adaptation and genetic identity of native plant and animal resources in the region (as a basis for restoration).
- Lack of scientifically rigorous and defensible restoration objectives and plans.

Management Goals:

1. *To control or eradicate invasive exotic plant species in the GINPR.*
2. *To prevent introduction of new invasive exotic plant species into the GINPR.*
3. *To prevent the further expansion of invasive exotic plant species within the park, and from adjacent lands into the park.*
4. *To maintain and restore natural vegetation communities.*

Management Strategies:

- Conduct baseline inventories of invasive exotic plant species.
- Prioritize species and areas to target for eradication and control. First priority would be exotic species in key areas (e.g., Bennett Bay, certain islets) over a five-year period. The next priority would be long term and broad scale control of invasive exotic species.
- Develop and implement site-specific (e.g. road and trail corridors) and species-specific strategies for control and eradication.
- Prioritize areas to target for habitat restoration; recognizing that, in the long term, representivity is desirable (i.e., efforts should not focus solely on rare ecosystems). Consider an approach that considers three ‘target levels’ for restoration: historic (culturally modified) landscapes, natural landscapes (natural processes prevail), and managed ‘natural’ landscapes (key natural components are “forced” through more intensive management).

- Identify appropriate (e.g., genetically compatible and sustainable) sources of plants and seeds for restoration efforts.
- Incorporate up-to-date restoration science into all restoration efforts.
- Consider an experimental (or pilot) approach at selected sites to inform future restoration efforts and contribute to the greater knowledge base.
- Develop a public education program designed to raise awareness of issues related to the impacts of introduced exotic plants on natural ecosystems, promote involvement and provide training in plant removal efforts (e.g., 'broom pulls'), and prevent further introductions (e.g., information for gardeners).
- Provide demonstration sites, as a component of the park interpretation programs, which showcase the removal of exotic species and restoration of habitat.
- Control recreational uses that contribute to the spread of exotic plants (e.g., soil on hiking boots).
- Support and cooperate with existing programs to educate the public (e.g., GOERT projects).
- Develop and maintain partnerships with adjacent landowners to facilitate the control and eradication of exotic and invasive plant species.
- Implement a surveillance and monitoring program to report and record regularly on the status of invasive exotic plants within and adjacent to the park.

Performance Indicators:

- Restoration effort (e.g., area of broom pulled, number of native trees planted).
- Species eradication (e.g., number of individuals, area/boundary of distribution).
- Number of Parks Canada occurrence reports related to the presence of exotic species.
- Number of local community stewardship initiatives.

Linked Key Conservation Issues:

- Key Conservation Issue 1: Loss of Rare, Endangered and Sensitive Ecosystems and Species
- Key Conservation Issue 3: Over-use and Inappropriate Activities by Park Users
- Key Conservation Issue 8: Impacts of Introduced and Hyper-abundant Wildlife
- Key Conservation Issue 10: Lack of Public Awareness

Key Conservation Issue 3: OVER-USE AND INAPPROPRIATE ACTIVITIES BY PARK USERS
--

Scope:

This issue is a concern, within a local context, throughout the GINPR and southern Gulf Islands region. This issue was identified as a concern in all park parcels with existing management plans. Activities that may have a negative impact on the GINPR if unrestricted and unregulated include: hiking off-trail, inappropriate existing facilities, camping in sensitive areas, disturbance of wildlife (e.g., seabird colonies), and mountain biking.

Model Spheres:

- Terrestrial, Marine, Coastal Interface

First Order Effects Categories:

- Disturbance Regime, Soil and Water Resources and Condition, Water and Substrate Resources and Condition

Knowledge Gaps:

- Limited information available on use intensity and patterns.
- Limited information available on condition and location of impacted sites.
- Cumulative effects.
- No spatial data on official and unofficial trail locations.

Management Goal:

To provide and manage recreational opportunities in a manner that is consistent with the protection of ecological integrity.

Management Strategies:

- Assess human impacts on the park's natural resources and determine where park facilities need to be provided, if existing park facilities need to be altered, and if some recreational activities need to be restricted (e.g., access to some areas may have to be restricted to minimize erosion).
- Develop a park zoning system related to use/non-use on land and water (including kayaks and recreational diving).
- Control public access and use on land and water through active enforcement and public awareness (e.g., signage).
- Consider 'natural' patterns of movement by users on foot and by water in any access planning.
- Identify and monitor sensitive areas requiring protection from human use.
- Provide access (e.g., trails) to direct users away from sensitive areas.
- Assess and predict the cumulative effects of various uses and facilities within the park parcels.
- Investigate the impacts of vessel anchoring.
- Regulate commercial wildlife-watching activities within the GINPR.
- Incorporate seasonal considerations into permitting of activities (e.g., freshwater use).

- Promote public awareness, within local communities and among park visitors, of the standards for appropriate recreational use and etiquette within the park (i.e., GINPR ‘code of conduct’).

Performance Indicators:

- Number of Parks Canada occurrence reports related to inappropriate use.
- Trail and camp site conditions (e.g., area of erosion, recovery of compacted sites).
- Park user surveys (e.g., complaints of inappropriate use, trail damage).

Linked Key Conservation Issues:

- Key Conservation Issue 1: Loss of Rare, Endangered and Sensitive Ecosystems and Species
- Key Conservation Issue 2: Invasive Exotic Plant Species
- Key Conservation Issue 5: Integrity of Small Islets

Key Conservation Issue 4: EXPLOITATION OF MARINE AND TERRESTRIAL RESOURCES

Scope:

This issue is a concern, within a local context, throughout the GINPR and southern Gulf Islands region. Exploitation occurs through both legal and illegal harvest or removal. Marine species that have been affected by exploitation include abalone, scallops, octopus, kelp, red urchins, lingcod and several species of rockfish. Terrestrial species that have been affected by exploitation include mushrooms, peregrine falcons (eggs), yew, prickly pear cactus, stunted (bonsai) Douglas-fir, Rocky Mountain juniper, Labrador tea, Indian consumption plant, deltoid balsamroot, arrowhead, and salal. Habitat elements that have been affected by exploitation include driftwood and wood with burls.

Model Spheres:

- Terrestrial, Marine, Coastal Interface

First Order Effects Categories:

- Functional Groups, Disturbance Regime

Knowledge Gaps:

- Clear messaging on the extent and scope of Parks Canada jurisdiction.
- What constitutes 'legal harvest'?
- Sites of exploitation.
- Extent of illegal harvest of plant species.
- Complete list of exploited species.

Management Goals:

1. *To minimize any negative impacts to marine and terrestrial species and habitats associated with legal harvest.*
2. *To eliminate the illegal harvest of marine and terrestrial resources within the GINPR.*

Management Strategies:

- Provide a stronger year-round enforcement presence in the marine and terrestrial environments, especially among the small islets, to the extent that the Parks Act applies.
- Work with First Nations groups to develop management strategies for the conservation and protection of traditional use resources.
- Initiate research on harvest motivation (legal and illegal).
- Implement a public outreach and education program that is multicultural in scope.
- Implement an 'observe and report' program for illegal harvest activities, and support community involvement in existing protection programs (e.g., Orca Watch).
- Support recreational dive-based monitoring of marine resources.

Performance Indicators:

- Recovery of over-exploited resources (e.g., population size and range expansion).

- Number of violations.
- Level of public involvement in protection programs.

Linked Key Conservation Issues:

- Key Conservation Issue 3: Over-use and Inappropriate Activities by Park Users
- Key Conservation Issue 10: Lack of Public Awareness

Key Conservation Issue 5: INTEGRITY OF SMALL ISLETS

Scope:

This issue is a concern, within a local context, throughout the GINPR and southern Gulf Islands region. The small islets act as reservoirs of native diversity albeit small ones. Due to the reduced level of human access and activity, these islets remain relatively undisturbed. However, they are also sensitive and susceptible to future disturbance due to their small size and isolation.

Model Spheres:

- Terrestrial, Marine, Coastal Interface

First Order Effects Category:

- Functional Groups

Knowledge Gaps:

- Detailed islet-specific plant and animal species inventories.
- Limited information available on use patterns.
- Limited information available on condition and location of impacted sites.

Management Goal:

To protect and recover the ecological values inherent to small islets throughout the GINPR.

Management Strategies:

- Continue islet vegetation inventory and research.
- Initiate islet animal inventory and research to document distribution of native and introduced fauna.
- Monitor seabird colonies.
- Develop a use/no use zoning system for islets.
- Close islets to public use in the interim (until zoning system is in place).
- Provide a stronger year-round enforcement presence around the small islets.
- Promote public awareness of the sensitivities of islets, particularly those with seabird nesting and roosting sites, and seal and sea lion haul-outs.
- Implement an 'observe and report' program to address unauthorized access to seabird colonies and inappropriate activities (e.g. campfires) on islets.
- Develop an islet restoration program.
- Develop a program for the management of Canada geese and mute swans on islets.

Performance Indicators

- Number of occurrence reports related to inappropriate activities on small islets.
- Number of violations.
- Species diversity index.
- Eradication of Canada geese and mute swans (e.g., population size and distribution).

Linked Key Conservation Issues:

- Key Conservation Issue 2: Invasive Exotic Plant Species
- Key Conservation Issue 3: Over-use and Inappropriate Activities by Park Users
- Key Conservation Issue 4: Exploitation of Marine and Terrestrial Resources
- Key Conservation Issue 8: Impacts of Introduced and Hyper-abundant Wildlife
- Key Conservation Issue 10: Lack of Public Awareness

Key Conservation Issue 6: RECREATIONAL AND COMMERCIAL VESSEL USE

Scope:

This issue is a concern throughout the GINPR and southern Gulf Islands region. Recreational vessel use is the primary concern in a local context, while commercial vessel traffic is the primary concern in a regional context. Floatplane traffic, particularly during landing and take-off, are included under this issue.

Model Spheres:

- Marine, Coastal Interface

First Order Effects Categories:

- Disturbance Regime, Water and Substrate Resources and Condition

Knowledge Gaps:

- Impacts of anchoring and moorage on the intertidal and subtidal zones.
- Noise disturbance effects on wildlife.
- Extent of wake-induced alterations to shoreline habitats.
- Volume of transient boat traffic.
- Volume of and impacts of floatplane traffic.

Management Goals:

1. *To provide and manage boating opportunities in a manner that is consistent with the protection of ecological integrity with the GINPR.*
2. *To minimize the impacts of commercial vessel activity on the natural resources of the GINPR.*

Management Strategies:

- Develop a zoning system for vessel access/non-access.
- Develop a site-specific quota system to regulate use levels (e.g., number of shore landings permitted per day).
- Consider speed limits and vessel restrictions (e.g., no Jet Skis) in some areas within the park.
- Investigate the impacts of recreational vessel anchoring, and develop anchoring impact indices.
- Investigate the impacts of vessel wakes on shoreline habitats.
- Provide a stronger enforcement presence with respect to appropriate anchoring, moorage, holding tanks, and shore access and landing practices of all vessels (including kayaks).
- Regulate commercial wildlife-watching activities within the GINPR.
- Implement a structured mooring program (designated areas, mooring buoys etc).
- Support and practice 'green' boating initiatives.
- Investigate the impacts of commercial vessel use in the GINPR.

Performance Indicators:

- Number of 'social' landing sites.
- Anchoring impact indices.

Linked Key Conservation Issues:

- Key Conservation Issue 3: Over-use and Inappropriate Activities by Park Users
- Key Conservation Issue 9: Marine Pollution
- Key Conservation Issue 10: Lack of Public Awareness

Key Conservation Issue 7: SIZE AND CONNECTIVITY OF PROTECTED AREAS

Scope:

This issue is a concern within the GINPR and across the larger ecosystem. There are a full range of protected areas on the Gulf Islands ranging from National Parks and Regional or municipal parks to conservation easements and/or covenants on private lands. It is important that all of these measures be considered in conservation planning within this area.

Model Spheres:

- Terrestrial, Marine, Coastal Interface

First Order Effects Category:

- Functional Groups

Knowledge Gaps:

- Limited understanding of how much area is required to maintain the ecological integrity of the GINPR.
- Lack of information on the design and effectiveness of corridors in insular environments.
- Amount of area protected outside of the park parcels within the GINPR (e.g., conservation covenants).

Management Goals:

1. *To provide natural connectivity of protected areas with the GINPR at various size and time scales, and among all ecosystems (terrestrial, marine and coastal interface), recognizing that a lack of connectivity is critical to the integrity of islands.*
2. *To increase the total area protected within the GINPR core area of interest recognizing the role of all protected areas and levels of protection across the landscape.*
3. *To reflect, within the GINPR, the diversity and relative abundance of ecosystems occurring in the southern Gulf Islands.*

Management Strategies:

- Acquire additional park parcels for the GINPR, targeting underrepresented ecosystems and potential corridors.
- Promote and develop cooperation with Islands Trust, landowners and local conservancies to maximize the effective ecological size of the park.
- Map existing park parcels and other 'protected areas' (e.g., conservation covenants) to identify potential or existing corridors, and flag connectivity gaps.
- Link to National Marine Conservation Area (NMCA) zoning for marine connectivity.
- Recognize and support, where appropriate, international linkages, both marine and terrestrial, such as the Orca Pass International Stewardship Area.
- Identify areas where a lack of connectivity is desirable to sustain isolated island ecosystems.
- Evaluate the feasibility of species-specific connectivity objectives (e.g., large carnivores, elk).

Performance Indicators:

- Total area protected by protection class.
- Gene flow among populations.
- Species diversity within park parcels.
- Ecosystem representivity.

Linked Conservation Issues:

- Key Conservation Issue 1: Loss of Rare, Endangered and Sensitive Ecosystems and Species
- Key Conservation Issue 12: Large Carnivores

Key Conservation Issue 8: IMPACTS OF INTRODUCED AND HYPER-ABUNDANT WILDLIFE

Scope:

This issue is a concern, within a local context, throughout the GINPR and southern Gulf Islands region. Although feral non-native wildlife are not as widespread as they once were (e.g., sheep have been removed from Portland Island), their impacts are still evident in many areas, and they continue to be an active problem in certain areas (e.g., Saturna and Sidney islands). The primary concern is the impact of herbivores, including hyper-abundant native species (e.g., black-tailed deer), on vegetation communities, but additional concerns include predation (feral cats on songbirds), and potential concerns regarding disease transfer. Both increasing local human populations and a changing climate regime increase the risk of new introductions and range extensions of exotic species not currently found in the area.

Model Spheres:

- Terrestrial, Marine, Coastal Interface

First Order Effects Categories:

- Functional Groups, Disturbance Regime

Knowledge Gaps:

- Limited information available on the present status and distribution of introduced wildlife within the GINPR.
- Lack of information on the original (historic) and current condition of the natural resources within the GINPR, with respect to the impacts of introduced and hyper-abundant wildlife.
- What is an acceptable level of grazing/browsing impact on native vegetation?
- Limited knowledge on effective restoration measures for various ecosystems.
- Lack of credible information on local adaptation and genetic identity of native plant and animal resources in the region (as a basis for restoration).
- Lack of scientifically rigorous and defensible restoration objectives and plans.

Management Goals:

1. *To control or eliminate introduced wildlife and hyper-abundant native wildlife species that pose a threat to ecological integrity within the GINPR, and to prevent further introductions of non-native wildlife into the GINPR.*
2. *To restore the native vegetation in areas historically grazed or browsed by non-native or hyper-abundant native herbivores.*

Management Strategies:

- Inventory the distribution and populations of introduced wildlife to determine where they remain and whether their populations require management, ensuring that all species groups are targeted, including cryptic and lesser known introduced species (e.g., slugs, earthworms, green crabs).
- Support research that examines the ecological impacts of introduced and hyper-abundant species.
- Clarify the role of grazing by feral goats in the apparent control of Invasive Exotic species and maintenance of rare and endangered plant species (in lieu of naturally occurring fires) on Brown Ridge, Saturna Island.

- Assess the costs and benefits of different management scenarios for the feral goats on Saturna Island.
- Initiate research on the impacts of introduced insects within the park.
- Develop and implement species-specific management approaches for introduced or hyper-abundant wildlife (e.g., feral cat sterilization, Canada geese egg addling, deer cull) that incorporate adaptive management principles with respect to levels of removal or reduction.
- Identify sites for restoration of heavily grazed native vegetation, and incorporate these sites into broader restoration strategies for the park.
- Work with Parks Canada veterinarian to identify potential for transfer of diseases among domestic and wild animals (e.g., elk, chickens).
- Establish an ‘observe and report’ program in cooperation with local communities for the reporting of livestock escapees and damage within the park boundaries.
- Design and implement public education programs regarding the effects of livestock and feral animals on natural ecosystems. Target audiences would include local community stewardship groups, 4-H clubs, and pet owners (via veterinary clinics), with the intent of preventing further introductions to the park and adjacent properties and promoting control programs (e.g., feral cat sterilization).
- Develop, support and maintain partnerships with landowners, local communities, and other agencies to facilitate the management of introduced or hyper-abundant species (e.g., fallow deer management initiatives on Sidney Island).
- Fence areas where grazing of greatest immediate concern and utilize monitoring to document effect and recovery.

Performance Indicators:

- Exclosure monitoring (e.g., plant species diversity).
- Eradication of introduced species (e.g., population size, number of individuals relocated).
- Number of animals handled (e.g., removed, sterilized).
- Number of Parks Canada occurrence reports.

Linked Key Conservation Issues:

- Key Conservation Issue 1: Loss of Rare, Endangered and Sensitive Ecosystems and Species
- Key Conservation Issue 2: Invasive Exotic Plant Species

Key Conservation Issue 9: MARINE POLLUTION

Scope:

This issue is a concern, primarily within a local context, throughout the GINPR and southern Gulf Islands region. Local sources of pollution that may impact the submerged land areas in the GINPR include: old marine and residential garbage dumping sites, lighthouse battery disposal sites, upland biocides, fertilizers, storm drains, boat engine oil, bilge cleaners, boat sewage, and anti-fouling paint. Regionally, there are additional sources of marine pollution that may be affecting the park (e.g., commercial shipping disposal).

Model Spheres:

- Marine, Coastal Interface

First Order Effects Category:

- Water and Substrate Resources and Condition

Knowledge Gaps:

- No detailed information is available on the extent and distribution of marine pollution within the GINPR.
- Cumulative impacts.

Management Goals:

1. *To protect marine water quality by minimizing or eliminating the negative impacts of marine use on water quality in GINPR.*
2. *To obtain an understanding of the potential effects of pollution (including oil spills, sewage and toxins) on marine flora and fauna.*
3. *To ensure that response to any oil spill or spill of other marine contaminants occurs efficiently and focus on the areas most sensitive to such an incident.*

Management Strategies:

- Designate submerged land areas of the GINPR as a 'no dump zone' through federal Pleasure Craft Sewage Pollution Prevention Regulation.
- Prepare marine contaminant response plans, which include the identification of areas most sensitive to marine contaminants such as oil, and prioritize areas for clean up.
- Develop partnerships with local community groups (e.g., shorekeepers, reefkeepers) to implement water quality monitoring programs.
- Work with Islands Trust on issues related to upland sources of marine pollution.
- Ensure that park facilities and practices are 'green'.

Performance Indicators:

- Marine water quality within the park.
- Epiphytic loading on eelgrass.

Linked Key Conservation Issues:

- Key Conservation Issue 2: Over-use and Inappropriate Activities by Park Users
- Key Conservation Issue 10: Lack of Public Awareness

Key Conservation Issue 10: LACK OF PUBLIC AWARENESS

Scope:

Parks Canada is relatively new in the region and the context of our management policies are not well known locally. This issue is a concern, within a local context, throughout the GINPR and southern Gulf Islands region.

Model Spheres:

- Terrestrial, Marine, Coastal Interface

First Order Effects Categories:

- Social and Economic Conditions, Disturbance Regime, Functional Groups, Soil and Water Resources and Condition, Water and Substrate Resources and Condition, Functional Groups

Knowledge Gaps:

- Parks Canada's understanding of the public's values and priorities in the southern Gulf Islands.
- The public's understanding of the role of National Parks, and in the particular the management objectives for the GINPR.
- The public's understanding of basic park orientation (e.g., boundaries, appropriate behaviour).
- The public's understanding of ecological integrity.

Management Goal:

To build upon the strong public support for the GINPR, by providing information that contributes to developing awareness, understanding and appreciation of the natural values and management principles of the GINPR.

Management Strategies:

- Identify park-specific interpretative themes and 'messages' for park signage and orientation materials.
- Provide orientation signage at the entry points (e.g., ferry terminals, visitor information booths) to islands that have park parcels.
- Provide park orientation information on the ferries.
- Provide up-to-date park orientation information on a web site (include maps).
- Provide 'friendly' signage and other information that clearly delineates GINPR boundaries and areas with restricted access.
- Ensure that interpretive programs and other forms of park information heighten visitor awareness of the park's natural values, flag the sensitive nature of certain habitats (e.g., spit and lagoon environments), and promote appropriate recreational activities and etiquette.
- Provide local communities and the public with information to enable them to participate in park management initiatives (e.g. volunteer invasive species removal projects, observe and report programs).
- Provide park visitors and local communities with information on the negative impacts of introduced plants and animals, to prevent new introductions and the further distribution of introduced species already in the park and on adjacent lands.

- Facilitate the development of a code of ethics document for tour operators.
- Initiate an assessment of park visitor values and priorities.

Performance Indicators:

- Number of islands with orientation signs.
- Number of Parks Canada occurrence reports related to inappropriate activities.
- Survey level of public awareness.
- Number of park volunteers and/or stewardship initiatives.

Linked Conservation Issues:

- Key Conservation Issue 2: Invasive Exotic Plant Species
- Key Conservation Issue 3: Over-use and Inappropriate Activities by Park Users
- Key Conservation Issue 4: Exploitation of Marine and Terrestrial Resources
- Key Conservation Issue 5: Integrity of Small Islets
- Key Conservation Issue 6: Recreational and Commercial Vessel Use
- Key Conservation Issue 8: Introduced and Hyper-abundant Wildlife
- Key Conservation Issue 9: Marine Pollution
- Key Conservation Issue 11: Adjacent Land Uses

Key Conservation Issue 11: ADJACENT LAND USES
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Scope:

This issue is a concern, primarily within a local context, throughout the GINPR and southern Gulf Islands region. There are, however, activities occurring on a regional scale (outside the park), which may impact long-ranging marine mammal and bird species that spend part of their annual ranges within the GINPR (e.g., industrial effluents and emissions, land development). More specifically, issues related to fire suppression, hazard and risk, within and outside the park, are a concern, especially with regard to the suburban-park interface.

Model Spheres:

- Terrestrial, Marine, Coastal Interface

First Order Effects Categories:

- Disturbance Regime, Atmospheric Condition, Soil and Water Resources and Condition, Water and Substrate Resources and Condition

Knowledge Gaps:

- Scale, magnitude and type of impacts occurring, or with the potential to occur within the GINPR as the result of on adjacent lands.
- Cumulative effects.
- Adjacent landowner awareness of park location and management issues.
- Impact of the park on local landowners.
- Location of local support (e.g., conservation covenants).

Management Goal:

To work cooperatively with local land managers and owners towards the maintenance of the ecological integrity of the GINPR.

Management Strategies:

- Clearly identify and maintain the integrity of the interface between private land and park parcels (e.g., to reduce impact of adjacent timber extraction on park parcels).
- Co-operate with Islands Trust to include consideration of this interface in the land use planning process and conservation covenants.
- Work with adjacent property owners to protect and restore ecosystem processes within and adjacent to the park, and to avoid negative impacts to natural values (e.g. domestic animals accessing the GINPR, timber harvesting right to park boundaries, development of shoreline areas which cause accelerated erosion or prevent natural movements of sediments).
- Develop and communicate a strategy on fire hazard and the suburban-park interface.
- Consider adjacent land uses in any park zoning initiatives.
- Assess and predict the cumulative effects of adjacent land uses on park parcels.
- Cooperate with landowners to exclude livestock from park parcels as required.

- Identify local sources of pollution within and outside park parcels.
- Identify high fire risk sites within and outside the park parcels.
- Support credible local stewardship initiatives.

Performance Indicators:

- Marine and freshwater quality within the park.
- Number of park volunteers.
- Number of local stewardship initiatives.
- Number of conservation covenants.
- Number of local community members involved in park decision-making initiatives.
- Number of complaints about park impacts on adjacent landowners.
- Number of Parks Canada occurrence reports related to adjacent land use.
- Fire reports.

Linked Key Conservation Issues:

- Key Conservation Issue 7: Size and Connectivity of Protected Areas
- Key Conservation Issue 10: Lack of Public Awareness

Key Conservation Issue 12: LARGE CARNIVORES
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Scope:

This issue is a concern, within a local and regional context, throughout the GINPR and southern Gulf Islands region. Although the presence of large carnivores (i.e., black bear, wolf and cougar) within the region is relatively uncommon, this issue is a high priority due to the possibility of human interactions and associated liability concerns.

Model Sphere:

- Terrestrial

First Order Effects Category:

- Functional Groups

Knowledge Gaps:

- Lack of understanding regarding the role of large carnivores in the southern Gulf Islands.
- Frequency, extent and duration of large carnivore activities within and through the GINPR.

Management Goals:

To allow the natural movements and activity patterns of large carnivores to take place within and through the GINPR, where feasible with respect to public safety and protection of property.

Management Strategies:

- Initiate research on the role of large carnivores in the southern Gulf Islands.
- Collaborate with the regional Conservation Officer(s) in the compilation and update of a database of large carnivore records (sightings, predation events, human interactions) for the southern Gulf Islands.
- Evaluate the past, present and future role of large carnivores in the southern Gulf Islands.
- Survey public attitudes and values related to the presence of large carnivores in the southern Gulf Islands.
- Develop a policy for the management of large carnivores within the GINPR.
- Promote public education programs related to the minimization of large carnivore-human interactions (e.g., Bear Aware).

Performance Indicators:

- Number of sightings.
- Number of predator-prey interactions (e.g., evidence of predation events).
- Number of human interactions.

Linked Key Conservation Issues:

- Key Conservation Issue 7: Size and Connectivity of Protected Areas
- Key Conservation Issue 10: Lack of Public Awareness

8.2 Implementation Plan for Key Conservation Issue Management Strategies

Table 8-1 presents an implementation plan template for the management strategies proposed for each of the twelve Key Conservation Issue management plans (Section 8.1). The intent of Table 8-1 is two-fold – first, it provides a summary list of all proposed management strategies¹⁵ and, second, it is a tool that can be used in subsequent planning tasks.

The template identifies linkages among issue-specific strategies, and linkages and overlaps among strategies from different Key Conservation Issues. This information may be used to prioritize strategy implementation, streamline planning, avoid duplication of effort, realize cost (and time) savings, and flag synergistic opportunities. For example, strategies that address more than one issue may be given higher priority than single-issue strategies, or a strategy that is linked to multiple other strategies within an issue may be a candidate for immediate implementation. The linkages identified in Table 8-1 are not definitive – the identification of linkages is assumed to be dynamic and will change as programs evolve, priorities change, and opportunities arise.

The implementation plan is proposed as two phases in this template. However, these phases are not, as yet, strictly defined – in this example they are broadly defined as ‘short’ and ‘long’ term implementation horizons (Phase I and II, respectively).

There are a total of 115 management strategies of which 69 are assigned to Phase I and 46 to Phase II.

¹⁵ Note that the management strategies are presented in a condensed form in Table 8-1 – more detailed descriptions are included in Section 8.1 under the individual Key Conservation Issue management plans.

Table 8-1 Management Plan Implementation Strategy

Management Strategy ID	Management Strategy	Key Conservation Issues addressed	Phase I	Phase II	Supporting or linked Management Strategy ID
1-1	Implement inventory and monitoring programs for provincially and federally listed species and ecosystems.	<ul style="list-style-type: none"> Key Conservation Issue 1: Loss of Rare, Endangered and Sensitive Ecosystems and Species 	√		1-3
1-2	Work within the park first and then turn to the broader region. That is, the first priorities are 'common' sensitive species, critical habitats and plant species with disjunct distributions.	<ul style="list-style-type: none"> Key Conservation Issue 1: Loss of Rare, Endangered and Sensitive Ecosystems and Species 	√		1-1
1-3	Develop management strategies for rare, endangered and sensitive species based on an understanding of their habitat requirements, to ensure their protection.	<ul style="list-style-type: none"> Key Conservation Issue 1: Loss of Rare, Endangered and Sensitive Ecosystems and Species 	√		1-8
1-4	Define and identify 'sensitive' species, ecosystems and habitat features in a park-specific context to enable their protection or restoration.	<ul style="list-style-type: none"> Key Conservation Issue 1: Loss of Rare, Endangered and Sensitive Ecosystems and Species 	√		
1-5	Co-operate with and support conservation and recovery strategies developed by other agencies.	<ul style="list-style-type: none"> Key Conservation Issue 1: Loss of Rare, Endangered and Sensitive Ecosystems and Species 	√		1-3
1-6	Identify areas for habitat restoration and undertake restoration initiatives (including reintroduction of ecosystem processes).	<ul style="list-style-type: none"> Key Conservation Issue 1: Loss of Rare, Endangered and Sensitive Ecosystems and Species 		√	1-1
1-7	Employ an experimental and incremental approach to the reintroduction of ecosystem processes.	<ul style="list-style-type: none"> Key Conservation Issue 1: Loss of Rare, Endangered and Sensitive Ecosystems and Species 		√	1-5
1-8	Assess the feasibility of reintroduction of extirpated species.	<ul style="list-style-type: none"> Key Conservation Issue 1: Loss of Rare, Endangered and Sensitive Ecosystems and Species 		√	1-4

Table 8-1 Management Plan Implementation Strategy cont'd

Management Strategy ID	Management Strategy	Key Conservation Issues addressed	Phase I	Phase II	Supporting or linked Management Strategy ID
1-9	Maintain a full suite of successional stages in all operational plans related to the protection or restoration of habitats.	<ul style="list-style-type: none"> Key Conservation Issue 1: Loss of Rare, Endangered and Sensitive Ecosystems and Species 		√	1-5
1-10	Initiate research on the role of fire as a part of the natural disturbance regime of ecosystems in the southern Gulf Islands.	<ul style="list-style-type: none"> Key Conservation Issue 1: Loss of Rare, Endangered and Sensitive Ecosystems and Species 	√		
1-11	Continue research on the effects of past and present climate change on the ecosystems of the southern Gulf Islands.	<ul style="list-style-type: none"> Key Conservation Issue 1: Loss of Rare, Endangered and Sensitive Ecosystems and Species 	√		
1-12	Assess the status of previously identified site-specific issues and implement actions where required (e.g., maintenance of Roe Lake natural water level to protect its riparian ecosystems).	<ul style="list-style-type: none"> Key Conservation Issue 1: Loss of Rare, Endangered and Sensitive Ecosystems and Species 	√		
1-13	Acquire additional park parcels for the GINPR, targeting underrepresented ecosystems, critical habitats, and connectivity options.	<ul style="list-style-type: none"> Key Conservation Issue 1: Loss of Rare, Endangered and Sensitive Ecosystems and Species Key Conservation Issue 7: Size and Connectivity of Protected Areas 		√	7-1
1-14	Develop a public education program that explains park specific concerns related to sensitive species and ecosystems.	<ul style="list-style-type: none"> Key Conservation Issue 1: Loss of Rare, Endangered and Sensitive Ecosystems and Species 	√		
1-15	Provide demonstration sites that showcase ecosystem restoration.	<ul style="list-style-type: none"> Key Conservation Issue 1: Loss of Rare, Endangered and Sensitive Ecosystems and Species Key Conservation Issue 2: Invasive Exotic Plant Species 		√	2-9
2-1	Conduct baseline inventories of invasive exotic plant species.	<ul style="list-style-type: none"> Key Conservation Issue 2: Invasive Exotic Plant Species 	√		

Table 8-1 Management Plan Implementation Strategy cont'd

Management Strategy ID	Management Strategy	Key Conservation Issues addressed	Phase I	Phase II	Supporting or linked Management Strategy ID
2-2	Prioritize species and areas to target for eradication and control (over the short and long term).	<ul style="list-style-type: none"> Key Conservation Issue 2: Invasive Exotic Plant Species 	√		2-3
2-3	Develop and implement site-specific and species-specific strategies for control and eradication.	<ul style="list-style-type: none"> Key Conservation Issue 2: Invasive Exotic Plant Species 	√		2-2
2-4	Prioritize areas to target for habitat restoration.	<ul style="list-style-type: none"> Key Conservation Issue 2: Invasive Exotic Plant Species 	√		
2-5	Identify appropriate sources of plants and seeds for restoration efforts.	<ul style="list-style-type: none"> Key Conservation Issue 2: Invasive Exotic Plant Species 	√		2-6
2-6	Incorporate up-to-date restoration science into all restoration efforts.	<ul style="list-style-type: none"> Key Conservation Issue 2: Invasive Exotic Plant Species 		√	2-7
2-7	Consider an experimental (or pilot) approach at selected sites.	<ul style="list-style-type: none"> Key Conservation Issue 2: Invasive Exotic Plant Species 		√	2-6
2-8	Develop a public education program on the impacts of introduced plants, and promote involvement and provide training in plant removal efforts.	<ul style="list-style-type: none"> Key Conservation Issue 2: Invasive Exotic Plant Species Key Conservation Issue 8: Impacts of Introduced and Hyper-abundant Wildlife Key Conservation Issues 10: Lack of Public Awareness 	√		2-9, 8-10, 10-8
2-9	Provide demonstration sites that showcase the removal of exotic species and restoration of habitat.	<ul style="list-style-type: none"> Key Conservation Issue 2: Invasive Exotic Plant Species Key Conservation Issue 1: Loss of Rare, Endangered and Sensitive Ecosystems and Species 		√	2-8, 1-15
2-10	Control park uses that contribute to the spread of exotic plants.	<ul style="list-style-type: none"> Key Conservation Issue 2: Invasive Exotic Plant Species 	√		2-8

Table 8-1 Management Plan Implementation Strategy cont'd

Management Strategy ID	Management Strategy	Key Conservation Issues addressed	Phase I	Phase II	Supporting or linked Management Strategy ID
2-11	Support and cooperate with existing programs to educate the public.	<ul style="list-style-type: none"> Key Conservation Issue 2: Invasive Exotic Plant Species 	√		2-8
2-12	Develop and maintain partnerships with adjacent landowners to facilitate the control and eradication of exotic and invasive plant species.	<ul style="list-style-type: none"> Key Conservation Issue 2: Invasive Exotic Plant Species 		√	2-8
2-13	Implement a surveillance and monitoring program to report and record regularly on the status of invasive exotic plants.	<ul style="list-style-type: none"> Key Conservation Issue 2: Invasive Exotic Plant Species 	√		2-8, 2-12
3-1	Assess human impacts on the park's natural resources and determine where park facilities need to be provided, if existing park facilities need to be altered, and if some recreational activities need to be restricted.	<ul style="list-style-type: none"> Key Conservation Issue 3: Over-use and Inappropriate Activities by Park Users 	√		
3-2	Develop a zoning system related to park use/non-use on land and water.	<ul style="list-style-type: none"> Key Conservation Issue 3: Over-use and Inappropriate Activities by Park Users Key Conservation Issue 5: Integrity of Small Islets Key Conservation Issue 6: Recreational and Commercial Vessel Use 		√	5-4, 6-1
3-3	Control public access and use on land and water through active enforcement and public awareness.	<ul style="list-style-type: none"> Key Conservation Issue 3: Over-use and Inappropriate Activities by Park Users 	√		
3-4	Consider 'natural' patterns of movement by users on foot and by water in any access planning.	<ul style="list-style-type: none"> Key Conservation Issue 3: Over-use and Inappropriate Activities by Park Users 	√		
3-5	Identify and monitor sensitive areas requiring protection from human use.	<ul style="list-style-type: none"> Key Conservation Issue 3: Over-use and Inappropriate Activities by Park Users 	√		
3-6	Provide access to direct users away from sensitive areas.	<ul style="list-style-type: none"> Key Conservation Issue 3: Over-use and Inappropriate Activities by Park Users 	√		

Table 8-1 Management Plan Implementation Strategy cont'd

Management Strategy ID	Management Strategy	Key Conservation Issues addressed	Phase I	Phase II	Supporting or linked Management Strategy ID
3-7	Assess and predict the cumulative effects of various park uses and facilities.	<ul style="list-style-type: none"> Key Conservation Issue 3: Over-use and Inappropriate Activities by Park Users 		√	
3-8	Investigate the impacts of recreational vessel anchoring.	<ul style="list-style-type: none"> Key Conservation Issue 3: Over-use and Inappropriate Activities by Park Users Key Conservation Issue 6: Recreational and Commercial Vessel Use 	√		6-4
3-9	Regulate commercial wildlife-watching activities within the GINPR.	<ul style="list-style-type: none"> Key Conservation Issue 3: Over-use and Inappropriate Activities by Park Users Key Conservation Issue 6: Recreational and Commercial Vessel Use 	√		6-7
3-10	Incorporate seasonal considerations into permitting of activities.	<ul style="list-style-type: none"> Key Conservation Issue 3: Over-use and Inappropriate Activities by Park Users 		√	
3-11	Promote public awareness of the standards for appropriate use and etiquette within the park.	<ul style="list-style-type: none"> Key Conservation Issue 3: Over-use and Inappropriate Activities by Park Users 	√		
4-1	Provide a stronger year-round enforcement presence in the marine and terrestrial environments.	<ul style="list-style-type: none"> Key Conservation Issue 4: Exploitation of Marine and Terrestrial Resources Key Conservation Issue 5: Integrity of Small Islets 	√		5-6
4-2	Work with First Nations groups to develop management strategies for the conservation and protection of traditional use resources.	<ul style="list-style-type: none"> Key Conservation Issue 4: Exploitation of Marine and Terrestrial Resources 		√	
4-3	Initiate research on harvest motivation.	<ul style="list-style-type: none"> Key Conservation Issue 4: Exploitation of Marine and Terrestrial Resources 		√	4-4
4-4	Implement a public outreach and education program that is multicultural in scope.	<ul style="list-style-type: none"> Key Conservation Issue 4: Exploitation of Marine and Terrestrial Resources 		√	
4-5	Implement an 'observe and report' program for illegal harvest activities.	<ul style="list-style-type: none"> Key Conservation Issue 4: Exploitation of Marine and Terrestrial Resources Key Conservation Issue 5: Integrity of Small Islets Key Conservation Issue 8: Impacts of Introduced and Hyper-abundant Wildlife 		√	4-1, 5-8, 8-9

Table 8-1 Management Plan Implementation Strategy cont'd

Management Strategy ID	Management Strategy	Key Conservation Issues addressed	Phase I	Phase II	Supporting or linked Management Strategy ID
4-6	Support recreational dive-based monitoring of marine resources.	<ul style="list-style-type: none"> Key Conservation Issue 4: Exploitation of Marine and Terrestrial Resources 		√	
5-1	Continue islet vegetation inventory and research.	<ul style="list-style-type: none"> Key Conservation Issue 5: Integrity of Small Islets 	√		5-2
5-2	Initiate islet animal inventory and research.	<ul style="list-style-type: none"> Key Conservation Issue 5: Integrity of Small Islets 	√		5-1
5-3	Monitor seabird colonies.	<ul style="list-style-type: none"> Key Conservation Issue 5: Integrity of Small Islets 		√	5-2
5-4	Develop a use/no use zoning system for islets.	<ul style="list-style-type: none"> Key Conservation Issue 5: Integrity of Small Islets Key Conservation Issue 3: Over-use and Inappropriate Activities by Park Users Key Conservation Issue 6: Recreational and Commercial Vessel Use 		√	5-5, 5-7, 3-2, 6-1
5-5	Close islets to public use until zoning system in place.	<ul style="list-style-type: none"> Key Conservation Issue 5: Integrity of Small Islets 	√		5-6
5-6	Provide a stronger year-round enforcement presence around the small islets.	<ul style="list-style-type: none"> Key Conservation Issue 5: Integrity of Small Islets Key Conservation Issue 4: Exploitation of Marine and Terrestrial Resources 	√		5-5, 4-1
5-7	Promote public awareness of the sensitivities of islets.	<ul style="list-style-type: none"> Key Conservation Issue 5: Integrity of Small Islets 	√		5-5, 5-8
5-8	Implement an 'observe and report' program to address unauthorized access to seabird colonies and inappropriate activities on islets.	<ul style="list-style-type: none"> Key Conservation Issue 5: Integrity of Small Islets Key Conservation Issue 8: Impacts of Introduced and Hyper-abundant Wildlife Key Conservation Issue 4: Exploitation of Marine and Terrestrial Resources 		√	5-7, 5-5, 8-9, 4-5
5-9	Develop an islet restoration program.	<ul style="list-style-type: none"> Key Conservation Issue 5: Integrity of Small Islets Key Conservation Issue 7: Size and Connectivity of Protected Areas 		√	5-1, 7-6

Table 8-1 Management Plan Implementation Strategy cont'd

Management Strategy ID	Management Strategy	Key Conservation Issues addressed	Phase I	Phase II	Supporting or linked Management Strategy ID
5-10	Develop a program for the management of Canada geese and mute swans on islets.	<ul style="list-style-type: none"> • Key Conservation Issue 5: Integrity of Small Islets • Key Conservation Issue 8: Impacts of Introduced and Hyper-abundant Wildlife 	√		5-2, 8-6
6-1	Develop a zoning system for vessel access/non-access.	<ul style="list-style-type: none"> • Key Conservation Issue 6: Recreational and Commercial Vessel Use • Key Conservation Issue 3: Over-use and Inappropriate Activities by Park Users • Key Conservation Issue 5: Integrity of Small Islets 		√	3-2, 5-4
6-2	Develop a site-specific quota system to regulate use levels.	<ul style="list-style-type: none"> • Key Conservation Issue 6: Recreational and Commercial Vessel Use 		√	6-1
6-3	Consider speed limits and vessel restrictions in some areas within the park.	<ul style="list-style-type: none"> • Key Conservation Issue 6: Recreational and Commercial Vessel Use 		√	6-1
6-4	Investigate the impacts of vessel anchoring, and develop anchoring impact indices.	<ul style="list-style-type: none"> • Key Conservation Issue 6: Recreational and Commercial Vessel Use • Key Conservation Issue 3: Over-use and Inappropriate Activities by Park Users 	√		3-8
6-5	Investigate the impacts of vessel wakes on shoreline habitats.	<ul style="list-style-type: none"> • Key Conservation Issue 6: Recreational and Commercial Vessel Use 	√		
6-6	Provide a stronger enforcement presence with respect to appropriate anchoring, moorage, holding tanks, and shore access and landing practices.	<ul style="list-style-type: none"> • Key Conservation Issue 6: Recreational and Commercial Vessel Use 		√	6-8, 6-7, 6-3
6-7	Regulate commercial wildlife-watching activities within the GINPR.	<ul style="list-style-type: none"> • Key Conservation Issue 6: Recreational and Commercial Vessel Use • Key Conservation Issue 3: Over-use and Inappropriate Activities by Park Users 		√	6-6, 3-9
6-8	Implement a mooring buoy program.	<ul style="list-style-type: none"> • Key Conservation Issue 6: Recreational and Commercial Vessel Use 	√		6-6

Table 8-1 Management Plan Implementation Strategy cont'd

Management Strategy ID	Management Strategy	Key Conservation Issues addressed	Phase I	Phase II	Supporting or linked Management Strategy ID
6-9	Support and practice 'green' boating initiatives.	<ul style="list-style-type: none"> • Key Conservation Issue 6: Recreational and Commercial Vessel Use • Key Conservation Issue 9: Marine Pollution 	√		9-5
6-10	Investigate the impacts of commercial vessel use in the GINPR.	<ul style="list-style-type: none"> • Key Conservation Issue 6: Recreational and Commercial Vessel Use 		√	
7-1	Acquire additional park parcels for the GINPR, targeting underrepresented ecosystems and potential corridors.	<ul style="list-style-type: none"> • Key Conservation Issue 7: Size and Connectivity of Protected Areas • Key Conservation Issue 1: Loss of Rare, Endangered and Sensitive Ecosystems and Species 		√	7-3, 1-13
7-2	Promote and develop cooperation with Islands Trust, landowners and local conservancies to maximize the effective ecological size of the park.	<ul style="list-style-type: none"> • Key Conservation Issue 7: Size and Connectivity of Protected Areas 	√		
7-3	Map existing park parcels and other 'protected areas' to identify potential or existing corridors, and flag connectivity gaps.	<ul style="list-style-type: none"> • Key Conservation Issue 7: Size and Connectivity of Protected Areas 	√		
7-4	Link to National Marine Conservation Area (NMCA) zoning for marine connectivity.	<ul style="list-style-type: none"> • Key Conservation Issue 7: Size and Connectivity of Protected Areas 		√	
7-5	Recognize and support international linkages (e.g., Orca Pass International Stewardship Area).	<ul style="list-style-type: none"> • Key Conservation Issue 7: Size and Connectivity of Protected Areas 	√		
7-6	Identify areas where a lack of connectivity is desirable.	<ul style="list-style-type: none"> • Key Conservation Issue 7: Size and Connectivity of Protected Areas • Key Conservation Issue 5: Integrity of Small Islets 	√		7-3, 5-1
7-7	Evaluate the feasibility of species-specific connectivity objectives (e.g., large carnivores).	<ul style="list-style-type: none"> • Key Conservation Issue 7: Size and Connectivity of Protected Areas • Key Conservation Issue 12: Large Carnivores 		√	7-3, 12-3
8-1	Inventory the distribution and populations of introduced wildlife.	<ul style="list-style-type: none"> • Key Conservation Issue 8: Impacts of Introduced and Hyper-abundant Wildlife 	√		

Table 8-1 Management Plan Implementation Strategy cont'd

Management Strategy ID	Management Strategy	Key Conservation Issues addressed	Phase I	Phase II	Supporting or linked Management Strategy ID
8-2	Support research that examines the ecological impacts of introduced and hyper-abundant species.	<ul style="list-style-type: none"> Key Conservation Issue 8: Impacts of Introduced and Hyper-abundant Wildlife 	√		8-3
8-3	Clarify the role of grazing by feral goats in the apparent control of invasive exotic species and maintenance of rare and endangered plant species on Saturna Island.	<ul style="list-style-type: none"> Key Conservation Issue 8: Impacts of Introduced and Hyper-abundant Wildlife 	√		8-2
8-4	Assess the costs and benefits of different management scenarios for the feral goats on Saturna Island.	<ul style="list-style-type: none"> Key Conservation Issue 8: Impacts of Introduced and Hyper-abundant Wildlife 		√	8-2, 8-3
8-5	Initiate research on the impacts of introduced insects within the park.	<ul style="list-style-type: none"> Key Conservation Issue 8: Impacts of Introduced and Hyper-abundant Wildlife 	√		
8-6	Develop and implement species-specific management approaches for introduced or hyper-abundant wildlife.	<ul style="list-style-type: none"> Key Conservation Issue 8: Impacts of Introduced and Hyper-abundant Wildlife Key Conservation Issue 5: Integrity of Small Islets 		√	8-4, 5-10
8-7	Identify sites for restoration of heavily grazed native vegetation.	<ul style="list-style-type: none"> Key Conservation Issue 8: Impacts of Introduced and Hyper-abundant wildlife 	√		
8-8	Work with Parks Canada veterinarian to identify potential for transfer of diseases among domestic and wild animals.	<ul style="list-style-type: none"> Key Conservation Issue 8: Impacts of Introduced and Hyper-abundant Wildlife 		√	
8-9	Establish an ‘observe and report’ program in cooperation with local communities for the reporting of livestock escapees and damage within the park boundaries.	<ul style="list-style-type: none"> Key Conservation Issue 8: Impacts of Introduced and Hyper-abundant Wildlife Key Conservation Issue 4: Exploitation of Marine and Terrestrial Resources Key Conservation Issue 5: Integrity of Small Islets 		√	8-10, 5-8, 4-5

Table 8-1 Management Plan Implementation Strategy cont'd

Management Strategy ID	Management Strategy	Key Conservation Issues addressed	Phase I	Phase II	Supporting or linked Management Strategy ID
8-10	Design and implement public education programs regarding the effects of livestock and feral animals on natural ecosystems.	<ul style="list-style-type: none"> Key Conservation Issue 8: Impacts of Introduced and Hyper-abundant wildlife Key Conservation Issue 2: Invasive Exotic Plant Species Key Conservation Issue 10: Lack of Public Awareness 	√		8-9, 2-8, 10-8
8-11	Develop, support and maintain partnerships with landowners, local communities, and other agencies to facilitate the management of introduced or hyper-abundant species.	<ul style="list-style-type: none"> Key Conservation Issue 8: Impacts of Introduced and Hyper-abundant Wildlife 	√		
8-12	Fence areas where grazing of greatest immediate concern.	<ul style="list-style-type: none"> Key Conservation Issue 8: Impacts of Introduced and Hyper-abundant Wildlife Key Conservation Issue 11: Adjacent Land Uses 	√		11-7
9-1	Designate submerged land areas of the GINPR as a 'no dump zone' through existing federal regulations.	<ul style="list-style-type: none"> Key Conservation Issue 9: Marine Pollution 	√		
9-2	Prepare marine contaminant response plans.	<ul style="list-style-type: none"> Key Conservation Issue 9: Marine Pollution 		√	
9-3	Develop partnerships with local community groups to implement water quality monitoring programs.	<ul style="list-style-type: none"> Key Conservation Issue 9: Marine Pollution 		√	
9-4	Work with Islands Trust on issues related to upland sources of marine pollution.	<ul style="list-style-type: none"> Key Conservation Issue 9: Marine Pollution 		√	
9-5	Ensure that park facilities and practices are 'green'.	<ul style="list-style-type: none"> Key Conservation Issue 9: Marine Pollution Key Conservation Issue 6: Recreational and Commercial Vessel Use 	√		6-9

Table 8-1 Management Plan Implementation Strategy cont'd

Management Strategy ID	Management Strategy	Key Conservation Issues addressed	Phase I	Phase II	Supporting or linked Management Strategy ID
10-1	Identify park-specific interpretative themes and 'messages' to promote in park signage and orientation materials.	<ul style="list-style-type: none"> Key Conservation Issue 10: Lack of Public Awareness 	√		10-6
10-2	Provide orientation signage at the entry points to islands that have park parcels.	<ul style="list-style-type: none"> Key Conservation Issue 10: Lack of Public Awareness 	√		10-1, 10-6
10-3	Provide park orientation information on the ferries.	<ul style="list-style-type: none"> Key Conservation Issue 10: Lack of Public Awareness 	√		10-1, 10-6
10-4	Provide up-to-date park orientation information on a web site.	<ul style="list-style-type: none"> Key Conservation Issue 10: Lack of Public Awareness 	√		10-1, 10-6
10-5	Provide 'friendly' signage that clearly delineates GINPR boundaries and areas with restricted access.	<ul style="list-style-type: none"> Key Conservation Issue 10: Lack of Public Awareness 	√		
10-6	Ensure that interpretive programs and other forms of park information heighten visitor awareness of the park's natural values, flag the sensitive nature of certain habitats, and promote appropriate recreational activities and etiquette.	<ul style="list-style-type: none"> Key Conservation Issue 10: Lack of Public Awareness 	√		10-1
10-7	Provide local communities with information to enable them to participate in park management initiatives.	<ul style="list-style-type: none"> Key Conservation Issue 10: Lack of Public Awareness 	√		10-1, 10-6
10-8	Provide park visitors and local communities with information on the negative impacts of introduced plants and animals.	<ul style="list-style-type: none"> Key Conservation Issue 10: Lack of Public Awareness Key Conservation Issue 2: Invasive Exotic Plant Species Key Conservation Issue 8: Impacts of Introduced and Hyper-abundant Wildlife 	√		2-8, 8-10

Table 8-1 Management Plan Implementation Strategy cont'd

Management Strategy ID	Management Strategy	Key Conservation Issues addressed	Phase I	Phase II	Supporting or linked Management Strategy ID
10-9	Facilitate the development of a code of ethics document for tour operators.	<ul style="list-style-type: none"> Key Conservation Issue 10: Lack of Public Awareness 		√	
10-10	Initiate an assessment of park visitor values and priorities.	<ul style="list-style-type: none"> Key Conservation Issue 10: Lack of Public Awareness 	√		12-4
11-1	Identify and maintain the integrity of the interface between private land and park parcels.	<ul style="list-style-type: none"> Key Conservation Issue 11: Adjacent Land Uses 		√	11-2
11-2	Co-operate with Islands Trust to include consideration of this interface in the land use planning process and conservation covenants.	<ul style="list-style-type: none"> Key Conservation Issue 11: Adjacent Land Uses 		√	11-1
11-3	Work with adjacent property owners to protect and restore ecosystem processes within the park, and to avoid negative impacts to natural values.	<ul style="list-style-type: none"> Key Conservation Issue 11: Adjacent Land Uses 		√	11-1, 11-2
11-4	Develop and communicate a strategy on fire hazard and the suburban-park interface.	<ul style="list-style-type: none"> Key Conservation Issue 11: Adjacent Land Uses 	√		11-9
11-5	Consider adjacent land uses in any park zoning initiatives.	<ul style="list-style-type: none"> Key Conservation Issue 11: Adjacent Land Uses 	√		
11-6	Assess and predict the cumulative effects of adjacent land uses on park parcels.	<ul style="list-style-type: none"> Key Conservation Issue 11: Adjacent Land Uses 		√	11-1
11-7	Cooperate with landowners to exclude livestock from park parcels as required.	<ul style="list-style-type: none"> Key Conservation Issue 11: Adjacent Land Uses Key Conservation Issue 8: Impacts of Introduced and Hyper-abundant Wildlife 	√		11-1, 8-12
11-8	Identify local sources of pollution within and outside park parcels.	<ul style="list-style-type: none"> Key Conservation Issue 11: Adjacent Land Uses 		√	
11-9	Identify high fire risk sites within and outside the park parcels.	<ul style="list-style-type: none"> Key Conservation Issue 11: Adjacent Land Uses 	√		11-4

Table 8-1 Management Plan Implementation Strategy cont'd

Management Strategy ID	Management Strategy	Key Conservation Issues addressed	Phase I	Phase II	Supporting or linked Management Strategy ID
11-10	Support credible local stewardship initiatives.	<ul style="list-style-type: none"> Key Conservation Issue 11: Adjacent Land Uses 	√		
12-1	Initiate research on the role of large carnivores in the southern Gulf Islands.	<ul style="list-style-type: none"> Key Conservation Issue 12: Large Carnivores 		√	12-3
12-2	Collaborate with the regional Conservation Officer(s) in the compilation and update of a database of large carnivore records for the southern Gulf Islands.	<ul style="list-style-type: none"> Key Conservation Issue 12: Large Carnivores 	√		
12-3	Evaluate the past, present and future role of large carnivores in the southern Gulf Islands.	<ul style="list-style-type: none"> Key Conservation Issue 12: Large Carnivores Key Conservation Issue 7: Size and Connectivity of Protected Areas 	√		12-1, 7-3
12-4	Survey public attitudes and values related to the presence of large carnivores in the southern Gulf Islands.	<ul style="list-style-type: none"> Key Conservation Issue 12: Large Carnivores 	√		10-10
12-5	Develop a policy for the management of large carnivores within the GINPR.	<ul style="list-style-type: none"> Key Conservation Issue 12: Large Carnivores 		√	12-1, 12-2, 12-3, 12-4
12-6	Promote public education programs related to the minimization of large carnivore-human interactions.	<ul style="list-style-type: none"> Key Conservation Issue 12: Large Carnivores 	√		

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9.1 Questionnaire Respondents

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- D. Biffard, Aquatic Ecologist, BC Parks
- T. Chatwin, Rare and Endangered Species Biologist, BC Ministry of Water, Land and Air Protection
- S. Ford, Botanist, BC Conservation Data Centre
- M. Fuchs, Garry Oak Ecosystems Recovery Team
- E. Gonzales, Graduate Student, Centre for Applied Conservation Research, UBC
- B. Henwood, NMCA Planner, Parks Canada
- P. Janszen, Mycologist, Saturna Island
- A. Kikuchi, Pender Island Conservancy Association
- J. Kirkby, Landscape Ecologist, CWS
- T. Lea, Vegetation Ecologist, BC Ministry of Water, Land and Air Protection

M. Meagher, Garry Oak Meadows Preservation Society

P. & M. Middleton, Residents, Little D'Arcy Island

D. Repard, GIS Coordinator and Terrestrial Programs Assistant, Canadian Parks and Wilderness Committee

T. Rutherford, Partnerships Biologist, DFO

Appendix A Questionnaire: Conservation Issues in the Gulf Islands

Introduction

The Gulf Islands National Park Reserve was established in 2003. The key objectives of this National Park Reserve are to ensure the long-term integrity of the ecological and cultural values within the park; protect a representative example of the Strait of Georgia Lowlands; protect small island ecosystems, as well as representative examples of headlands, shorelines and uplands of larger islands; protect and commemorate the rich cultural heritage of both the First Nations and the area's pioneering immigrants; provide opportunities for the public and school groups to learn about the biodiversity and cultural values within the park in a low-impact manner; complement the unique way of life of the Gulf Islands communities; and maximize protection of the ecological and cultural values through a continuing land assembly program.

Parks Canada intends to develop Interim Management Guidelines for this National Park Reserve to direct management and operational decisions prior to the approval of a long-term Park Management Plan. In order to ensure that ecological integrity is given appropriate consideration in this initial planning process, and in subsequent management decisions, a comprehensive compilation and review of existing conservation information is required to identify issues and flag knowledge gaps. These questions are an important component of this process.

1. What do you consider to be the main conservation issues in the southern Gulf Islands as a whole? Why?
 - a. Of these conservation issues, which would you consider to be the highest priority and why.
2. What do you consider to be the main conservation issues in the National Park Reserve? Why?
 - a. Of these conservation issues, which would you consider to be the highest priority and why.
3. Could you describe and discuss any site-specific conservation issues in the National Park Reserve?
4. Do you have suggestions for addressing any of the conservation issues you identified (e.g., monitoring strategies, mitigation measures)?
5. What do you consider to be the main knowledge gaps in the National Park Reserve?
6. Can you recommend/provide any information sources (e.g., reports, inventory data, maps) on the ecology and/or conservation of the southern Gulf Islands?
7. Can you recommend any additional people/organizations that we should contact with respect to these issues?

Appendix B Workshop Participants

- D. Biffard, Aquatic Ecologist, BC Parks
- F. Burnett, Administration Officer, Parks Canada
- R. Butler, Research Scientist, Canadian Wildlife Service
- A. Charlie, Cowichan Tribes
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- C. Stewart, Park Planner, Parks Canada

Appendix C Islands Trust Ecosystem Mapping Units Legend

Class	Definition	Subclass	Definition
Natural Ecosystems			
OF	Old Forest: forested stands >250 yrs	co	Conifer: broadleaf component <15%
		mx	Mixed: broadleaf component >15%
MF	Mature Forest: forested stands 80 - 250 yrs	co	Conifer: broadleaf component <15%
		mx	Mixed: broadleaf component >15%
WD	Woodland: open stands that may include Garry oak, arbutus, big-leaf maple and Douglas-fir.	mx	Mixed: conifer component >15%
		bd	Broadleaf: dominated by broadleaf species
HB	Herbaceous: non-forested (<10% tree cover).	mx	Mixed herbaceous: grasses, forbs, mosses and lichens
		cs	Coastal herbaceous: rocky marine shoreline with grasses, forbs, mosses and lichens
		vs	Vegetated shoreline: low-lying rocky shorelines with <20% vegetation
		sp	Spit: sand and gravel deposits, low to moderate cover of grasses and herbs
		du	Dunes: sand dunes, low cover of grasses and herbs
		sh	Shrub: shrub cover >20%
RI	Riparian: zone of variable width adjacent to lakes, streams, gullies, canyons and rivers	fl	Low bench: flooded at least once every two years for part of growing season
		fm	Medium bench: flooded every 1-6 years for short periods (10-25 days)
		fh	High bench: periodically and briefly inundated by high waters
		ff	Fringe: narrow, linear areas along open water bodies (e.g., lakes)
		gu	Gully: steep V-shaped watercourse

Islands Trust Ecosystem Mapping Units Legend (cont'd)

Class	Definition	Subclass	Definition
Natural Ecosystems			
WN	Wetland: characterized by daily, seasonal or year-round water at or above the surface.	bg	Bog: nutrient-poor peatlands, shrubby or treed
		fn	Fen: peatlands where groundwater inflow maintains high mineral content in rooting zone
		ms	Marsh: shallowly flooded, dominated by emergent grass-like vegetation
		sp	Swamp: forested, dominated by broadleaf shrubs and trees, flowing, semi-permanent water near surface
		sw	Shallow water: dominated by rooted, submerged and floating aquatic plants
		wm	Wet meadow: seasonally inundated, dominated by grasses, sedges, or rushes, tree cover <10%
CL	Cliffs: steep, vertical or overhanging rock faces where sparse vegetation may occur in crevices or on ledges.	cc	Coastal cliffs: cliffs with a marine interaction, generally near vertical bedrock
		ic	Inland cliffs: typically formed as a result of erosion, catastrophic failures or mass wasting
LC	Lacustrine: freshwater ecosystems where vegetated coverage of the total surface area is <5%.	la	Lake: naturally occurring static body of water, >2m deep in some portion
		pd	Pond: small body of water >2m deep but not large enough to be classified as a lake
LT	Littoral: marine influenced ecosystems where vegetated coverage of the total surface area is <5%.	mu	Mudflat: fine-textured sediments, exposed at low tide, includes estuaries
		be	Beach: sorted sediments, reworked by wave action in recent times

Islands Trust Ecosystem Mapping Units Legend (cont'd)

Class	Definition	Subclass	Definition
Modified Ecosystems			
YF	Young Forest: forested stands 0 - 80 yrs	co	Conifer: <15% broadleaf
		mx	Mixed: broadleaf component >15%
		ps	Pole sapling: dense post-logging regeneration 15-30 years old (up to 40 years old under poor growing conditions)
		cc	Clearcut: clearcuts (<15 yrs old) and other heavily logged areas, other land clearing (includes significant human-caused erosion)
		fc	Commercially thinned forest
RW	Rural: areas where development is interspersed with forest range, farmland and native vegetation or cultivated crops.	rr	Rural residence: residences or other structures interspersed with native vegetation, farmland or cropland.
		gc	Golf course
		pk	Park: groomed areas including parks, playgrounds, aesthetic areas, and cemeteries
AG	Agricultural: areas where the dominant use is agriculture.	cf	Cultivated field
		co	Cultivated orchard
		cv	Cultivated vineyard
DP	Developed: areas where human features or disturbances are dominant.	ca	Canal: watercourse created for transport, drainage, and/or irrigation purposes
		sz	Developed/occupied foreshore: dock, marina or shellfish lease
		rz	Road surface
		gp	Gravel pit
		ur	Urban/suburban: almost continuous cover of residences and other developments
		uc	Utility corridor
		es	Exposed soil: area of exposed soil; not included in any of the other definitions
lq	Unrestored landfills, quarries, and major ditching disturbances		