Islands Trust Fund

The Vision of the Islands Trust Fund is:
To create a legacy of special places, protecting both natural and cultural features in perpetuity, in order to help sustain the unique character and environment of the Islands Trust Area.

The Mission of the Islands Trust Fund is:
To protect special places by encouraging, undertaking and assisting in voluntary conservation initiatives within the Islands Trust Area.

REGIONAL CONSERVATION PLAN 2005 - 2010

Pebble Beach, Galiano Island

TABLE OF CONTENTS

Table of Contents **2**
List of Figures **3**
List of Tables **3**
Executive Summary **4**
1.0 Introduction **6**
1.0 Introduction **6**
2.0 Islands Trust Ecosystem Mapping **7**
2.1 Study Area 8
2.2 Ecosystem Descriptions 9
2.3 Air Photo Interpretation (2000 and 2002) 11
2.4 Limitations 14
2.5 Mapping Revisions and Updates 15
3.0 Analysis of the Islands Trust Ecosystem Maps **16**
3.1 Methodology 16
3.2 Detailed Results 17
3.3 Summary of the Results 21
3.4 Related Considerations 22
4.0 Goals and Objectives for Regional Conservation **23**
5.0 Tools for Implementing the Regional Conservation Plan **25**
5.1 Partnerships 25
5.2 Voluntary Conservation 26
5.3 Land Use Planning Tools 27
5.4 Stewardship Education 28
6. Future Directions **29**
6.1 Adaptive Management 30
6.2 Challenges to Achieving the Goals and Objectives 31
Literature Cited **34**

Appendix I: History of Conservation Planning at the Islands Trust 35

Appendix II: Percentage of Field-checked Polygons in the SEI by Island 36

Appendix III: Ecosystem Defined 37

Appendix IV: Ecosystem Classifications 37

Natural Ecosystems 37

Modified Ecosystems 40

Appendix V: Reasons for the Loss of Natural Ecosystems 41

Appendix VI: Ecosystem Classes, Total and Protected, Across the Islands Trust Area 47

LIST OF FIGURES

Figure 1: Biogeoclimatic Zones Represented in the Islands Trust Area 9

Figures 2 and 3: Polygons for Salt Spring Island and Sample Ecosystem Map ... 13

Figure 4: Percentages of Natural and Modified Ecosystems by Local Trust Area/Island Municipality 17

Figure 5: Percentages of Natural Ecosystems and Protected Area by Local Trust Area/Island Municipality 19

Figure 6: Comparison of Annual Budget to Total Hectares Protected 32

LIST OF TABLES

Table 1: Air Photo Details 12

Table 2: Sample of the Table for Salt Spring Island Ecosystem Map 13

Table 3: Summary by Local Trust Area/Island Municipality of Natural Ecosystem Classes with Less Than 5% Protection 20

EXECUTIVE SUMMARY

This plan promotes a regional approach to the protection of land of ecological significance across the Islands Trust Area. Sound conservation planning is of particular importance for this region, because it is one of the most ecologically significant areas in Canada and because development pressure is modifying the fragile and vulnerable island ecosystems at an alarming rate and causing drastic habitat destruction.

The first step in developing the plan was to map and characterize the natural and modified ecosystems on all major islands in the area. The Islands Trust Ecosystem Mapping (ITEM) is based on aerial photographs taken in 2000 and 2002, and uses a classification system of nine natural and four modified ecosystem classes, each with a variety of subclasses. Maps for each local trust area/island municipality delineate polygons for each area of uniform ecosystem, and associated tables provide further information about the polygons.

Once complete, the ITEM data were examined to evaluate the level of protection of the various ecosystem classes and recommend regional priorities for future conservation work. For this purpose, land considered “protected” is land owned or covenanted by the Trust Fund Board or another authorized agency, or held by local, provincial or federal government as a park or ecological reserve.

Analysis of the ITEM identified areas with large percentages of remaining natural ecosystems, which by virtue of their size and consequent viability were considered important to protect. Also identified were areas with very small percentages or remnants of natural ecosystems, which by virtue of their representative nature were also considered important to protect. Additionally, the analysis compared the percentages of protected natural ecosystem classes across the Islands Trust Area. The local trust areas and island municipality with classes with the lowest percentages were considered appropriate targets for future conservation work in order to promote a regional, ecologically comprehensive approach.

Two related undertakings, namely, establishing networks of protected areas and protecting endangered ecosystems and habitats, were identified as further appropriate targets.

These results lead to the heart of the Regional Conservation Plan, namely, a set of seven long-term goals, each with an associated five-year objective, intended to guide the policy-setting, decision-making and work programs of the Trust Fund Board. The focus of these goals and objectives is as follows:

- protecting each natural ecosystem class within each local trust area/island municipality;

- protecting the remaining blocks of natural ecosystems;
- protecting nationally and provincially identified ecosystems and habitats of species considered endangered, threatened or of special concern, Garry oak ecosystem sites being of particular importance;
- protecting viable ecosystems in each local trust area/island municipality;
- expanding protected areas on the major islands;
- incorporating the concept of a protected area network in the official community plans of local trust areas/island municipalities; and
- improving the ITEM by updating the maps and ground-truthing the resulting polygons.

A variety of conservation tools are recommended for achieving the goals and objectives of this plan, all of which have already been used to a large extent by the Islands Trust Fund. Partnerships with landowners, other land trusts and various levels of government will be pivotal to implementing the plan. Conservation covenants and land acquisitions, which are the traditional tools used to protect land, will also be used to promote the objectives. The plan puts new emphasis on encouraging communities to identify networks of protected areas in their official community plans and to use tools such as amenity zoning, density transfers and development permit areas to protect natural ecosystems. Last, stewardship education is seen as increasingly important for protecting the special values on privately-owned land.

To evaluate its progress towards achieving the objectives of this plan, the Island Trust Fund will use a process of adaptive management to assess recent accomplishments against recent threats and new opportunities and against updated information on the changing landscape of the Islands Trust Area. As might be expected, limits in staff resources, budget and property management capacity must be considered in this process when resetting the objectives or refining the goals. The evaluation in 2010 will review the five-year accomplishments with a view to developing a new set of objectives for 2010 – 2015.

1.0 INTRODUCTION

The Islands Trust Area is recognized as one of the most ecologically significant regions in Canada. It provides important habitat to many rare and endangered species yet much of this habitat has been lost or is under threat of being lost due to development pressures.

A recent audit by the Canadian Wildlife Service found that, of the sensitive ecosystems documented through the Sensitive Ecosystem Inventory (SEI) between 1993 and 1997, 11% have been disturbed in just over 10 years. The statistics are even more alarming for several islands within the Islands Trust Area:

- Denman Island lost an average of 49.3% of its sensitive ecosystems. In the older second growth category, more than 65% of the habitat was lost.
- Sidney Island lost an average of 20.1% of its sensitive ecosystems, with a 100% loss of the island's older forest.
- Galiano Island lost an average of 12.1% of its sensitive ecosystems.

These losses are likely to continue, as the area experiences one of the most dramatic urban growth increases occurring in all of North America. In 1998, population growth on the Canadian side of the Georgia Basin[1] was forecast to grow by 35% between 2002 and 2020.

Recognizing the threat and the growing urgency to protect this area, the Islands Trust has been working on conservation planning since 1975 (see Appendix I). Since the inaugural meeting of the Islands Trust Fund in 1990, the Trust Fund Board has been fine-tuning a priority list of conservation areas in the Islands Trust Area. This work highlighted the need for the Islands Trust Fund to adopt a regional approach to conservation planning.

Regional conservation planning is a science-based process used by land trusts, national, provincial and local governments and international organizations to identify conservation priorities in the context of large ecological systems and human use of the landscape. It is intended to provide a vision for conservation and a plan whereby the vision could be achieved.

The Trust Fund Board's vision is "to create a legacy of special places, protecting both natural and cultural features in perpetuity, in order to help sustain the unique character and environment of the Islands Trust Area." (TFB 2003-2007 Strategic Plan)

[1] The Trust Area is located within a larger ecoregion known as the Georgia Basin-Puget Sound. This ecoregion encompasses areas south of the border including the San Juan Islands in the United States.

The purpose of the Islands Trust Fund's Regional Conservation Plan is to guide the decisions of the Trust Fund Board in order to achieve one portion of this vision—the protection of natural features across the Islands Trust Area. It is the intention of the Board to develop a plan in the future that will focus on the protection of cultural features. This plan identifies significant ecosystems, sets goals and objectives for protecting these ecosystems, and recommends tools for achieving this end.

In addition to science-based priorities, the plan recognizes that the Islands Trust Fund operates in an environment where economic, social, and political factors are often more important determinants of land use than conservation values. Potential land acquisitions may therefore arise from bequests, available crown lands, development schemes or strong local interest, some of which may not support the goals and objectives of this plan. The simple opportunity to acquire land that would otherwise not be conserved is recognized as a compelling argument for consideration by the Trust Fund Board. The plan therefore recognizes that covenants and acquisitions may still occur in areas which are not priorities of the plan.

Although the Regional Conservation Plan received extensive public feedback in 2005 and continues to be publicly available, it functions as an internal, operational document. It is a tool to guide the Trust Fund Board in preparing policy, making decisions about conservation proposals, applying for Crown Grants, determining its annual work program and measuring its success in protecting natural places. It is not intended to guide the work of other conservation agencies or land trusts operating within the Islands Trust Area or to influence government policy.

While the plan defines long-term goals and sets measurable short-term objectives for the region, it does not prescribe specific tasks to achieve these targets. These tasks will be outlined in yearly work programs and must be considered within the context of the current annual budget and staffing level of the Islands Trust Fund.

2.0 ISLANDS TRUST ECOSYSTEM MAPPING

The first step in developing a regional conservation plan was to prepare an inventory of the entire landscape of the islands in the Islands Trust Area. In the fall of 1999, the Islands Trust Fund began mapping the entire Islands Trust Area and identifying the existing ecosystems as the basis for developing the plan. The Islands Trust Ecosystem Mapping (ITEM) is the outcome of this process.

2.1 Study Area

The islands in the Islands Trust Area vary greatly in size, ranging from 180 sq. km. with a resident population of 8,000 to uninhabited rocky islets providing important habitat for wildlife.

As shown in Figure 1, the Salt Spring, North Pender, South Pender, Mayne, Galiano, Saturna, Thetis, Denman, Hornby and Lasqueti Local Trust Areas fall within the Coastal Douglas-fir zone, whereas the Gambier Local Trust Area and the Bowen Island Municipality, fall within the Coastal Western Hemlock zone.

The ITEM includes all major islands in the region except the Thormanby islands and Anvil Island (in the Gambier Local Trust Area), which were excluded due to budget constraints.

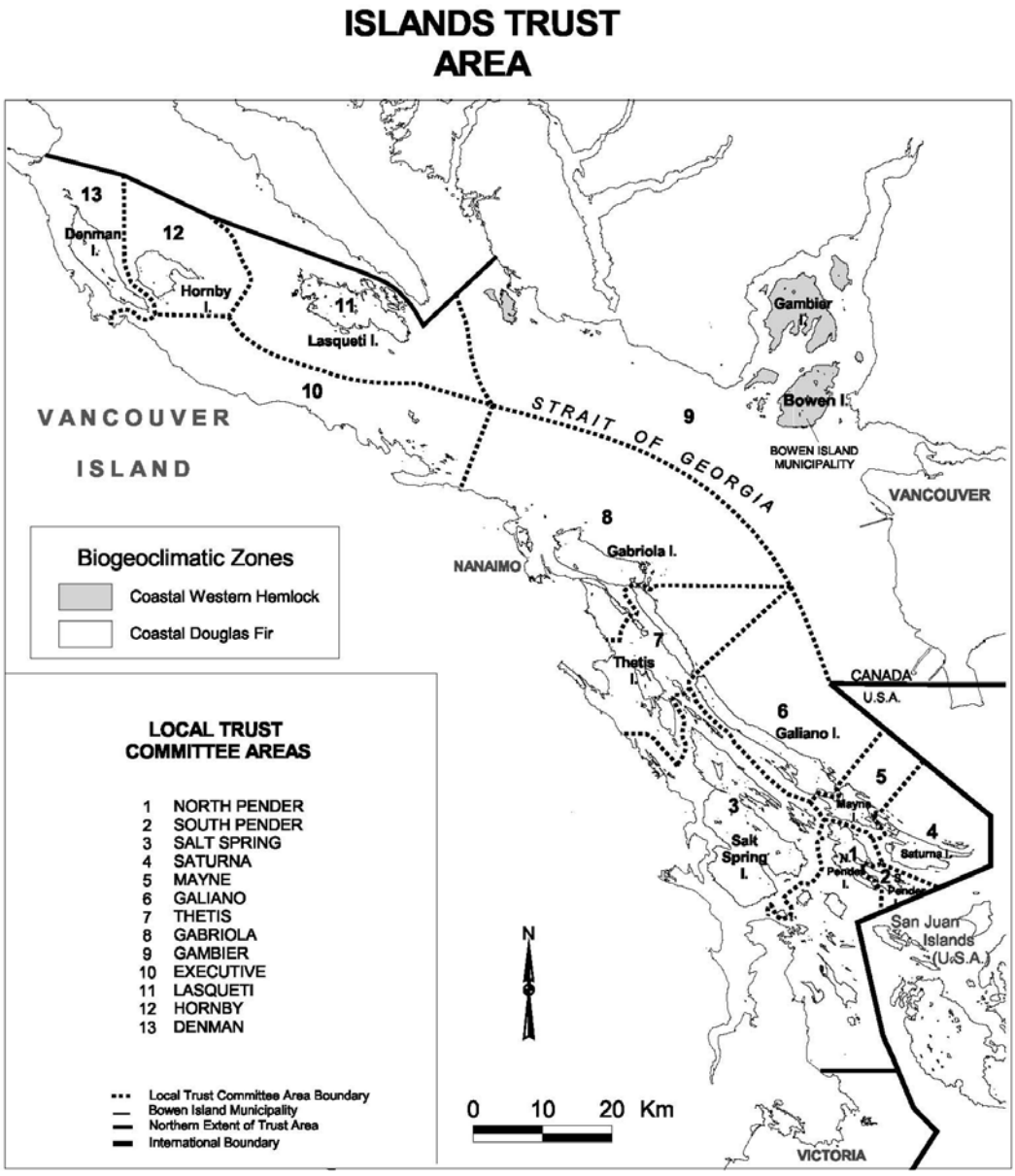


Figure 1: Biogeoclimatic Zones Represented in the Islands Trust Area

2.2 Ecosystem Descriptions

Until the Islands Trust Fund started mapping islands in the Islands Trust Area, the best consistent scientific information available was the Sensitive Ecosystem Inventory (SEI)[2].

[2] Further information regarding the methods and limitations of the SEI study can be found in the technical report entitled "Sensitive Ecosystems Inventory: East Vancouver Island and Gulf Islands 1993-1997. Volume 1: Methodology, Ecological Descriptions and Results" (Ward et al., 1998)".

Data collection for the SEI occurred between 1993 and 1997 and resulted in seven sensitive ecosystems being identified and mapped, as well as two other "important" ecosystems.

The seven sensitive ecosystem types are: riparian, wetland, woodland, older forest, coastal bluff, sparsely vegetated, and terrestrial herbaceous. Seasonally flooded agricultural fields and older second growth forests were also mapped due to their importance in providing habitat.

The Islands Trust Fund considered using this information for its Regional Conservation Plan, but it soon became clear that the SEI had the following limitations:

- Age of the air photos: The air photos used for the Islands Trust Area were black and white and primarily from the 1980's. The Islands Trust Fund needed a more up-to-date picture of the Islands Trust Area.
- Polygon size: The minimum mapping size for most ecosystem types was 5.0 ha. Some important ecosystems in the Islands Trust Area were missed due to this limitation.
- Accuracy: The accuracy of the polygons was limited by the scale of the air photos (1:10,000). In addition, the degree of field-checking varied island-by-island (see Appendix II).
- Coverage: The SEI only mapped ecosystem classes considered sensitive. The Islands Trust Fund needed the entire landscape mapped to provide a comprehensive approach to conservation planning.
- Classification: The ecosystem classifications included in the SEI are logical, well described and suitable to form the basis for the Islands Trust Ecosystem Classification Scheme. However, they excluded two sensitive ecosystems important to the Islands Trust Area, namely, shorelines, and lakes and ponds.

The challenge in mapping the Islands Trust Area was to create a classification system that was broad enough to describe all the ecological features of the islands at a landscape level. The system needed to incorporate all natural and humanly modified characteristics that were distinguishable by observing an air photo. Although many ecosystem[3] classification schemes use a number of components, such as climate, physiography and soils, the ITEM classification system used uniform vegetation communities and human-made disturbance of vegetation. This approach resulted in two broad ecosystem types, Natural and Modified, each with a variety of descriptive classes and subclasses.

The definitions for these classes and subclasses were created in consultation with the former BC Ministry of Environment and the BC Conservation Data Centre. The

[3] For more information on ecosystem attributes, see Appendix III.

definitions are loosely based on the SEI classifications, as well as the Provincial Terrain Ecosystem Mapping (TEM) standards.[4]

NATURAL ECOSYSTEMS	MODIFIED ECOSYSTEMS
Natural ecosystems are landscape units with little or no human development. In the Islands Trust Area these areas are usually rare and/or fragile ecosystems. The nine ITEM classes in this category are: • Old Forest • Mature Forest • Woodland • Herbaceous • Riparian • Wetland • Cliff • Lacustrine • Littoral. Each class is further subdivided into subclasses. Descriptions of the classes and subclasses are in Appendix IV.	Modified ecosystems are areas where human development or evident disturbance may be captured as a uniform spatial unit on the landscape. The four classes in this category are: • Young Forest • Rural • Agricultural • Developed Each class is further divided into subclasses. Descriptions of the classes and sub-classes are in Appendix IV.

2.3 Air Photo Interpretation (2000 and 2002)

In 2002 and 2003, the Islands Trust hired an ecosystem mapping specialist to use the ITEM ecosystem classification scheme and map the landscape of most of the islands in the Islands Trust Area[5]. The natural and modified ecosystems present were identified using air photo interpretation. The resulting maps include only those ecosystems that could be distinguished when the photo was taken. Details of the photography are in Table 1.

[4] Further information regarding TEM may be found in the Resource Inventory Committee standard entitled "Standard for Terrestrial Ecosystem Mapping in British Columbia" (Province of British Columbia, 1997). http://srmwww.gov.bc.ca/risc/pubs/teecolo/tem/indextem.htm

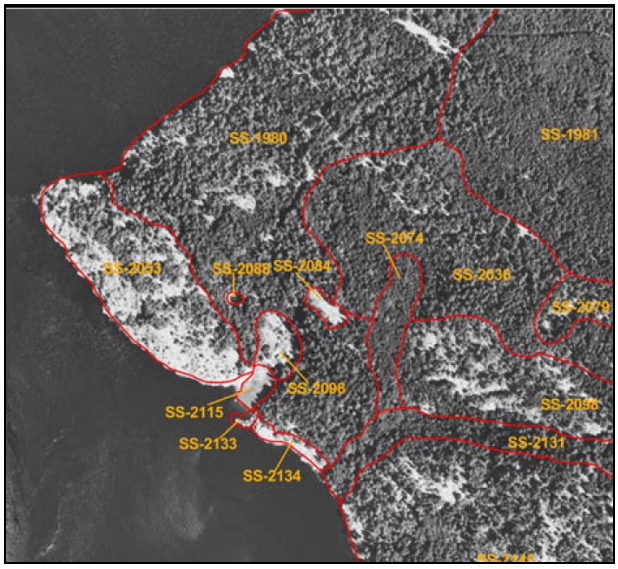
[5] Due to budget constraints, Anvil Island and the Thormanby Islands have not been mapped.

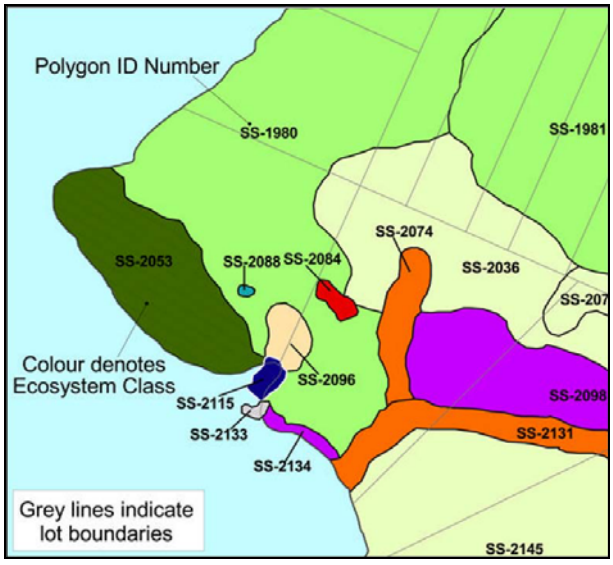
Local Trust Area/Island Municipality	Date of Photography	Scale	Resolution
Bowen	2002	1:25000	0.5
Denman	2002	1:25000	0.5
Gabriola	2002	1:42000	0.5
Galiano	2000	1:15000	1.0
Gambier	2002	1:25000	0.5
Hornby	2002	1:25000	0.5
Lasqueti	2002	1:25000	0.5
Mayne**	2000	1:25000	1.0
North Pender*	2000	1:25000	1.0
Salt Spring*	2000	1:25000	1.0
Saturna*	2000	1:25000	1.0
South Pender*	2000	1:25000	1.0
Thetis*	2000	1:25000	1.0

Table 1: Air Photo Details

The information captured in these air photos was used to delineate polygons of areas that had a uniform vegetation or ecosystem. An example of delineated polygons captured using the air photos can be seen in Figures 2 and 3.

(*) The line work for the ecosystem mapping of these islands was adjusted and refined based on 2002 digital orthographic photos captured at a scale of 1:25,000 with a resolution of 0.5 meters. All other ecosystem mapping was delineated with digital orthographic photos as a base map.





Figures 2 and 3: Polygons for Salt Spring Island and Sample Ecosystem Map

Figure 2 shows an example of the polygons for the southwest portion of Salt Spring Island. This information was then put into a Geographic Information System (GIS), with an additional layer, namely the cadastral (lot lines), to produce the final map, as illustrated in Figure 3.

In the digital form of the ITEM, the colour of each polygon represents its ecosystem class. Bright colours denote Natural Ecosystems and muted colours denote Modified Ecosystems. In addition, each polygon has an identifying number, which is repeated in an associated table that sets out the ecosystem class, the subclass and the total area of all of the polygons for that particular island (see Table 2).

Polygon-ID	Ecosystem State	Ecosystem Class	Ecosystem Subclass	Area (acres)
SS-1978	Modified	Young Forest	Mixed	289.3
SS-1979	Natural	Mature Forest	Conifer	118.9
SS-1980	Natural	Mature Forest	Conifer	83.3
SS-1981	Natural	Mature Forest	Mixed	142.6
SS-1982	Modified	Rural	Rural residence	19.5
SS-1983	Modified	Young Forest	Conifer	96.4
SS-1984	Modified	Young Forest	Mixed	11.1
SS-1985	Modified	Agricultural	Cultivated field	1.6
SS-1986	Modified	Young Forest	Mixed	15.0

Table 2: Sample of the Table for Salt Spring Island Ecosystem Map

In Table 2, one of the polygons, for example, has been assigned the number SS-1980. The green colour of this polygon on the map denotes that it is classified as Mature

Forest. The accompanying table shows the subclass and size of the polygon. In the example of Polygon SS-1980, the Ecosystem State is Natural, the Class is Mature Forest and the Subclass is Conifer. The size of the polygon is 83.3 acres.

The completed maps for each island and related information for ecosystem class and subclass may be viewed on the Islands Trust Fund website under “Conservation Planning” (www.islandstrustfund.bc.ca).

2.4 Limitations

The information describing the ecosystem classes across the Island Trust Area has the following limitations.

2.4.1. Year of the Air Photo

The Islands Trust Ecosystem Maps are a snapshot in time. The information that they provide reflects the condition of the land on the date that the air photos were taken.

2.4.2. Quality of the Air Photo

Three characteristics of the air photos affect the quality of the resulting maps, namely, the scale, resolution, and accuracy.

Scale: The air photos used for the ITEM were taken at various scales. The closer the plane is flying to the earth when the photo is taken, the smaller the scale. A smaller scale produces more detail and more information, because geographic features can be seen more clearly. As a result, the ecosystem mapper can zoom in on an area and obtain more data. There is always a limit, however, after which the detail is lost. This limit is determined by the resolution of the air photo.

Resolution: The resolution reflects the quality of digital images. All the photos used in the ITEM were converted into orthographic rectified digital air photos before the ecosystem boundaries were drawn. An orthographic rectified air photo is a digital image of the air photo without the distortions caused by camera angle and ground contour. The level of detail in a digital air photo seen at very close range depends on the resolution. The higher the resolution is, the better the quality will be.

Accuracy: The accuracy of a digital air photo is affected by a combination of the scale, the orthographic rectification process and the resolution of the final digital image. To a certain extent, an air photo captured at a large scale (e.g., 1:42,000) with a small resolution (e.g. 0.5 meters) can be as helpful for regional level planning as an air photo captured at a smaller scale.

The accuracy of ecosystem mapping from digital air photos is improved when the ecosystem mapper references a stereo pair of hard copy air photos for further detail. This traditional method of air photo interpretation was used to clarify parts of the landscape during the ITEM initiative.

2.4.3. Percentage of the Area Ground-truthed

It is important to remember that the ITEM information is developed from a bird's eye view of the landscape and the ecosystem mapper is therefore limited to images that can be seen from above. For example, a wetland under the tree canopy may not be picked up if it cannot be seen on the air photo. To address this problem, ground-truthing is used to confirm the accuracy of information generated from aerial photo interpretation.

The process of checking accuracy by walking on and examining the mapped properties is time-consuming and costly. As a result, few areas have been ground-truthed to date and a degree of error must be expected in some of these classifications.

2.5 Mapping Revisions and Updates

The Islands Trust Fund intends, in conjunction with the Trust Area Services of the Islands Trust, to update the ITEM continually. Workshops will be held in each local trust area/island municipality to obtain feedback from the public and local community groups regarding the accuracy of the updated maps.

The current timeline for obtaining the necessary air photos and holding these workshops is as follows:

- For the Southern Gulf Islands, (Salt Spring, Galiano, Mayne, Saturna, North Pender and South Pender Local Trust Areas), air photos will be taken in 2005, and workshops/ consultation will be held in 2006.
- For the Northern Gulf Islands (Denman, Hornby, Lasqueti, Gabriola and Thetis Local Trust Areas), air photos will be taken in 2006, and workshops/consultation will be held in 2007.
- For the Eastern/Howe Sound Islands (Gambier Local Trust Area and the Bowen Island Municipality), air photos will be taken in 2007, and workshops/consultation will be held in 2008. At that time, the ITF will include ecosystem mapping for Anvil Island and the Thormanby Islands, which currently are not mapped.

3.0 ANALYSIS OF THE ISLANDS TRUST ECOSYSTEM MAPS

The Islands Trust Fund used the information captured in the Islands Trust Ecosystem Maps in the following two ways:

- to assess the existing level of protection of all ecosystems found across the Islands Trust Area; and
- to identify regional priorities for future conservation work.

The results of the analysis were tabulated by local trust area/island municipality, rather than individual islands, to produce results that would be more practical when used within the context of the Islands Trust.

3.1 Methodology

Analysis of the ITEM was primarily carried out using GIS technology. This mapping software connects a series of databases and air-photo imagery, by creating layers of information. In developing the ITEM, the ecosystem maps were layered with the cadastral (a map showing lot lines) and a map of known protected sites in order to answer the following three questions:

1. How many hectares of natural ecosystems are remaining?
2. How many hectares of natural ecosystems are currently protected?
3. Which natural ecosystem classes are least protected?

For the purposes of this plan, a protected area is defined as follows:

- land owned or covenanted by the Trust Fund Board,
- land covenanted by an agency authorized to hold Section 219 covenants under the Land Title Act, or
- land owned by a conservancy, land trust, local, provincial or federal government whose purpose in holding the land is to protect the natural values.

Several limitations of the data analysis directly affected the results. The following two points should be considered when reviewing the results:

1. Although the Islands Trust Fund attempted to identify all known locations that meet the definition of a protected area, some may have been missed.
2. The data for the ecosystem classes Riparian, Littoral and Lacustrine are likely inaccurate, as some areas within these classes were missed in the air photo interpretation because they were hidden under the tree canopy. The subclass road surface (rz) within the class of Developed (DP) is not accurately depicted for the same reason.

3.2 Detailed Results

3.2.1 Natural and Modified Ecosystems

For each local trust area/island municipality, land was classified as either a natural ecosystem or a modified ecosystem.

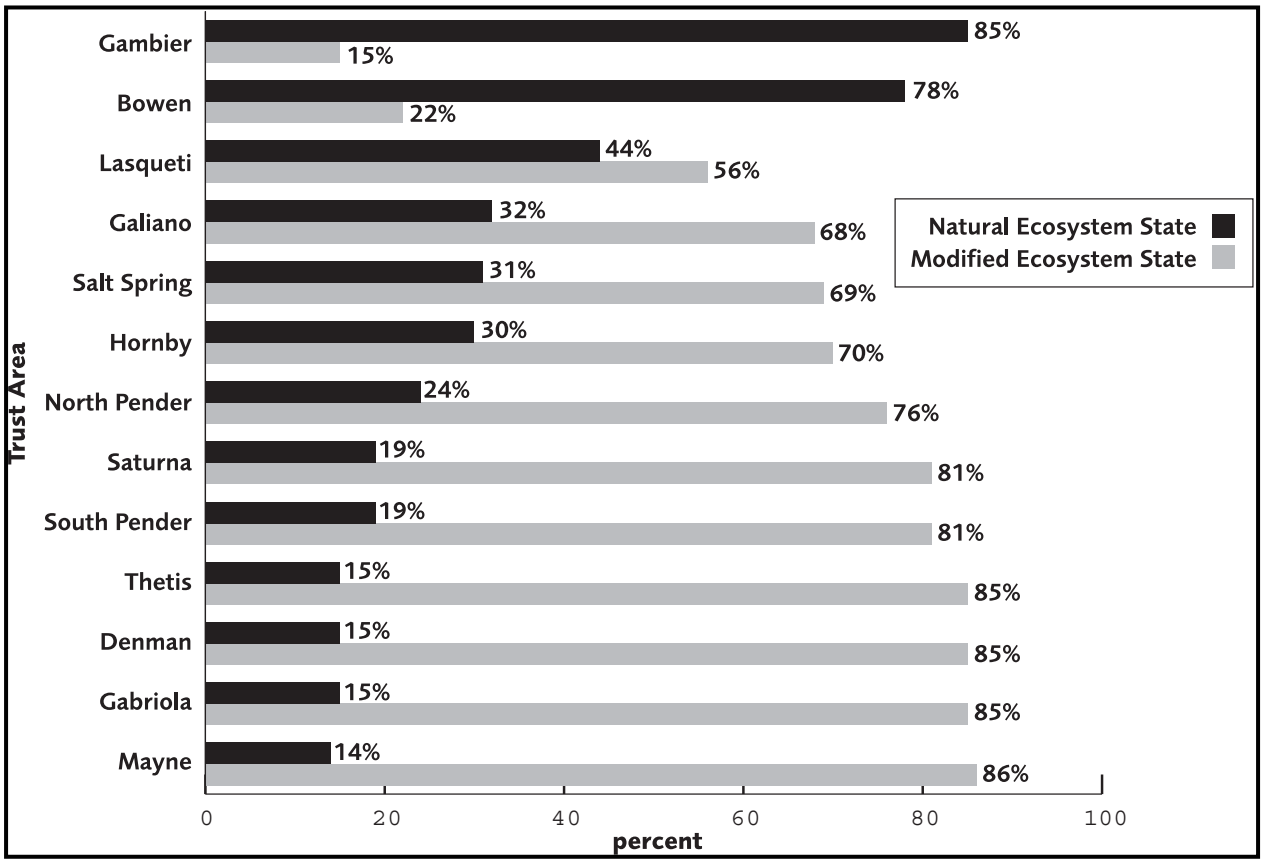


Figure 4: Percentages of Natural and Modified Ecosystems by Local Trust Area/Island Municipality

As shown in Figure 4, the Gambier Local Trust Area, Bowen Island Municipality and Lasqueti Local Trust Area have the largest percentages of remaining natural ecosystems (85%, 78%, and 44%, respectively), while the Mayne, Thetis, Denman and Gabriola Local Trust Areas have the smallest percentages of natural ecosystems (14%, 15%, 15%, and 15%, respectively).

Very few local trust areas still contain large pockets of relatively undisturbed natural ecosystems. It is well documented that larger nature reserves are more viable than smaller reserves. Generally, the smaller the area, the less the diversity of habitat, which in turn decreases species diversity. In addition to reducing habitat diversity and species diversity, smaller areas support fewer individuals of any one species. Small populations are more prone to extinction, since they are proportionally more affected by problems

such as natural disaster, sex/age fluctuations, environmental change, and genetic inbreeding. As indicated in Section 1.0, this region provides habitat for many rare and endangered species. However, conservation areas need to be relatively large to provide adequate habitat for these species to survive. It is therefore essential that remaining blocks of intact natural ecosystems be protected.

Equally important is protecting small remnant areas, which, in some cases, are the last remaining natural ecosystems on an island. These small areas can become degraded quickly, as they are much more vulnerable to impacts such as edge effects, invasive species introduction, fragmentation, and climate change. Due to these impacts and the associated risk of loss, small remnant patches of natural ecosystems should be protected quickly before all natural habitats are lost. See Appendix V for further information on the loss of natural ecosystems in the Islands Trust Area.

3.2.2 Protected Ecosystems

Following on the preceding analysis, lands identified as protected areas were classified as either natural or modified ecosystems. As indicated in Section 3.1, protected areas are lands either owned or covenanted by land trust groups or managed as a park by local, regional, provincial or federal governments.

Of the 732 sq. km. land base of the Islands Trust Area, only 90 sq. km. or 12.32% is protected. In the Howe Sound area, the figure drops to 8%, while 13% of the Gulf Island areas are protected.

Figure 5 compares the percentage of protected area to the percentage of natural ecosystems for each local trust area/island municipality.

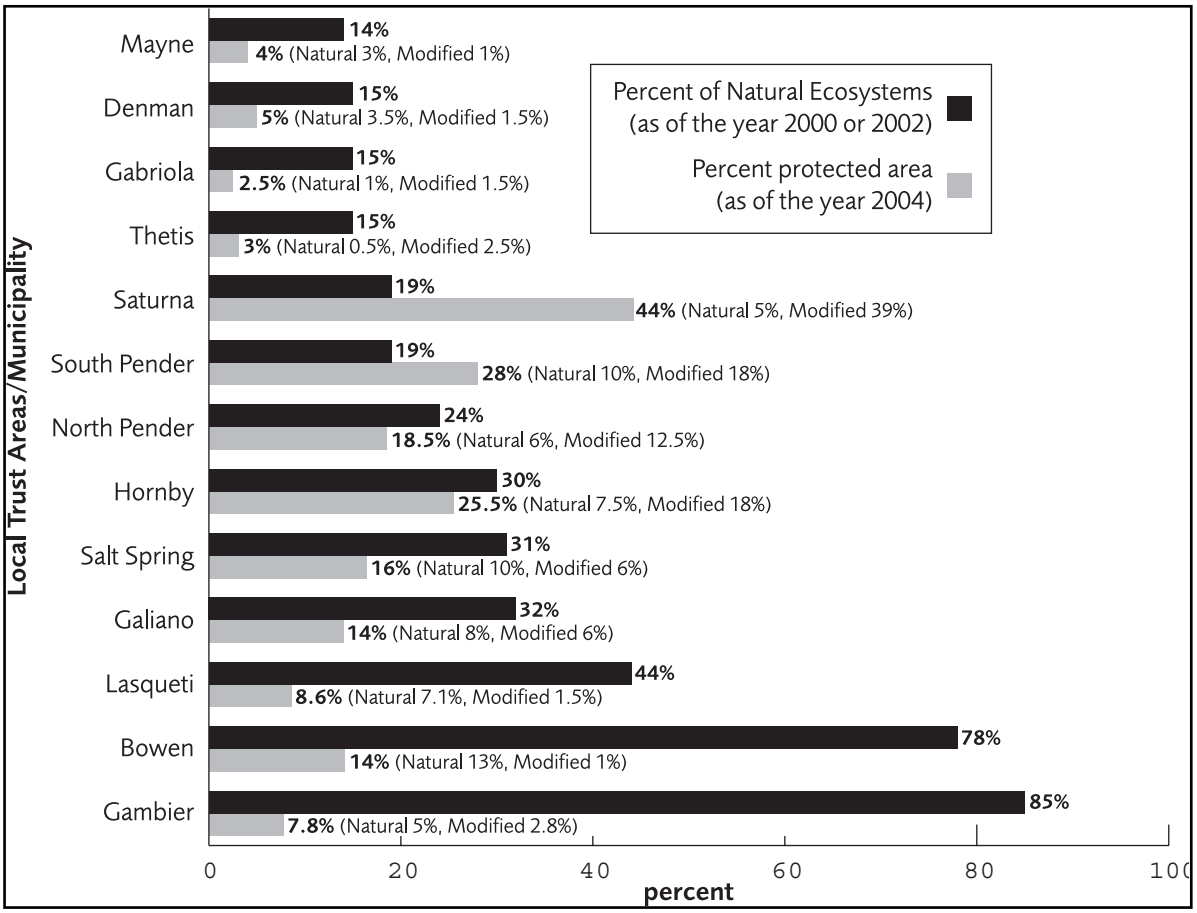


Figure 5: Percentages of Natural Ecosystems and Protected Area by Local Trust Area/Island Municipality

As noted earlier, the Bowen Island Municipality and the Gambier and Lasqueti Local Trust Areas have large areas of natural ecosystems; however, as Figure 5 shows, these three areas have relatively small percentages of protected areas, when compared to some other local trust areas. Of the three, the Lasqueti and Gambier Local Trust Areas have lower percentages of protected areas.

As also noted earlier, Mayne, Thetis, Denman and Gabriola Local Trust Areas have the smallest percentages of natural ecosystems. As Figure 5 shows, these three local trust areas also have the smallest percentages of protected areas.

Critical to the success of the Regional Conservation Plan is ensuring that each local trust area/island municipality has as high a percentage of protected land as possible. In addition to natural areas, modified ecosystems need protection, especially on islands with few natural areas. Modified ecosystems are important for their ability to create the connectivity in networks of protected areas and for their potential to meet longer-term preservation goals. For example, Young Forest ecosystems eventually become mature forest, but in the meantime, they provide buffer areas to natural systems and can provide corridors for species to move from one protected area to another. To a lesser

extent Rural, Agricultural and Developed areas can also provide needed habitat and be part of enhancing the natural landscape.

3.2.3 Protected Ecosystem Classes

Diversity and complexity are necessary in a healthy island. It is crucial, therefore, to protect not just a few ecosystem classes but to ensure that the entire matrix of ecosystem classes is represented.

In order to be certain that each island achieves protection of all ecosystem classes, the natural ecosystems with the least protection (less than 5%) were identified for each local trust area/island municipality in order to flag areas meriting immediate attention[6] (see Table 3). For a full description on the protected status of all the ecosystems, both modified and natural, see Appendix VI.

Local Trust Area/ Island Municipality	Natural Ecosystem Class	% Protected (as of 2004)
Bowen	Cliffs	0
	Herbaceous	0
	Littoral	0
	Older Forest	0
	Riparian	0
	Woodland	0
Gambier	Cliffs	4.33
	Herbaceous	1.15
	Lacustrine	0
	Littoral	0
	Mature Forest	4.33
	Older Forest	0
	Riparian	0
	Wetland	0
	Woodland	0
Lasqueti	Cliffs	0
	Lacustrine	0
	Littoral	2.59
	Riparian	0
	Wetland	1.03
Denman	Lacustrine	0
	Wetland	1.23
	Woodland	0

[6] Littoral ecosystems are the hardest to protect as most of this ecosystem is located below the high water mark and is therefore owned by the Crown. See Section 5.4 on protecting Littoral ecosystems.

Local Trust Area/ Island Municipality	Natural Ecosystem Class	% Protected (as of 2004)
Hornby	Lacustrine	0
	Riparian	4.38
Gabriola	Lacustrine	4.14
	Wetland	1.73
	Woodland	0.51
Thetis	Lacustrine	0
	Littoral	0.05
	Mature Forest	0
	Riparian	0
	Woodland	4.02
Salt Spring	Lacustrine	0.31
Galiano	All classes exceed 5% protection	
Mayne	Herbaceous	2.79
	Lacustrine	0
	Riparian	0
	Wetland	0
Saturna	Riparian	0
North Pender	Cliffs	0
South Pender	All classes exceed 5% protection	

Table 3: Summary by Local Trust Area/Island Municipality of Natural Ecosystem Classes with Less Than 5% Protection.

3.3 Summary of the Results

The following three important findings emerged from the ITEM mapping program and data analysis:

a) The local trust areas/island municipality with large blocks of natural ecosystems are Gambier, Bowen, and Lasqueti.

b) The local trust areas with the least protection and with only small remnants of natural ecosystems are Denman, Mayne, Gabriola and Thetis.

c) The local trust areas/island municipality with less than 5% protection of more than three natural ecosystems are Gambier, Bowen, Lasqueti, Thetis and Mayne.

These findings strongly suggest that the Islands Trust Fund should focus its work for at least the next five years on Bowen Island Municipality and Gambier, Lasqueti, Denman, Gabriola, Thetis and Mayne Local Trust Areas.

3.4 Related Considerations

The ITEM findings provide the basis for constructing the goals and objectives of the Regional Conservation Plan. However, two related factors are also essential to this process.

3.4.1 Networks of Protected Areas

The first factor is the need for connectivity. Were the focus of the plan limited to increasing the protection of natural ecosystems across the Islands Trust Area, isolated fragments of protected land would be created, where ecological integrity would be in constant jeopardy. This unintended consequence can be minimized by adding a further emphasis, namely, the creation of networks of protected areas. Such networks, to be successful, must occur on every island in each local trust area/island municipality.

This concept has been promoted by the Islands Trust Council for some time. The Islands Trust Policy Statement (Sections 3.1.2 to 3.1.4 consolidated April, 2003) states:

> 3.1.2 It is Trust Council's policy to work towards the establishment of a network of protected areas that preserves representative ecosystems in their natural state and in sufficient size and distribution to sustain their ecological integrity.
>
> 3.1.3 Local trust committees and island municipalities shall, in their official community plans and regulatory bylaws, address the identification and protection of the environmentally sensitive areas and significant natural sites, features and landforms in their planning area.
>
> 3.1.4 Local trust committees and island municipalities shall, in their official community plans and regulatory bylaws, address the planning, establishment and maintenance of a network of protected areas that preserve the representative ecosystems of their planning area and maintain their ecological integrity.

3.4.2 Endangered Species and Habitats

The second related factor meriting consideration is the need to protect endangered ecosystems and habitats. Although not specifically identified in the ITEM analysis, national or provincially identified ecosystems and habitats of species that are considered endangered, threatened or of special concern were considered a priority and therefore were added as a further focus of the goals and objectives.

4.0 GOALS AND OBJECTIVES FOR REGIONAL CONSERVATION

The Islands Trust Fund's long-term goals for regional conservation clearly reflect the "preserve and protect" mandate of the Islands Trust. The goals are high-level, long-term statements that are consistent with the annual work plans in place before the completion of the ecosystem mapping and this Plan. However, the mapping and subsequent analysis provide a scientific basis for focusing efforts and measuring results as the Trust Fund continues to work towards its vision.

In contrast to the goals, the objectives represent measurable, short-term (five-year) targets and may change over time depending on changing circumstances. (See Section 6.1 on adaptive management.) The objectives have been set to be realistic and achievable, based on the existing capacity of the Islands Trust Fund's staff and budget to carry out the work required. If that capacity should increase or decrease, the objectives may well be achieved sooner or later than expected.

Long Term Goals	Five-Year Objectives (2005-2010)	Rationale for the Objectives
Protect a significant[7] amount of each natural ecosystem in each local trust area and island municipality	To protect at least 5% of each natural ecosystem class within each local trust area and island municipality	Since its inception, the Islands Trust Fund (ITF) has completed 3 covenants and 1 acquisition per year, protecting an average of 39.4 ha annually. At that rate, it would take 1.5 years to protect the 58.5 ha of land required to meet a 5% goal. However, as wetlands, littoral and lacustrine areas have not been adequately accounted for in the mapping, new mapping would likely increase this number from 58.5.
Protect the last remaining blocks of large natural ecosystems	To protect at least two parcels of land of at least 50 ha within the Bowen Island Municipality, Gambier or Lasqueti Local Trust Area	For the 5 largest parcels that the ITF has acquired to date, the average parcel size is 52 ha. These acquisitions occurred roughly every two years. Thus, a 5–year goal to achieve two more parcels is realistic.

[7] The size of a protected area is determined by the specific ecosystem (i.e., wetland, woodland etc.) that is being protected, and the size of area needed by species that use these particular habitats. Each protected area must therefore be judged separately as to its "significance".

Long Term Goals	Five-Year Objectives (2005-2010)	Rationale for the Objectives
Protect nationally and provincially identified ecosystems and habitats of species that are considered endangered, threatened or of special concern	To protect at least one of the Garry oak ecosystem sites identified by the Garry oak Ecosystem Recovery Team (GOERT)	Garry oak ecosystems are among the most endangered in Canada. Less than 5% of the original habitat remains in near-natural condition The Islands Trust Fund has been a partner in the Garry Oak Ecosystem Recovery Team (GOERT) since 2000. Recently GOERT has developed a list of 20 priority sites within B.C. Seven of these sites are located in the Islands Trust Area.
Ensure that each local trust area and island municipality has protected viable ecosystems	To work with partners to achieve at least 15% protection of the total area of each local trust area and island municipality, including modified ecosystems on islands with few natural areas	Protecting 15% of each local trust area and island municipality represents approximately 1965 ha of newly protected land. At an average rate of 40 ha per year, the ITF would need 49 years to achieve this target. However, as most protection achieved to date in the Islands Trust Area has been led by other conservancies and levels of government, this target can probably be accomplished. The protection of modified ecosystems should be included where they will likely develop into natural ecosystems.
Expand existing protected areas for each island	To protect at least four properties adjacent to protected areas	The ITF currently protects 4 properties that are adjacent to already protected areas. Doubling this number in 5 years is a realistic target.
Create a network of protected area for each island	To see protected area networks delineated in all OCPs across the Islands Trust Area. The first step in achieving this target is preparing set of guidelines for approval by Trust Council	Most Official Community Plans (OCPs) will be reviewed in the next 5 years. By developing guidelines to assist planners and trustees, the ITF can help each local trust area and island municipality create a network of protected areas.
Improve the ITEM to form a stronger foundation for future plans	To update the ITEM and increase accuracy by ground-truthing at least 20% of polygons and to provide information to all partners each year on protected status for each local trust area/island municipality	The Islands Trust and the Islands Trust Fund have developed a schedule to update the ITEM for all local trust areas and the Bowen Island Municipality within the coming 2–3 years (see Section 2.5). This information will assist the ITF in adjusting its goals on a yearly basis.

Success in protecting land will be counted as contributing to the achievement of the one objective that best fits the particular property. For example, the acquisition of a large parcel of Garry oak would only count under the special threats goal and would not be counted again in the large parcel goal. The exception in this process is the 15% overall protection goal, which will incorporate the accomplishments counted under the other objectives.

5.0 TOOLS FOR IMPLEMENTING THE REGIONAL CONSERVATION PLAN

This section outlines tools that the Islands Trust Fund currently uses to protect land and evaluates the usefulness of these tools in implementing this plan.

5.1 Partnerships

Partnerships are essential to the success of the Islands Trust Fund. The leadership and support of partners will be the key to the achievement of the goals and objectives of this plan.

Island-based and regional conservancies have been at the forefront of the success to date in protecting land in the Islands Trust Area. When implementing this plan, the Islands Trust Fund should continue to coordinate with and support these groups in establishing landowner contact programs, obtaining covenants, fundraising for acquisitions, and conducting stewardship education. Initiatives such as the new Opportunity Fund should help to strengthen these partnerships.

Community members generally and landowners in particular are valuable partners and often become involved in unexpected ways. An effective communications program that publicizes the role and accomplishments of the Islands Trust Fund is a prerequisite to attracting this sort of partnership.

Local Trust Committees and Bowen Island Municipal Council have significant roles in building networks of protected areas through island-specific conservation planning and land use regulation. (See Section 3.4 for relevant excerpts from the Islands Trust Policy Statement.)

Trust Council is an important partner in Trust-wide initiatives including advocacy, education and improving the effectiveness of land use planning tools.

5.2 Voluntary Conservation

The two tools traditionally used by the Islands Trust Fund have been voluntary land donations and voluntary conservation covenants.

5.2.1 Conservation Covenants

Conservation covenants are useful for many reasons. Covenants are often attractive to landowners because they achieve protection of the land while the landowner continues to own and maintain the property and can dispose of it as desired. Compared to land purchases, covenants have low initial costs. Generally these costs include title searches, covenant drafting, surveying, legal reviews, appraisals, and registration. Some of these costs are often shared among the partners/landowners.

In addition to the pre-registration costs, covenants require a long-term commitment by the covenant holder, which includes on-going landowner contact and relationship-building, annual on-the-ground monitoring and possible legal enforcement costs.

The staff-time required to complete a covenant, from initial contact to covenant registration, varies widely. If a landowner approaches the Islands Trust Fund and is highly motivated and receptive, a straightforward covenant may be completed in 8 to 12 months. However, if proactive contact is required and a landowner is not aware of the Islands Trust Fund or its partner groups or is unfamiliar with covenants, the process can take several years. This variability in timing substantially affects staff work load and staff availability to respond to new inquiries.

A new tool is the Natural Area Protection Tax Exemption Program (NAPTEP), a special incentive program of the Islands Trust for landowners who place a conservation covenant on their land. Landowners in this program receive a 65% property tax exemption for the area of land covered by the covenant. An important aspect of this program is that the annual monitoring costs are borne by the landowners, rather than the Islands Trust Fund. This unique program is not available to other land trusts or conservancies. Although currently offered in only parts of the Islands Trust Area, the program is intended for the entire area and is expected to increase substantially the land protected through conservation covenants.

5.2.2 Land Acquisitions

The Islands Trust Fund has a mandate to purchase and receive donations of property from private or public sources. Once acquired, by whatever means, Islands Trust Fund-owned properties are managed as nature reserves.

A nature reserve is defined as an area that has been set aside because it has regionally significant natural ecosystems and may have nationally and provincially identified ecosystems and species considered endangered, threatened or of special concern.

The primary purpose of a nature reserve is the preservation and protection of the natural ecosystems. The size of a nature reserve should be sufficient to ensure that these ecosystems remain viable over the long term. The only activities permitted on a nature reserve are those with minimal impact on the land, which in general means only hiking and only in areas that are considered not sensitive to this activity. The location and extent of hiking trails is determined through the management plan process.

Donations

Land donations are a relatively simple tool for the Islands Trust Fund to use to protect land. They have low up-front costs and usually can be concluded quickly if the landowner has initiated the process. They are only possible, however, where the landowner has the means to dispose of his/her land without compensation other than the donation receipt. Partial land donations, also known as split receipting (wherein a part sale and a part donation are made and a tax receipt is provided for the donated portion), are a new option that allows more landowners to consider this tool.

The long-term management and monitoring costs associated with land-ownership exceed those for covenanted lands and must be considered when assessing acquisition opportunities. Nevertheless, when opportunities arise, the Islands Trust Fund should seriously consider a donation where the land being offered contains one of the high-priority ecosystems identified in this report and its acquisition would advance an objective of this plan.

Free Crown Grants

Another tool available to local governments is the Free Crown Grants Program. In mid-June 2004, the Province released details of this program to the public. Under the program, local governments may apply for a free grant of Crown land to support public purposes. As a public agency, the Trust Fund Board is eligible to receive tenure to Crown land through this program. Because one of the objectives of the regional conservation plan is to protect large tracts of natural ecosystems in the Gambier and Lasqueti Local Trust Area and Bowen Island Municipality and because many of these areas are Crown land, this tool should be particularly valuable for achieving this objective.

5.3 Land Use Planning Tools

As a land trust, the Island Trust Fund is in the unique position of being part of the Islands Trust. This association identifies the Islands Trust Fund as the logical recipient of lands to be set aside for conservation as a result of a development. Further, it gives

the Islands Trust Fund access to the planners processing development proposals and designing amendments to land use regulations, for the purpose of identifying key areas for conservation.

5.3.1 Official Community Plans

While the Islands Trust Fund has no official role in the process of creating or amending official community plans, it can assist planning staff and local trust committees during these processes to identify significant areas, and offer expertise on creating a plan for establishing a network of protected areas. The information provided by the ITEM will be essential for designing these networks. The Island Trust Fund can provide assistance in interpreting the ITEM and in encouraging qualified individuals and local organizations to participate in the ground-truthing needed to improve the accuracy and usefulness of this information base.

5.3.2 Amenity Zoning and Density Transfer

The Islands Trust Fund has on occasion received conservation covenants and land donations through development or subdivision applications involving amenity zoning or density transfer. Amenity zoning occurs when an owner achieves rezoning of his/her property in return for providing a public amenity.

Density transfer is a planning process that shifts subdivision development potential from one parcel to another. It involves a sending area (where development might have notable negative impacts or where desirable ecosystem values exist) and a receiving area (where increased development is considered more suitable). This tool can be valuable in shifting density from an area of high conservation value to an area considered less valuable for conservation or more suitable for higher density or clustering.

5.3.3 Zoning Bylaws and Development Permits

Regulatory planning tools have historically been the foundation of land use planning. Such tools include zoning bylaws, development permits and subdivision approvals. As one of the early steps in implementing the Regional Conservation Plan, the Islands Trust Fund will begin discussions with local trust committees and planning staff to determine the level of protection that priority areas could receive through zoning restrictions and/or the development permit process.

5.4 Stewardship Education

Public education will always be a key component for realizing conservation goals. Many of the priority areas identified in the Plan will never be protected by relying exclusively on the tools described above. It is therefore critical that the Islands Trust Fund continue

to work on educating the public about actions they can take themselves to protect and steward their land and its special values.

For example, one of the ecosystems that is least protected in the Islands Trust Area is Littoral or shorelines. The reason for this situation is that the shoreline is owned by the Crown. This area, however, is home to many waterfront buildings and is subject to impacts from docks, boats and overuse. Education is the key to the protection of these areas in the future. Providing information from such resources as *On the Living Edge: Your Handbook for Waterfront Living* (Kipp, 2002) is one way that the Trust Fund can encourage private land stewardship.

Building awareness of appropriate alternative technologies is also part of the education process. For example, the Islands Trust Fund recently launched a project to encourage island residents and builders to install water harvesting systems to reduce dependence on groundwater. These systems collect water from the roof and store it in cisterns. The cost for installation can be comparable to drilling a well, yet the benefits to conserving the integrity of water resources on an island are significant.

Although stewardship education is a critical aspect of conservation, the Islands Trust Fund has limited staff resources and is unable to deliver sustained and integrated stewardship education programs (e.g. contacting landowners, holding workshops on each island). Nevertheless, the Islands Trust Fund can make landowners aware of the available options and tools via the Islands Trust Fund website, newsletters and brochures. The Islands Trust Fund can also work in partnership with local conservancies to target individual landowners in highly sensitive areas and can support local conservancies in their land protection efforts.

6. FUTURE DIRECTIONS

The Islands Trust Fund has developed this regional plan as a way to focus its resources on the highest priority areas for protection. As staff work towards achieving the objectives in this plan, they will continually evaluate the accomplishments in light of changing circumstances, new opportunities and threats and new information. Any regional conservation plan will need to be flexible to adapt to new knowledge and emerging trends. Adaptive management is a well accepted method of responding to change.

6.1 Adaptive Management

Adaptive Management consists of undertaking an action or set of actions, evaluating effectiveness of achieving the goal, modifying the action if it is not achieving its intended results and using the information from early efforts to guide later efforts" (Brown et al., 1998). It is generally described as an ongoing series of events that continue to feed into the planning process.

In order to build this feedback loop into the Islands Trust Fund's work program, the Trust Fund Board should undertake the following steps at the beginning of every fiscal year:

Step 1: Gather and Assess Data – The first step in adaptive management is recognizing that the islands are dynamic systems that are in constant change. As indicated in Section 2.5, the Islands Trust Fund has committed to update the Islands Trust Ecosystem Maps by 2010. However, until this time the Islands Trust Fund will continue on a yearly basis to gather new information and adjust its goals and objectives based this new information. Such new information will include:

- current status of protected areas;
- known loss of natural ecosystem;
- known threats and opportunities;
- evaluation of the management of owned Islands Trust Fund Board lands; and
- evaluation of the effectiveness of the tools that are being used to achieve the objectives outlined in this document.

Step 2: Revise Measurable Goals – Section 4 of this document provides measurable objectives that are based on ecosystem mapping that comes from a specific year (2000 and 2002) and known protected status as of the year 2004. As the ecosystem maps are updated from more recent air photos and as our partners inform us of their successes in protecting land throughout the Islands Trust Area, the statistics presented in this report will change, resulting in a need to review and possibly alter the goals in this document.

Step 3: Implement the Plan – Based on the new information that is gathered, in some circumstances it may be necessary to deviate from what has been set out in this Regional Conservation Plan. In each case a clear rationale should be available to support the change.

Step 4: Monitor – Monitoring is critical to success of this plan. On a yearly basis the Islands Trust Fund will examine its progress in achieving its goals.

Step 5: Evaluate – Based on the information gathered in Step 4, the Islands Trust Fund will evaluate its effectiveness in achieving its goals. Issues and barriers to success, as well as solutions to these problems, will be discussed and documented at this time.

Step 6: Adjust – Adaptive management is about using the information gained through the preceding five steps to adjust goals and objectives and make decisions based on the best available information. It is therefore expected that in doing Steps 1 to 5 the goals and objectives will be reviewed and incorporated into a work program for that year.

The Islands Trust Fund will evaluate its success at achieving the Regional Conservation Plan's objectives in 2010 and set new objectives for the subsequent five years.

6.2 Challenges to Achieving the Goals and Objectives

As with all land trusts the Islands Trust Fund may encounter barriers to achieving its goals and objectives. Potential problems include limits in staff resources, budget and property management capacity.

Currently the staff of the Islands Trust Fund comprises four full-time staff: a manager, a secretary, a communications and fundraising specialist and an ecosystem protection specialist. The secretary and ecosystem protection specialist dedicate 20% of their time to other needs of the Islands Trust.

By late 2004, the Islands Trust Fund had protected 50 properties within the Islands Trust Area. By 2010, the Trust Fund Board expects to have protected an additional 20 properties. As this success in protecting land grows, the cost of managing and monitoring such lands also grows. Currently the Islands Trust Fund receives its base budget from Trust Council to cover these costs. As demonstrated in Figure 6, the budget does not automatically increase to cover the real costs of managing the rising number of hectares protected by the Islands Trust Fund. The uncertainty created by this difficulty could present a barrier to accepting all of the new properties that become available.

Islands Trust Fund Board Covenants and Acquisitions and Islands Trust Fund Board Budget (1992-2004)

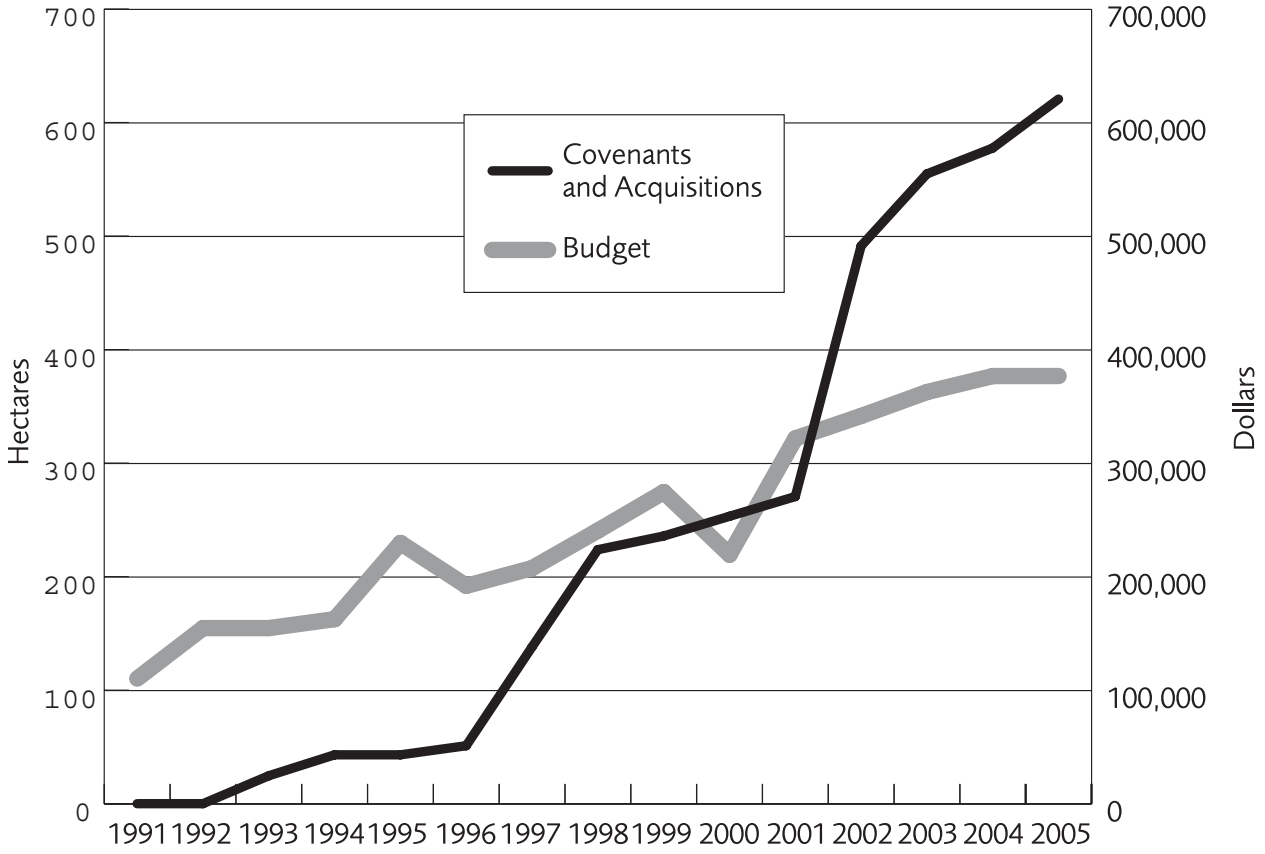


Figure 6: Comparison of Annual Budget to Total Hectares Protected

In order to increase funding for Islands Trust Fund operations, the Trust Fund Board is looking at the following short-term and long-term solutions:

- Federal Government: Request Federal funding for the protection of the Islands Trust Area. As noted earlier the Islands Trust Area is home to many at-risk[8] species, especially in Garry oak ecosystems. The Species at Risk Act recognizes the essential role of habitat protection for conservation of species at risk and for preventing species from becoming at risk.

[8] According to the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), Species at Risk are species designated in the following categories;
Extinct: no longer exists
Extirpated: no longer present in the wild in Canada, but exists elsewhere in the wild.
Endangered: facing imminent extirpation or extinction.
Threatened: likely to become an endangered species if nothing is done to reverse the factors leading to its extirpation or extinction.
Special Concern (Vulnerable): particularly sensitive to human activities or natural events, but not including extirpated, endangered, or threatened species.

- Provincial Government: Request funding from the Provincial government for the protection of the Islands Trust Area. The Islands Trust Act states that the Islands Trust was established "to preserve and protect the Islands Trust Area and its unique amenities and environment for the benefit of the residents of the Islands Trust Area and of British Columbia generally…."
- Islands Trust Council: Seek annual increases in the Islands Trust Fund's property management budget through a formula based on the number of hectares the Board holds.
- Local Trust Committees: Ask local trust committees to ensure that 100% cost recovery measures are implemented whenever covenants or acquisitions are coming to the Islands Trust Fund as a consequence of development applications such as rezoning or subdivision.

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APPENDIX I: HISTORY OF CONSERVATION PLANNING AT THE ISLANDS TRUST

1974 Islands Trust established

1975 Identification and assessment of the most significant areas of the Trust completed in December 1975

1987 Michael Humphries, prepared for the Ministry of Municipal Affairs and the Islands Trust a paper entitled "The Islands Trust Fund: A Discussion Paper". In this paper Mr. Humphries notes under Program and Priorities the importance of inventorying important sites: "one of the first tasks will be to develop a list of sites that are worthy of preservation by one means or another."

1990 Trust Fund Inaugural Meeting

1991 Trust Fund Plan
Policies 1.2.1 Trust Fund inventory of Key Areas and Features

1992 It was moved and seconded that the Board's three priorities were to:

- 1. continue with acquisition of initial properties
- 2. inventory key areas and sites
- 3. develop public information program

1993 Framework for Development of a Trust Area Conservation Strategy approved by Trust Council (Resolution TFB 64/92).

1995 Trust Fund Inventory of Special Areas and Features (Jacqueline Booth and Associates) completed.

1996-1999 Development of the Environmental Information Management System (EIMS) that combined information on significant areas and features into a database system.

2000-2004 Regional Conservation Plan

APPENDIX II: PERCENTAGE OF FIELD-CHECKED POLYGONS IN THE SEI BY ISLAND

ISLAND	*Number of Field-Checked Polygons*	*Number of Polygons*	*Percent of Polygons Field-Checked*
Hornby	10	44	23%
Denman	56	86	65%
Lasqueti	28	277	10%
Gambier	7	103	7%
Anvil	0	29	0%
Bowen	24	105	23%
Keats & Pasley	12	60	20%
Gabriola	23	66	35%
Thetis	0	29	0%
Valdes	0	70	0%
Galiano	15	164	9%
Mayne	16	46	35%
Saturna	25	104	24%
South Pender	9	49	18%
North Pender	24	56	43%
Salt Spring	86	406	21%
TOTAL	279	1608	17%

APPENDIX III: ECOSYSTEM DEFINED

According to Kimmins (1987), there are six major attributes to the term ecosystem that are consistent across much of the literature. These attributes can be summarized as follows:

- The attribute of **structure**. Ecosystem structure consists of numerous entities both living (biotic) and nonliving (abiotic). There are various stands of trees, plants, animals and microbes as well as other non-living entities such as soil, atmospheres that are all influenced by a source of energy.
- The attribute of **function** is the processes that occur as energy and matter are exchanged between the physical environment and the living community. In a forested ecosystem, such processes include nutrient, hydrologic, energy and sedimentation cycling.
- The attribute of **complexity** results from the multiple variations that occur within the biological system. Within a forest there are a number of outcomes from the interactions that occur between structure and process.
- The attribute of **interaction** and **interdependency**. There is a symbiotic relationship among many of the plants and animals in a forest. For example, fungi form a beneficial "mycorrhizal" relationship with tree roots. The fungi absorb water and nutrients from the soil and transfer them to the tree roots for use in photosynthesis and other growth processes (Hammond, 1991 p.19).
- The attribute of **temporal scale**. Ecosystems are not static but are constantly changing. New trees are constantly being added to a forest as older trees die resulting in a change to the ecosystem's composition through time.

While all of these attributes can be found in the term ecosystem, the concept of spatial scale is missing. An ecosystem can be any size ranging from a microcosm such as a vernal pool, to a macrocosm such as the earth's biosphere. For the purpose of this discussion however, an ecosystem is defined as a portion of landscape with relatively uniform dominant vegetation (Ward et al., 1998).

APPENDIX IV: ECOSYSTEM CLASSIFICATIONS

Natural Ecosystems

Definition:

Natural ecosystems are landscape units with little or no human development. In the Islands Trust Area these are usually rare and/or fragile ecosystems.

Information:

Natural ecosystems in the Islands Trust Area are usually remnant fragments of what once were much larger ecosystems. Most of the ecosystems captured in the ecosystem mapping project are considered by both the provincial and federal governments to be fragile and/or rare. However, development pressures with the Islands Trust Area continue to result in significant loss of these natural ecosystems.

CLASS	SUBCLASS
OF – Old Forest Old Growth Forest ecosystems are structurally complex stands comprised mainly of shade-tolerant and regenerating tree species (>250 years old). The understory can include snags, coarse woody debris, in all stages of decomposition and a fully developed moss layer.	**co – Conifer:** with < 15% broadleaf. **mx – Mixed:** mixed with broadleaf component > 15%.
WD – Woodland Woodland ecosystems are open stands of deciduous forest, composed of pure or mixed stands of Garry oak or mixed stand of arbutus and Douglas fir. Mature big-leaf maple can also be found in sites designated as woodland. Woodlands may include non-forested openings, often with shallow soils and bedrock outcroppings.	**Mx – Mixed:** mixed with conifer component > 15%. **bd – Broadleaf:** Dominant broadleaf.
MF – Mature Forest Mature Forest ecosystems are characterized by establishment of shade-tolerant trees after the last disturbance (80-250 years old). The under story can be well developed as the canopy begins to open up but in Douglas-fir forests the under story is typically dry with few woody shrubs, forbs and grasses.	**co – Conifer:** with < 15% broadleaf. **mx – Mixed:** mixed with broadleaf component > 15%.
HB – Herbaceous Herbaceous ecosystems are non-forested ecosystems with less than 10% tree cover. They are typically found in areas of shallow soils and bedrock near shorelines and at the summit of hills and mountains.	**Mx – Herbaceous:** a mix of grasses and forbs as well as mosses and lichens. **cs – Coastal herbaceous:** rocky shoreline, influenced by the marine environment and characterized by grasses, forbs, mosses and lichens. **vs – Vegetated shoreline:** low-lying rocky shorelines with less than 20% vegetation. **sp – Spit:** sand and gravel deposits with low to moderate cover of grasses and herbs. **du – Dunes:** sand dunes with a low cover of grasses and herbs. **sh – Shrub:** shrubs account for more than 20% of the vegetation.

CLASS	SUBCLASS
RI – Riparian Riparian ecosystems occur adjacent to lakes, streams, gullies, canyons and rivers and may vary in width.	**fl – Low bench:** areas flooded at least once every two years for part of the growing season; plants are adapted to extensive flooding and abrasion. **fm – Medium bench:** areas flooded every one-six years for short periods (10-25 days); usually deciduous or mixed forests with trees tolerant of flooding and sedimentation. **fh – High bench:** areas periodically and briefly inundated by high waters; typically conifer-dominated floodplains of larger coastal rivers. **ff – Fringe:** narrow, linear areas along open water bodies (rivers, lakes, and ponds). **gu – Gully: where the watercourse is in a steep V-shaped gully.**
WN – Wetland Wetland ecosystems are characterized by daily, seasonal or year-round water at or above the surface.	**bg – Bog:** shrubby or treed, nutrient-poor peatlands with distinctive communities of plant species adapted to highly acid and oxygen-poor soil conditions. **fn – Fen:** peatlands where groundwater inflow maintains a high mineral content within the rooting zone. **ms – Marsh:** shallowly flooded mineral wetland dominated by emergent grass-like vegetation. **sp –Swamp:** forested, mineral wetland dominated by broadleaf shrubs and trees on sites with a flowing, semi-permanent, near surface of water table. **sw –Shallow Water:** aquatic ecosystems dominated by rooted, submerged and floating aquatic plants. **wm – Wet Meadow:** seasonally inundated wetlands, dominated by grasses, sedges, or rushes. They generally occur on mineral soils and have little or no peat accumulation. Tree cover is less than 10%.
CL – Cliffs Cliff ecosystems are 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 with accumulation of soil limited to fissures and ledges. **ic – Inland cliffs:** typically formed as a result of erosion, catastrophic failures or mass wastage. Generally characterized by rapid drainage and the accumulation of soil that is limited to bedrock fissures and ledges.
LC – Lacustrine Lacustrine ecosystems are freshwater ecosystems where total vegetated coverage of the total surface area is less than 5%.	**la – Lake:** a naturally occurring static body of water, greater than 2m deep in some portion. **pd – Pond:** a small body of water greater than 2m deep, but not large enough to be classified as a lake.

CLASS	SUBCLASS
LT – Littoral Littoral ecosystems are marine influenced ecosystems where total vegetated coverage of the total surface areas is less than 5%.	**Mu – Mudflat:** flat, plain-like areas dominated by fine-textured sediments and exposed at low tide; includes estuaries. **be – Beach:** area that expresses sorted sediments, reworked by wave action in recent times.

Modified Ecosystems

Definition:

Modified ecosystems are areas where there is human development or disturbance evident throughout the landscape.

Information:

There are four classes in this category including: Young Forest, Rural, Agricultural and Developed. How these areas are maintained and developed can be crucial to the success of natural ecosystems. For example, Young Forest ecosystems will eventually become mature forest but in the meantime they provide buffer areas to natural systems and can provide corridors for specifies to move from one protected area to the next. Rural, Agricultural and Developed areas can also provide much needed habitat and can be part of enhancing the natural landscape.

CLASS	SUBCLASS
YF – Young Forest Young Forest ecosystems are coniferous dominated stands with an age range that varies between 0 and 80 years old	**co – Conifer:** with < 15% broadleaf **mx Mixed:** mixed with broadleaf component > 15%. **ps – Pole Sapling:** dense regeneration of clearcut area between 15 and 30 years old, but can range upwards of 50 years if growing under poor conditions. **cc – Clearcut:** unrestored clear-cuts and heavily logged areas, other land clearing (was mostly or all stripped of native vegetation, none replanted- now mixed with spontaneous regeneration of native and invasive species), includes human caused serious erosion areas. **fc – Commercially thinned forest:** forest canopy remains after harvest, individually selected, or small groups of commercially viable trees are removed from site.

CLASS	SUBCLASS
RW – Rural Rural ecosystems are areas in which human developments are interspersed with forest range, farmland and native vegetation or cultivated crops.	**rr –** Rural Residence: residences or other structures are interspersed with native vegetation, farmland or cultivated crops **gc – Golf course: g**rass-covered fairways and open areas for the playing of golf. **pk – Park:** groomed areas including parks, playgrounds, aesthetic areas, and cemeteries.
AG – Agricultural Agricultural ecosystems are areas where the dominant use is for agricultural purposes	**cf –** Cultivated Field: flat or gently rolling, non-forested open area subject to human agricultural practices. **co – Cultivated Orchard:** an agricultural area composed of single or multiple tree species planted in rows. **cv – Cultivated Vineyard:** vineyard.
DP – Developed Developed ecosystems are areas in which human features or disturbances are dominant across the landscape	**ca – Canal:** artificial watercourse created for transport, drainage, and/or irrigation purposes. **sz – Developed/occupied Foreshore:** dock, marina or shellfish lease. **rz – Road Surface:** area cleared and compacted for vehicle transport. **gp – Gravel Pit:** area exposed for the removal of sand and gravel. **ur – Urban/suburban:** area in which residences and other human developments form an almost continuous covering of the landscape. **uc – Utility Corridor:** area permanently altered to allow for the passage of a public or private utility. **es – Exposed Soil:** area of exposed soil; not included in any of the other definitions. **lq – Unrestored Landfills and Quarries:** includes large-scale soil, rock and debris dumping, gravel/rock quarries, major ditching disturbances.

APPENDIX V: REASONS FOR THE LOSS OF NATURAL ECOSYSTEMS

The following is an excerpt from the Sensitive Ecosystems Inventory: East Vancouver Island and Gulf Islands 1993-1997 Volume 2: Conservation Manual (McPhee et al, 2000).

IMPACTS OF CONCERN

The incremental progression of urban and rural development, intensive agricultural use, logging and the construction of roads, railways, and power lines have all played a part in the rapid decline of sensitive ecosystems in the study are over the last 150 years. The consequences of these activities have been dramatic in terms of both the fragmentation of natural ecosystems into smaller and more isolated areas, and the growing list of endangered and threatened plant and animal species that depend upon these ecosystems for their continued existence. Some citizens also feel that there is a declining quality of life in communities that have lost their connection to their environment.

Many of the impacts have occurred incrementally over a long time period and are not always immediately apparent. Several landscape-wide concerns that seriously impact all ecosystems are discussed below and include *landscape fragmentation*, *edge effects* and *invasive species introduction*; *climate change* may also have far-reaching effects. Some activities have *direct* impacts on an ecosystem, whereas others may be *indirect*, such as causing a change in hydrology of a wetland area.

This chapter describes impacts of concern that apply to ecosystems in general. How these impacts affect individual ecosystems and how each ecosystem should be managed to conserve its functions and values will be dealt with in the individual ecosystem chapters. (see *Chapters 5 – 13*)

Landscape Fragmentation

The SEI has identified and documented the location and attributes of nine separate ecosystem types; however, these ecosystems relate to one another on a larger landscape level. In recent years, conservation biologists and environmental planners have increasingly focused on the broader landscape and interconnectedness of ecosystems across it. The landscape, in this case, refers to a large area of land (usually 50 to 5000 ha) that is a composite of landforms, ecosystems, and land uses. Another way to define landscape is the extent of what one can see in one view using the unaided human eye.

In the SEI study area, the patterns of ecosystem distribution repeat themselves across the landscape. Riparian ecosystems surrounding streams and rivers snake across valley bottoms. Dense conifer forests are found on the lower flanks of the mountains, whereas the lowlands are a mosaic of urban areas, farms highways, and patches of forest. Woodlands occur on south facing slopes and rocky hills. These patterns can be used to guide planning initiatives to protect or maintain the connectedness of sensitive ecosystems across the landscape

Fragmentation breaks the landscape into a series of isolated islands of habitat within developed areas. It has several general effects on sensitive ecosystems. It reduces the

amount of land available to support functioning ecosystems because highways, railways, power lines, subdivisions, and logged areas occupy land that was once woodland, forest, or wetland. It limits the ability of species to move between habitat islands or colonise available habitat. Fragmentation also increases edge effects (see below), breaks down ecosystem landscape-level processes, and makes ecosystems more susceptible to the introduction of invasive species.

Wildlife species depend on a series of inter-connected habitat patches. Without connections to other patches, many parks and undeveloped areas are too small to protect species or populations that require large home ranges or seasonal migrations. A black bear may have a winter den under a hollow Sitka spruce stump in a river floodplain, eat skunk cabbage roots in a red cedar swamp ten kilometres away in spring, and use a corn field and apple orchard on the suburban fringe in the fall. Seasonal or daily variation in habitat use depends on appropriate corridors or linkages to connect habitat patches. Wildlife corridors allow dispersal of individuals or species between habitats. This helps maintain genetic diversity, and may also allow for recolonisation of habitat patches following disturbance or loss of small local populations.

Invasive Species

The introduction of invasive species is one of the most widespread disturbance factors in sensitive ecosystems. Although this effect is less catastrophic than fragmentation or direct impacts on ecosystems, it can cause localized problems in many sensitive ecosystem types. Invasive species include many non-native plants and animals as well as some native species that rapidly colonize ecosystems because of their competitive abilities or adaptations to disturbed sites.

For example, English ivy and English holly are widespread in forests, riparian ecosystems, and some types of wetlands because birds disperse their seeds from gardens. They can cause localized problems for native trees or understory species. Woodland, terrestrial herbaceous, and coastal bluff ecosystems often support high numbers of introduced grasses, Scotch broom, and other species. Spurge-laurel, English ivy, and English holly colonize older and second-growth forest near developed areas. Purple loosestrife and yellow-flag iris can displace native wetland species.

Domestic or feral cats, dogs, sheep, and goats can cause localized problems in some ecosystem types. Even introduced European slugs have been identified as on cause of the decline of some wildflower species in oak woodlands. Domestic pets, such as cats and dogs, that are allowed to roam freely, can become predators responsible for unnecessary injury and death of wild species. For example, domestic cats can seriously affect bird populations and have been implicated in the extinction of over 20 species of wildlife. Many research studies over the past 10 years, indicate that free-ranging cars prey largely on small mammals, songbirds, insects, snakes, and lizards. In particular, significant impacts have been noted on urban birds, ground-nesting birds and birds at

feeders. When the species is rare, event the loss of a single breeding individual can affect the survival of the species.

Together, invasive, non-native species are a serious threat to the ecological integrity of sensitive ecosystems in the study area.

Edge Effects

Edge effects, caused by fragmentation and adjacent development, include the introduction of non-native plants species and domestic cats, or other species into the core sensitive ecosystem. The blowdown of trees next to the boundary of new clear-cuts is a common example of an edge effect. Others are more subtle. Some bird species avoid nesting near edges because of increased predation or other disturbances. Smaller ecosystem islands may be more susceptible to edge effects because of the predominance of edge habitat compared to interior habitat. Generally, ecologists describe three types of edge effects:

- ***Abiotic effects —*** Microclimate changes, including air temperature, wind speed, light levels, soil temperature, and relative humidity were examined near clear-cut edges of forest patches in Oregon. Although the changes to these factors varied considerably, the depth of edge influence could be greater than 240 metres in some situations. Edge orientation was an important modifier of microclimate change; southwest facing edges experienced the greatest microclimate changes.
- ***Direct biological effects —*** Researchers have also studied effects of adjacent residential development on the use of forest patches by migrant songbirds. Diversity and abundance of migrant songbirds consistently declined as density of houses outside the forest patch increased. The presence of domestic cats and grey squirrels or disturbance (e.g., noise) avoidance was put forward as a possible explanation for this decline. Other researchers found reduced bird use along road corridors because of traffic noise and collisions between birds and vehicles.
- ***Indirect biological effects —*** Edges also provide a mechanism fro introducing new species into forest habitats. These species tend to be generalists, with excellent dispersal abilities and capable of colonizing disturbed habitats. For example, following the construction of an interstate highway in Maine, researchers found 16 percent of the bird species within 100 metres of the new highway to be “edge” species, whereas this group comprised less than 4 percent of the bird species in the 100 to 400 metre zone. The effect is not just the intrusion of these edge species into the original avian community. There is evidence that edge species include nest predators and brood parasites such as Brown-headed Cowbird that can reduce breeding success of the forest interior species.

GLOBAL CLIMATE CHANGE

Global climate change is long longer supposition; most atmospheric scientists now agree that human activities around the Earth are affecting the climate. In September 1999, the Environment Program of the United Nations concluded: “indications are that it is too late to prevent global warming as a result of increased greenhouse gas emissions.”

Greenhouse gas emissions will continue to increase and one—carbon dioxide—is expected to double the pre-industrial level by 2030. As global warming increases, changes in precipitation patterns and temperature may occur that could have far-reaching effects on these ecosystems. Any habitat changes associated with climate changes are difficult to predict; however, they could result in a complete change of species within the ecosystem.

Direct Impacts

Direct impacts occur on site and are the most visible. Direct impacts on sensitive and other important ecosystems include:

- **Vegetation removal** for construction, forestry, agriculture and recreation purposes. As well, snags and falling limbs are removed next to roads, buildings, and trails because of safety concerns.
- **Vegetation damage** from activities such as walking on fragile vegetation, riding mountain bikes, horses and motorized off-road vehicles (trail bikes and all-terrain vehicles), and grazing and trampling by livestock and feral animals.
- **Soil removal or compaction** caused by increased human access from trails or adjacent residential areas and livestock trampling; trails directly under trees may compact the root zone and lead to deterioration in tree health.
- **Ditching, draining and/or filling in aquatic ecosystems.**
- **Wildlife disturbance**—Nesting bird species are particularly vulnerable. Disturbance at a critical time could have a serious consequences ranging from crushed eggs as disturbed birds leave their nests, to increased predation of the eggs by jays, crows and ravens, to premature fledging of the young, to complete abandonment of the nest. The nesting season for many coastal bird species ranges from March through August.

Indirect Impacts

Indirect impacts causing habitat and species degradation are commonly associated with activities that are upstream, adjacent to, or distant from the ecosystems and may also be expressed ova a short-or long-term period. Off-site impacts do not directly cause loss of trees, plant communities, or wildlife; however, their effects can be severe if careful planning and management is not undertaken. Examples of such impacts include:

- **Changes to hydrology** caused by development, deforestation, ditching, draining, increased impervious surfacing (e.g., rooftops, sidewalks, and

highways), agriculture or event trail construction, can often affect adjacent ecosystems though the:

- reduction of the total amount of groundwater infiltration,
- reduction of summer soil moisture,
- increased mean annual runoff by reduction in evapotranspiration losses,
- increased size, duration, and frequency of flood events,
- disruption of surface and groundwater drainage patterns upon which nearby or even distant plant communities depend,
- reduction of the storage capacity of the soil layer due to subsurface drainage associated with agriculture.

- **Changes to natural disturbance regimes**—Activities such as dyking, channel engineering, fire suppression and construction of jetties, breakwaters and docks can result in:
  - disruption of natural erosion processes which maintain coastal ecosystems such as dunes and spits,
  - prevention of fire regimes which enhance the structural diversity of forested ecosystems and maintain open woodlands by suppressing conifer and shrub growth,
  - prevention of natural flooding which can reduce the structural diversity and complexity of wetland and riparian ecosystems resulting in the loss of habitats upon which many species depend.
- **Water pollution**—Both point and non-point source pollution can come from filling up wetlands runoff from urban areas and farmlands (e.g., nitrates and agricultural and forestry pesticides entering the surface water and ground water, seepage from septic systems and landfills, runoff from roads), deforestation, construction activities near wetlands and other water bodies, and air pollution. Significant impacts to water quality resulting from the removal of streambank vegetation have been documented. Improper forest practices can be a source of increased sedimentation and other pollution problems that directly impact the quality of drink water from forested watersheds. These factors may:
  - Increase the incidence of water-borne disease,
  - Affect the safe consumption of water by humans,
  - Increase the loss of habitat or food for wildlife and deplete their populations,
  - Disrupt the food chain,
  - Impact, over the long term, wildlife reproduction and breeding success that ultimately threatens the survival of some species.

The clock cannot be turned back, but it is possible to rescue, preserve, protect, restore, and enhance the ecosystem remnants so that they function well for future generations

of humans and wildlife species that are dependent on them. Impacts at the landscape scale can be mitigated by landscape policy, planning, and management tools.

APPENDIX VI: ECOSYSTEM CLASSES, TOTAL AND PROTECTED, ACROSS THE ISLANDS TRUST AREA

The following tables list the total area of each ecosystem class and the area of each ecosystem class that is protected, as of 2004, for each local trust area and island municipality. The notation of "n/a" means not applicable and is used where no polygon of an ecosystem class was found.

BOWEN ISLAND Municipality

Natural Ecosystem Classes	**Total Area (Hectares)**	**Current Protected Area (Hectares)**	**Protected Area (% of Total)**
Cliffs (CL)	47.78	0.34	0.71
Herbaceous (HB)	2.48	0.00	0.00
Lacustrine (LC)	41.93	1.43	3.42
Littoral (LT)	0.01	0.00	0.00
Mature Forest (MF)	3561.14	621.75	17.46
Old Forest (OF)	138.79	0.00	0.00
Riparian (RI)	Error – not captured in the ITEM mapping	0.00	0.00
Wetland (WN)	37.74	21.80	57.76
Woodland (WD)	18.48	0.00	0.00
Modified Ecosystem Classes			
Agricultural (AG)	22.51	0.01	0.03
Developed (DP)	18.71	0.42	2.27
Rural (RW)	620.89	12.24	1.97
Young Forest (YF)	346.92	28.27	8.15

DENMAN ISLAND Local Trust Area

Natural Ecosystem Classes	Total Area (Hectares)	Current Protected Area (Hectares)	Protected Area (% of Total)
Cliffs (CL)	n/a	n/a	n/a
Herbaceous (HB)	29.19	24.29	83.21
Lacustrine (LC)	26.05	0.00	0.00
Littoral (LT)	21.65	3.55	16.38
Mature Forest (MF)	383.45	105.36	27.48
Old Forest (OF)	n/a	n/a	n/a
Riparian (RI)	79.30	5.87	7.41
Wetland (WN)	187.04	2.31	1.23
Woodland (WD)	1.76	0.00	0.00
Modified Ecosystem Classes			
Agricultural (AG)	366.72	0.00	0.00
Developed (DP)	32.92	0.00	0.00
Rural (RW)	512.19	3.32	0.65
Young Forest (YF)	3347.46	51.45	1.54

GABRIOLA ISLAND Local Trust Area

Natural Ecosystem Classes	Total Area (Hectares)	Current Protected Area (Hectares)	Protected Area (% of Total)
Cliffs (CL)	n/a	n/a	n/a
Herbaceous (HB)	39.99	3.14	7.86
Lacustrine (LC)	24.84	1.03	4.14
Littoral (LT)	13.37	3.58	26.78
Mature Forest (MF)	357.80	36.95	10.33
Old Forest (OF)	n/a	n/a	n/a
Riparian (RI)	25.32	4.83	19.09
Wetland (WN)	51.26	0.88	1.73
Woodland (WD)	184.12	0.93	0.51
Modified Ecosystem Classes			
Agricultural (AG)	362.94	6.68	1.84
Developed (DP)	62.51	0.32	0.51
Rural (RW)	909.75	11.97	1.32
Young Forest (YF)	3391.65	50.38	1.49

GALIANO ISLAND Local Trust Area

Natural Ecosystem Classes	Total Area (Hectares)	Current Protected Area (Hectares)	Protected Area (% of Total)
Cliffs (CL)	38.06	5.76	15.14
Herbaceous (HB)	10.41	2.84	27.23
Lacustrine (LC)	12.51	4.60	36.79
Littoral (LT)	5.46	3.53	64.66
Mature Forest (MF)	1520.07	371.21	24.42
Old Forest (OF)	3.68	2.42	65.67
Riparian (RI)	67.36	10.47	15.55
Wetland (WN)	76.15	18.76	24.64
Woodland (WD)	138.61	41.15	29.69
Modified Ecosystem Classes			
Agricultural (AG)	114.08	3.23	2.83
Developed (DP)	240.07	16.67	6.94
Rural (RW)	479.81	21.29	4.44
Young Forest (YF)	3080.53	289.24	9.39

GAMBIER ISLAND Local Trust Area

Natural Ecosystem Classes	Total Area (Hectares)	Current Protected Area (Hectares)	Protected Area (% of Total)
Cliffs (CL)	132.56	5.74	4.33
Herbaceous (HB)	9.48	0.11	1.15
Lacustrine (LC)	21.28	0.00	0.00
Littoral (LT)	1.16	0.00	0.02
Mature Forest (MF)	5852.72	253.16	4.33
Old Forest (OF)	603.06	0.00	0.00
Riparian (RI)	0.26	0.00	0.00
Wetland (WN)	21.22	0.00	0.00
Woodland (WD)	6.93	0.00	0.00
Modified Ecosystem Classes			
Agricultural (AG)	21.22	0.00	0.00
Developed (DP)	144.40	0.44	0.30
Rural (RW)	158.20	0.48	0.30
Young Forest (YF)	765.12	0.84	0.11

HORNBY ISLAND Local Trust Area

Natural Ecosystem Classes	Total Area (Hectares)	Current Protected Area (Hectares)	Protected Area (% of Total)
Cliffs (CL)	9.83	9.52	96.83
Herbaceous (HB)	26.16	14.54	55.60
Lacustrine (LC)	12.04	0.00	0.00
Littoral (LT)	29.72	17.54	59.03
Mature Forest (MF)	585.90	79.38	13.55
Old Forest (OF)	40.27	28.89	71.73
Riparian (RI)	7.31	0.32	4.38
Wetland (WN)	3.93	0.93	23.63
Woodland (WD)	95.97	58.48	60.93
Modified Ecosystem Classes			
Agricultural (AG)	179.65	7.39	4.11
Developed (DP)	7.03	0.00	0.00
Rural (RW)	457.08	24.87	5.44
Young Forest (YF)	1440.22	476.55	33.09

LASQUETI ISLAND Local Trust Area

Natural Ecosystem Classes	Total Area (Hectares)	Current Protected Area (Hectares)	Protected Area (% of Total)
Cliffs (CL)	1.35	0.00	0.00
Herbaceous (HB)	431.27	143.97	33.38
Lacustrine (LC)	12.04	0.00	0.00
Littoral (LT)	13.08	0.34	2.59
Mature Forest (MF)	854.81	178.56	20.89
Old Forest (OF)	n/a	n/a	n/a
Riparian (RI)	39.05	0.00	0.00
Wetland (WN)	121.39	1.25	1.03
Woodland (WD)	1664.96	195.49	11.74
Modified Ecosystem Classes			
Agricultural (AG)	50.83	8.72	17.15
Developed (DP)	3.37	0.01	0.23
Rural (RW)	260.12	2.49	0.96
Young Forest (YF)	3772.52	89.70	2.38

MAYNE ISLAND Local Trust Area

Natural Ecosystem Classes	Total Area (Hectares)	Current Protected Area (Hectares)	Protected Area (% of Total)
Cliffs (CL)	n/a	n/a	n/a
Herbaceous (HB)	28.50	0.80	2.79
Lacustrine (LC)	2.15	0.00	0.00
Littoral (LT)	1.73	0.63	36.47
Mature Forest (MF)	211.74	63.02	29.76
Old Forest (OF)	n/a	n/a	n/a
Riparian (RI)	2.79	0.00	0.00
Wetland (WN)	1.03	0.00	0.00
Woodland (WD)	58.37	2.25	3.86
Modified Ecosystem Classes			
Agricultural (AG)	250.82	1.97	0.78
Developed (DP)	87.97	n/a	n/a
Rural (RW)	452.46	4.58	1.01
Young Forest (YF)	1150.42	18.21	1.58

NORTH PENDER ISLAND Local Trust Area

Natural Ecosystem Classes	Total Area (Hectares)	Current Protected Area (Hectares)	Protected Area (% of Total)
Cliffs (CL)	4.72	0.00	0.00
Herbaceous (HB)	203.93	73.81	36.19
Lacustrine (LC)	30.86	1.80	5.84
Littoral (LT)	64.69	21.39	33.07
Mature Forest (MF)	254.35	156.57	61.56
Old Forest (OF)	n/a	n/a	n/a
Riparian (RI)	11.05	5.37	48.56
Wetland (WN)	46.32	22.79	49.21
Woodland (WD)	267.36	25.65	9.59
Modified Ecosystem Classes			
Agricultural (AG)	326.32	4.63	1.42
Developed (DP)	30.55	3.64	11.92
Rural (RW)	1030.54	50.07	4.86
Young Forest (YF)	2779.85	567.05	20.40

SALT SPRING ISLAND Local Trust Area

Natural Ecosystem Classes	**Total Area (Hectares)**	**Current Protected Area (Hectares)**	**Protected Area (% of Total)**
Cliffs (CL)	15.01	11.79	78.56
Herbaceous (HB)	340.74	62.47	18.33
Lacustrine (LC)	60.47	0.19	0.31
Littoral (LT)	17.30	1.14	6.59
Mature Forest (MF)	3259.02	1159.37	35.57
Old Forest (OF)	19.17	2.13	11.12
Riparian (RI)	263.20	64.94	24.67
Wetland (WN)	176.28	31.08	17.63
Woodland (WD)	1562.41	502.10	32.14
Modified Ecosystem Classes			
Agricultural (AG)	1375.11	124.04	9.02
Developed (DP)	306.92	5.42	1.77
Rural (RW)	2307.08	42.44	1.84
Young Forest (YF)	8979.39	1081.85	12.05

SATURNA ISLAND Local Trust Area

Natural Ecosystem Classes	**Total Area (Hectares)**	**Current Protected Area (Hectares)**	**Protected Area (% of Total)**
Cliffs (CL)	n/a	n/a	n/a
Herbaceous (HB)	166.21	40.74	24.51
Lacustrine (LC)	8.56	2.68	31.30
Littoral (LT)	5.92	2.50	42.25
Mature Forest (MF)	163.21	11.60	7.11
Old Forest (OF)	n/a	n/a	n/a
Riparian (RI)	1.30	0.00	0.00
Wetland (WN)	35.58	23.67	66.55
Woodland (WD)	212.90	94.68	44.47
Modified Ecosystem Classes			
Agricultural (AG)	104.27	1.64	1.57
Developed (DP)	17.05	1.58	9.29
Rural (RW)	185.02	26.47	14.31
Young Forest (YF)	2587.73	1345.72	52.00

SOUTH PENDER ISLAND Local Trust Area

Natural Ecosystem Classes	Total Area (Hectares)	Current Protected Area (Hectares)	Protected Area (% of Total)
Cliffs (CL)	n/a	n/a	n/a
Herbaceous (HB)	6.51	3.02	46.33
Lacustrine (LC)	3.48	3.37	96.82
Littoral (LT)	1.71	0.86	50.46
Mature Forest (MF)	n/a	n/a	n/a
Old Forest (OF)	n/a	n/a	n/a
Riparian (RI)	3.31	2.58	78.05
Wetland (WN)	4.95	4.34	87.74
Woodland (WD)	137.04	76.36	55.72
Modified Ecosystem Classes			
Agricultural (AG)	58.20	1.37	2.35
Developed (DP)	3.09	0.00	0.00
Rural (RW)	125.92	4.68	3.71
Young Forest (YF)	524.58	147.18	28.06

THETIS ISLAND Local Trust Area

Natural Ecosystem Classes	Total Area (Hectares)	Current Protected Area (Hectares)	Protected Area (% of Total)
Cliffs (CL)	n/a	n/a	n/a
Herbaceous (HB)	74.82	6.92	9.25
Lacustrine (LC)	8.23	0.00	0.00
Littoral (LT)	40.63	0.02	0.05
Mature Forest (MF)	32.47	0.00	0.00
Old Forest (OF)	n/a	n/a	n/a
Riparian (RI)	51.57	0.00	0.00
Wetland (WN)	50.35	3.72	7.39
Woodland (WD)	196.90	7.91	4.02
Modified Ecosystem Classes			
Agricultural (AG)	26.72	0.00	0.00
Developed (DP)	19.61	0.12	0.60
Rural (RW)	224.94	2.93	1.30
Young Forest (YF)	3095.93	120.18	3.88