A NOTICE OF A BUSINESS MEETING OF **THE HORNBY ISLAND LOCAL TRUST COMMITTEE**
to be held at 11:30 am on Friday, March 14, 2014
Room to Grow, 2100 Sollans Road, Hornby Island, BC

AGENDA

		Page No.	****Approx. Time****
1.	**CALL TO ORDER**		11:30 am
2.	**APPROVAL OF AGENDA**		
3.	**MINUTES**		
3.1	Local Trust Committee Meeting Minutes of February 7, 2014 – *for adoption*	1	
3.2	Section 26 Resolutions Without Meeting - *none*		
3.3	Hornby Island Advisory Planning Commission Minutes - *none*		
4.	**BUSINESS ARISING FROM MINUTES**		
4.1	Follow-up Action List dated March 4, 2014 - *attached*	9	
4.2	Shoreline Protection Workshop Request		
	4.2.1 Memorandum dated January 8, 2014 – *attached for discusssion*	10	
5.	**CORRESPONDENCE**		
	Correspondence specific to an active development application and/or project will be received by the Hornby Island Local Trust Committee when that application and/or project is on the agenda for consideration.		
6.	**TRUSTEES' REPORT**		
7.	**CHAIR'S REPORT**		
8.	**DELEGATIONS - *none***		
9.	**TOWN HALL SESSION**		12:30 pm
10.	**APPLICATIONS AND PERMITS - *none***		12:40 pm
11.	**LOCAL TRUST COMMITTEE PROJECTS**		
11.1	HO-OCP-2009.1 (Official Community Plan/Land Use Bylaw Review)		
	11.1.1 Staff Report dated February 17, 2014 - *attached*	11	
	11.1.2 Draft Official Community Plan – Version 7.4 February, 2014 - *attached*	16	

12.	**REPORTS**		1:15 pm
12.1	**Work Program**		
	12.1.1 Top Priorities Report and Projects Report dated March 4, 2014 - *attached*	132	
12.2	**Applications Log**		
	12.2.1 Report dated March 4, 2014 - *attached*	136	
12.3	**Trustee and Local Expenses**		
	12.3.1 Expenses posted to February, 2014 - *attached*	138	
12.4	**Policies and Standing Resolutions**		
	12.4.1 Report – *attached for information*	139	
13.	**NEW BUSINESS**		
13.1	Eelgrass Mapping for the Hornby Island Local Trust Area		
	13.1.1 Islands Trust Fund Briefing – Memorandum dated February 13, 2014 - *attached*	140	
	13.1.2 Final Report – Nearshore Eelgrass Inventory 2012-2013 - *attached*	143	
	13.1.3 Eelgrass Presence Hornby Island Local Trust Area – Map 6 - *attached*	201	
13.2	Hornby Island Riparian Areas Regulation (RAR) Mapping		
	13.2.1 Madrone Environmental Services Ltd. Report dated January 21, 2014 Presented by Trystan Willmott, Aquatic/Terrestrial Biologist, Madrone Environment Services Ltd.	202	
14.	**BYLAWS**		2:00 pm
15.	**ISLANDS TRUST WEBSITE**		
15.1	Hornby Pages – *for discussion*		
16.	**NEXT MEETING DATE**		
16.1	Friday, April 25, 2014 at 11:30 pm at Room to Grow, 2100 Sollans Road, Hornby Island, BC.		
17.	**ADJOURNMENT**		2:30 pm

*Approximate time is provided for the convenience of the public only and is subject to change without notice.

DRAFT

Hornby Island
Local Trust Committee
Minutes of a Regular Meeting

Date of Meeting:	Friday, February 7, 2014
Location:	Room to Grow 2100 Sollans Road, Hornby Island, BC
Members Present:	David Graham, Chair Alex Allen, Local Trustee Tony Law, Local Trustee
Staff Present:	Vicky Bockman, Recorder
Media and Others Present:	Approximately three (3) member of the public-am Approximately three (3) members of the public-pm

1. CALL TO ORDER

Chair Graham called the meeting to order at 11:30 am. He acknowledged that the meeting was being held in traditional territory of the Coast Salish First Nations.

2. APPROVAL OF AGENDA

The following additions to the agenda were presented for consideration:

13.2 BC Ferries Service Reductions
13.3 Eelgrass Mapping

By general consent the agenda was approved, as amended.

3. MINUTES

3.1 Local Trust Committee Meeting Minutes of November 22, 2013

By general consent the Local Trust Committee meeting minutes of November 22, 2013 were adopted.

3.2 Section 26 Resolutions Without Meeting Log dated January 30, 2014

The Log was reviewed.

3.3 Hornby Island Advisory Planning Commission Minutes dated January 13, 2014

3.4 Hornby Island Advisory Planning Commission Minutes dated January 20, 2014

3.5 Hornby Island Advisory Planning Commission Minutes dated January 24, 2014

3.6 Hornby Island Advisory Planning Commission Draft Minutes dated January 27, 2014

HO-2014-001
It was MOVED and SECONDED,
that the Hornby Island Local Trust Committee receive the minutes of the Advisory Planning Commission dated January 13, 20, 24 and 27, 2014.

CARRIED

Chair Graham expressed appreciation for the diligent work that the Advisory Planning Commission has done on this project.

4. BUSINESS ARISING FROM MINUTES

4.1 Follow-up Action List dated January 30, 2014

The Follow-up Action List was reviewed.

5. CORRESPONDENCE – None.

6. TRUSTEES' REPORT

Trustee Law remarked that he attended a meeting of C.A.S.T., Community Solutions Together, where Hornby organizations gather to share updates on activities and consider collective issues. He reported on BC Ferries matters, advising that the Minister of Transportation and Infrastructure has announced that they will be proceeding with targeted savings from service reductions and that BC Ferries will work with communities to refine the schedules. He indicated that efforts to actively collaborate to generate responses to the draft alternative schedules are being organized by the Ferry Advisory Committees, a Union of BC Municipalities Special Committee on BC Ferries, and community organizations. He noted that the reductions are scheduled to be implemented on April 28, 2014.

Trustee Allen commented that he attended a meeting of the Trust Programs Committee which focused on advocacy policies and possible strategies to manage the number of separate advocacy programs in order to increase effectiveness. He noted that the

upcoming Trust Council meeting will provide an opportunity for deeper discussion of this subject.

7. CHAIR'S REPORT

Chair Graham reported that the Executive Committee has been reviewing the agenda for the Trust Council meeting which will be held the first week of March on Hornby Island. He noted that an item of interest will be a presentation by the First Nations treaty negotiator and it is hoped that at least a portion of that session will be available for public attendance. Chair Graham reported that the draft 2014/2015 budget will be reviewed at that meeting and proposes a small increase of less than one percent. He suggested that this is an amount appropriate for the current economic environment and is less than the cost of living index.

8. DELEGATIONS – None.

9. TOWN HALL SESSION

Tony Quin expressed support for the draft bylaw changes to facilitate the Islanders' Secure Land Association project. As a member of the Board of the Elder Housing Society, he summarized present difficulties including the need to expand in some manner to meet the large mortgage and operating costs, provide for an on-site caretaker and address the limits of the servicing program which are constrained by the density limitations. He requested the Committee give consideration to increasing the permitted density on that property, as a minor adjustment of this nature might save effort and cost for Elder Housing, while a review of zoning might be considered at a later date.

Committee members acknowledged that the strategies to approach the problem were complex and observed that staff input on the issue would be helpful.

By general consent it was requested that this issue be addressed at the next Local Trust Committee meeting when the Planner will be in attendance.

A member of the public requested an explanation of the Denman Island approach to permitting cottages, secondary suites and affordable housing currently being considered.

Chair Graham explained that the proposed draft amendments are for secondary suites and cottages on larger lots on Denman Island. He clarified that affordable housing is not a part of these draft bylaws and that the draft proposes the requirement of Temporary Use Permits for cottages.

A member of the public commented that in her work with the Advisory Planning Commission to review the Official Community Plan (OCP), she located the original OCP bylaw for Hornby Island and observed that the goals and objectives are almost identical today.

10. APPLICATIONS AND PERMITS – None**.**

11. LOCAL TRUST COMMITTEE PROJECTS

11.1 HO-OCP-2009.1 (Official Community Plan/Land Use Bylaw Review)

11.1.1 Advisory Planning Commission Draft Official Community Plan Review Report

Advisory Planning Commission (APC) member Carol Quin reported that the APC has reviewed the entire OCP while focusing on the recommended sections and noted that their suggested revisions have been submitted to the Local Trust Committee for consideration. She advised that the APC will begin its review of the Land Use Bylaw (LUB) shortly and will attempt to ensure that policies and regulations are on track. She offered to provide input and to answer any questions that might arise in the Committee's discussion of the review recommendations.

Trustees discussed the revisions recommended by the APC in their minutes of January 13, 20, 24 and 27, 2014 and the following comments were noted:

TABLE OF LOCAL TRUST COMMITTEE COMMENTS

APC Minutes of January 13, 2014

No.	*Section or Policy*	*Local Trust Committee Comments*
	Table of Revisions	
1.	6.3.1 Background	Add: d) notwithstanding these challenges the location, amount, type and density of current land use designations plus potential community housing in the Community Service Use designation and housing that may be created through rezoning enabled by policies in this plan are sufficient to meet anticipated housing needs over the next five years.
18.	6.5.1.3 a)	Change to: close proximity to the major commercial service centre for the island to reduce travel requirements and greenhouse gas emissions or in locations as provided for in policy 6.2.7 (Community Service Use) of this plan
	6.5.1.3 f)	Add after "technologies": and
	6.5.1.3 g)	Change the end punctuation to a period
	6.5.1.3 h)	Remove as it has been captured in a)
20.	6.5.2 Objectives (1)	Change to: to provide an appropriate range of accommodation for visitors without incurring undue cost to the local taxpayers in providing basic facilities for visitors.

21.	Jurisdictions Graphic	Support was expressed for providing this information on the website or in a location other than in the OCP
	Table of Issues	
2.	6.3.5.14	Discussion with Planner/legal review is suggested to determine if the TUP is being used appropriately, as it is being used to define criteria in areas that are permitted as opposed to allowing uses that are otherwise not permitted
5.	6.4.1.1	End the phrase after "maintained" as this exception was referencing a subdivision for the gas bar that has since been completed

APC Minutes of January 20, 2014

No.	***Section or Policy***	***Local Trust Committee Comments***
	Table of Revisions	
3.	Current 5.8.1 Main Rural (this number will change as it has been recommended that it be moved to Advocacy Policies)	Second line add before 50 km/hr: "consideration to be given to"
11.	6.5.3.5	Remove this policy as it is captured in the LUB; renumber subsequent policies accordingly
13.	6.5.5.5 e)	Remove "(such as stationary saw milling)" and do not provide an example
14.	Throughout the OCP	Do not capitalize "impact assessment report"
19.	6.6.1.11	New advocacy policy to read: The landing of seaplanes and helicopters in parks or public swimming beaches should be discouraged.

APC Minutes of January 24, 2014

No.	***Section or Policy***	***Local Trust Committee Comments***
	Table of Revisions	
7.	4.5.16	Change to: Property owners with wells on their property that are dry or contaminated (including by saltwater intrusion) are encouraged to back fill those wells.
8.	5.8 Roads Background	First line: Planner is requested to check with MOT to review language prior to changing as APC suggests (four categories and adding new "heritage") as these categories may be set by the Ministry without the ability to change

9.	Current 5.8.1 (this number will change as it has been recommended that it be moved to Advocacy Policies)	Planner is requested to check with MOT to review language prior to changing as APC suggest (adding a new, fourth category for road standards: Heritage Rural) as these categories may be set by the Ministry without the ability to change
10.	6.3.5.4 b)	Change to read: the availability of the housing units to persons whose special needs are to be accommodated;
11.	6.3.5.4 c)	Second line, change: "within a class" to "with special needs"

APC Draft Minutes of January 27, 2014

There were no comments on the APC recommendations of January 27, 2014.

HO-2014-002
It was MOVED and SECONDED,
that the Hornby Island Local Trust Committee request staff to incorporate the Advisory Planning Commission revisions including the Local Trust Committee comments as captured in the February 7, 2014 meeting.

CARRIED

Committee members thanked the APC for their thorough work on the OCP review and appreciated the many valuable recommendations made for the Local Trust Committee's consideration.

By general consent staff was requested to forward the draft minutes of the Local Trust Committee's February 7, 2014 meeting to the APC for their information.

APC Member Carol Quin asked for clarity on the completion timeline for the APC's Land Use Bylaw recommendations. Chair Graham suggested that Planner Milne be contacted to discuss the timing.

12. REPORTS

12.1 Work Program

12.1.1 Top Priorities and Projects List Report dated January 30, 2014

The report was reviewed.

12.2 Applications Log

12.2.1 Report dated January 30, 2014

The reported was reviewed.

12.3 Trustee and Local Expenses

12.3.1 Expenses posted to November, 2013

The report was received.

12.3.2 Expenses posted to December, 2013

The report was received.

12.3.3 Expenses posted to January, 2014

The report was received.

13. NEW BUSINESS

13.1 Islands Trust Council – Strategic Plan 2011-2014 – updated December 2013

The report was received.

13.2 BC Ferries Service Reductions

HO-2014-003
It was MOVED and SECONDED,
that the Hornby Island Local Trust Committee Chair be requested to write to the Ministry of Transportation and Infrastructure with copies to the President of BC Ferries and the MLA for Comox Valley with respect to service reductions on Route 22.

CARRIED

13.3 Eelgrass Mapping

Trustee Law reported that the eelgrass mapping report for the entire Islands Trust area is now available and it appears that Hornby Island has one of the highest percentages of coastline with eelgrass. He suggested that ways to inform and educate the community about eelgrass might be explored.

HO-2014-004
It was MOVED and SECONDED,
that "Information and education with respect to eelgrass, possibly in conjunction with Conservancy Hornby Island" be added to the Projects List.

CARRIED

14 BYLAWS – None**.**

15 ISLANDS TRUST WEBSITE

15.1 Hornby Page

Trustees noted that the meeting minutes are difficult to find on the website and requested they be presented and organized in a clear manner that is easily accessible.

16. NEXT MEETING DATE

16.1 Local Trust Committee Business Meeting

The next meeting will take place on Friday, March 14, 2014 at 11:30 am at Room to Grow, 2100 Sollans Road, Hornby Island, BC.

19. ADJOURNMENT

By general consent the meeting was adjourned at 1:36 pm.

_____
David Graham, Chair

CERTIFIED CORRECT:

_____
Vicky Bockman, Recorder

Print Date: Mar-04-2014

Follow Up Action Report w/ Target Date

Hornby Island
Nov-22-2013

No.	Activity	Responsibility	Target Date	Status
1	that the Hornby Island Local Trust Committee refer the draft Land Use Bylaw and associated schedules to the Advisory Planning Commission for their review and comment and refer the draft Official Community Plan and associated schedules for any comments arising from changes made from the previous draft. APC representative to present review findings at February 7th, 2014 HOLTC meeting.	Rob Milne		Done
1	that the Hornby Island Local Trust Committee request staff to research options for a shoreline protection workshop in the summer for waterfront property owners.	Rob Milne		On Going

Feb-07-2014

No.	Activity	Responsibility	Target Date	Status
1	Forward the draft minutes of the Local Trust Committee's Febraruy 7, 2014 meeting to the APC for their information	Becky McErlean		Done

Islands Trust

Memorandum

700 North Road Gabriola Island BC V0X 1X3
Telephone **(250) 247.2203** FAX: (250) 247.7514
Toll Free via Enquiry BC in Vancouver 660-2421. Elsewhere in BC **1.800.663.7867**
northinfo@islandstrust.bc.ca www.islandstrust.bc.ca

Date January 8, 2014 File Number

To HOLTC

From Rob MIlne
Island Planner

Re Shoreline Protection Workshop - HOLTC resolution from November 22, 2013 meeting

At the November meeting of the LTC the following resolution was passed:

> ***HO-045-2013***
> ***It was MOVED and SECONDED,***
> *that the Hornby Island Local Trust Committee request staff to research options for a shoreline protection workshop in the summer for waterfront property owners.*

Staff has been looking into options for such a workshop and have found that a workshop of this nature appears to have been held on Hornby Island at the community hall on February 26, 2013. This was one workshop of a series that were presented in various Local Trust Areas which were sponsored financially and in-kind by the Islands Trust, the BC Real Estate Foundation and the Stewardship Centre for BC. This series of workshops was facilitated by David Marlor, Director of Local Planning Services and included shoreline mapping of Hornby Island and other Trust islands, which was produced for this series of workshops, as well as presentations on greenshores approaches and eelgrass mapping. It is not clear if the workshop suggested in the resolution above is intended to be different from the February, 2013 workshop. Clarity on this would allow staff to more effectively address the wishes of the LTC. The Trust's website currently has a web page dedicated to the topic of Green Shores.

It should also be noted that if it is the wish of the LTC to proceed with the workshop suggested by the resolution that this item should be placed upon the LTC's priority list so as to allow for any necessary budgeting of resources to be considered.

STAFF REPORT

Date February 17, 2014 **File No.:** HO-OCP- 2009.1

To: Hornby Island Local Trust Committee
For meeting of March 14, 2014

From: Rob Milne, M.C.I.P, RPP.
Island Planner

Re: Draft Official Community Plan Review

Problem/Issue:

At their February 7, 2014 meeting the Local Trust Committee (LTC) gave consideration to the results of the Advisory Planning Commission's (APC) review of the current draft of the revised Official Community Plan (OCP). It was the direction of the LTC to make a number of revisions to the draft document based upon the APC's review.

BACKGROUND:

At their February 7, 2014 meeting the LTC adopted the following motion:

> **HO-2014-002**
> **It was MOVED and SECONDED,**
> *that the Hornby Island Local Trust Committee request staff to incorporate the Advisory Planning Commission revisions including the Local Trust Committee comments as captured in the February 7, 2014 meeting.*
>
> **CARRIED**

As directed through that motion staff has made the amendments contained within the minutes of that meeting to the draft OCP document.

Now that the APC's review process has been completed staff has studied the minutes of the APC meetings held to review the current OCP draft. It is the belief of staff that there are a number of additional recommendations in those minutes which should be considered for inclusion by the LTC. These recommendations are not substantive in nature but do provide additional clarity around some wordings and in one case directly relate to the recommendations approved at the February 7th meeting of the LTC. Others such as recommendation No. 1 from the January 24th APC meeting add helpful historical context to the current OCP review process. The recommendations in question follow below.

January 13, 2014 Minutes

No.	*Section or Policy*	*Identified Revisions Supported*
2.	6.3.1 Objectives (4)	Change to: "to provide for community initiatives to address housing needs for the foreseeable future."
5.	6.3.2.11	Change to: "Home occupations should be…"
9.	6.3.5 Housing Background	Second paragraph, first sentence: change to read: "The report estimated that at least 97 Hornby households were in need of housing."
11.	6.3.5 Affordable Housing	Affordable Housing Heading: change to "Affordable Housing Policies"
12.	6.3.5 Rental Housing	Rental Housing Heading: change to "Rental Housing Policies"
14.	6.3.5 Special Needs Housing	Special Needs Housing Heading: change to "Special Needs Housing (including housing for seniors) Policies"
17.	6.3.5 Land Co-operatives	Land Co-operatives Heading: change to "Land Co-operative Policies"

January 20, 2014 Minutes

No.	*Section or Policy*	*Identified Revisions Supported*
1.	5.6.6	Second line, after "around the Island" add: ",especially in parks or at public swimming beaches"
4.	6.2	Second paragraph, second line: change to read: "School District #71 owns the land on which the Community School, "Room to Grow" and the Preschool are located. The Hornby Island Residents' and Ratepayers' Association owns the land on which the Community Hall, Union Bay Credit Union-Hornby Branch, Art Centre, the Teen Centre, "the Kitchen", and RCMP office are located;" the Fire Hall is…
7.	6.5.1.3 a)	Add "central" after "existing" and change "sites" to "area(s)"
10.	6.5.3	Add "Area" section after Background and before Objectives, using verbiage similar to 6.5.5 Area

January 24, 2014 Minutes

No.	*Section or Policy*	*Identified Revisions Supported*
1.	1.4	Page 3, last paragraph: insert the following after the words ".. minimum lot size was introduced." the words: "in 1969 through a provincial cabinet Order-in-Council known as the "Ten-Acre Freeze", applying it to all of the Gulf Islands. The decree permitted no further subdivision creating lots under 10-acres in size, with a maximum of two dwellings per parcel, and was to continue to apply until zoning and subdivision bylaws could be enacted by the local governments for each

		island. As well, in about 1972, using existing soil analysis mapping, the Province established the BC Agricultural Land Reserve (ALR), and its Commission known as the ALC, covering all the known useable farm and grazing land in BC to prevent further subdivision or development of the Province's remaining farmland, except through application to the ALC (this was estimated to include no more than 3% of the province's land mass). In 1973, the Comox-Strathcona Regional District responded to the call for land use regulation by assisting the Hornby community to develop and pass its first set of local land use and subdivision bylaws (Bylaws # 137 and 139)."
2.	1.4	Page 4, first paragraph: please insert after the words "...inappropriate use and development." a new sentence: "In April 1977, the new Hornby Island Local Trust Committee, following lengthy discussion with Hornby residents, approved the first Official Community Plan for the Island."
4.	3.7.7	First Line: after “requested” add “,in addition to the already designated Ford Cove hill section of Central Road,”
8.	5.8 Roads Background	First line: change to read “Hornby’s roads fall into four categories: main rural, minor rural, residential rural and heritage rural.”

ISSUES SUMMARY:

The Hornby Island Official Community Plan review process began in 2009. The early stages of the review process identified four key areas for the OCP review to focus upon. These were:

1. Changes to the housing policies (Section 6.3.5), which include new provisions for secondary suites and the use of detached dwelling units for temporary housing;
2. A revised policy (6.3.3.1) regarding the subdivision of rural residential lots;
3. A revised policy (6.5.1.3) which specifies criteria to be considered for the possible limited expansion of commercial zoning for small scale retail and personal service use; and
4. A renamed and revised Section 6.2 “Community Service Use” which contains new policies to encourage community based tenants and businesses.

Since that time the draft OCP document has evolved as input has been sought and received on these topic areas through community information meetings, town hall sessions and APC reviews. The most recent community review opportunity was the October 27, 2013 community information meeting the results of which were reviewed and discussed at the LTC’s November 22, 2013 meeting.

At that meeting the Trustees noted that the Advisory Planning Commission had already completed a detailed review of a prior draft of the Official Community Plan (OCP) and suggested that the review of the OCP be limited to changes that have occurred since their previous review. The following motion was adopted at that meeting.

HO-044-2013
It was MOVED and SECONDED,
that the Hornby Island Local Trust Committee refer the draft Land Use Bylaw and associated schedules to the Advisory Planning Commission for their review and comment and refer the draft Official Community Plan and associated schedules for any comments arising from changes made from the previous draft.

CARRIED

The draft OCP document was subsequently referred to the APC on December 3, 2013. This report responds to the outcomes of that review and the LTC's direction from their February 7, 2014 meeting.

STAFF COMMENTS:

The APC's review of the current draft of the OCP was thorough and the recommendations well considered. Staff support the recommendations arising from the February 7th LTC meeting and support the inclusion of a small number of other recommendations from the APC review for inclusion in the draft document as outlined in this report.

It is the view of staff that the draft OCP is a mature document that is ready to move forward to the next steps required for ultimate adoption, including agency and public consultation. Given the importance of this document to the Island community staff consider it prudent to identify any significant issues that would hamper final adoption early in the next steps of the consultation process. This early identification can be facilitated through an early referral to the following key agencies and First Nations

Cowichan Tribes
Halalt First Nation
H'ul'qumi'num Treaty Group
K'omoks First Nation
Laich-kwil-tach Treaty Society
Lake Cowichan First Nation
Lyackson First Nation
Penelakut Tribe
Qualicum First Nation
shishalh (Sechelt) First Nation
Sliammon First Nation
Snaw'Naw'As Nation
Nanwakolis First Nations Referral Office
Stz'uminus First Nation
Te'Mexw Treaty Association
We Wai Kai Nation
Wei Wai Kum First Nation
Xwemalhkwu (Homalko) First Nation

Comox Valley Regional District
Vancouver Island Health Authority

RECOMMENDATIONS:

It is the recommendation of staff THAT the Local Trust Committee:

1. direct staff to amend the draft Official Community Plan bylaw to include additional Advisory Planning Commission recommendations as identified in the February 17, 2014 staff report; and
2. direct staff to send an early referral of the draft Official Community Plan to agencies and First Nations.

Prepared and Submitted by:

Rob Milne	March 4, 2014
RPP, MCIP Island Planner	Date

Concurred in by:

Courtney Simpson	March 4, 2014
RPP, MCIP Regional Planning Manager	Date

FINAL DRAFT Feb. 2014 V. 7.4

HORNBY ISLAND OFFICIAL COMMUNITY PLAN

BYLAW NO. ____, 201x

NOTE TO READER: This is a draft update to the Hornby Island Official Community Plan referenced as "APRIL 2013 V.7" which has been revised by the Hornby Island Local Trust Committee based on community input to date.

Preserving **Island** communities, culture and environment

BYLAW AMENDMENTS

This Copy is consolidated for convenience only and includes the following **Text Amendments** only:

Bylaw Number	Amendment Number	Adoption Date

HORNBY ISLAND LOCAL TRUST COMMITTEE
BYLAW NO. ___

****

A BYLAW TO ADOPT THE OFFICIAL COMMUNITY PLAN FOR THE HORNBY ISLAND LOCAL TRUST AREA

****

WHEREAS Section 29 of the *Islands Trust Act* gives the Hornby Island Local Trust Committee the same power and authority as a Regional District under Section 694(1)(i), 723 and Part 26, except sections 932 to 937 and 939 of the *Local Government Act*; and

WHEREAS Sections 876 and 882, respectively, of Division (2) of Part 26 of the *Local Government Act* applies to the Hornby Island Local Trust Committee and authorizes it to adopt an Official Community Plan and outlines procedures for developing and adopting such plans including a public hearing and Ministerial approval; and

WHEREAS Section 27 of the *Islands Trust Act* requires that the Executive Committee of the Islands Trust must approve an Official Community Plan prior to adoption; and

WHEREAS Section 877 of the *Local Government Act* lists the subjects that must be addressed in a Plan; and

WHEREAS Section 884(1) of the *Local Government Act* provides that the adoption of an official community plan does not commit or authorize the Hornby Island Local Trust Committee to proceed with any project that is specified in the Plan; and

WHEREAS Section 884(2) of the *Local Government Act* requires that all bylaws enacted, permits issued, and works undertaken by the Hornby Island Local Trust Committee be consistent with the Official Community Plan;

NOW THEREFORE the Hornby Island Local Trust Committee being the Trust Committee having jurisdiction on and in respect of the Hornby Island Local Trust Area in the Province of British Columbia pursuant to the *Islands Trust Act*, enacts as follows:

TITLE

1. This Bylaw may be cited as the "Hornby Island Official Community Plan Bylaw No. ___, 201x".

APPLICATION

2. This Bylaw applies to:
Hornby Island,
Toby Island,
Flora Islet,
Norris Rocks,
and unnamed islets and the surface of water within 1000 metres of the natural boundary of the sea on Hornby and Toby Islands and Flora Islet, except where the boundary overlaps with that of Denman Island in which case, the jurisdiction of the Hornby Island

Local Trust Committee extends to a line mid-channel between the two Islands as shown on Schedule B.

ORGANIZATION

3. Schedule A, including the Maps attached as Schedules B, C, D1, D2, E, F and G, attached to and forming part of this Bylaw, are hereby designated as the "Hornby Island Official Community Plan Bylaw No. ___, 201x".

4. The Schedules and Maps comprising this Bylaw are as follows:

Schedule A:	Bylaw Text
Schedule B:	Land Use Designations Map
Schedule C:	Land Status and Road Designations Map
Schedule D1:	Environmentally Sensitive Areas and Aquifers Map
Schedule D2	Environmentally Sensitive Aquifers Map
Schedule E:	Development Permit Areas Map
Schedule F:	Hazardous Areas Map
Schedule G:	List of Community References

BYLAW REPEAL

"Hornby Island Official Community Plan Bylaw No. 104, 2002", as amended, is repealed upon adoption of this Bylaw.

SEVERABILITY

If any section, subsection, sentence, clause, phrase, plan, map, diagram, table, schedule, or other graphic material or any part thereof of this bylaw is for any reason held to be invalid by the decision of any Court of competent jurisdiction, the invalid portion shall be severed and the decision that it is invalid shall not affect the validity of the remainder.

READINGS

READ A FIRST TIME THIS th DAY OF , 20
PUBLIC HEARING HELD THIS th DAY OF , 20
READ A SECOND TIME THIS th DAY OF , 20
READ A THIRD TIME THIS th DAY OF , 20
APPROVED BY THE EXECUTIVE COMMITTEE OF THE ISLANDS TRUST THIS
th DAY OF , 20
APPROVED BY THE MINISTRY OF COMMUNITY, SPORT AND CULTURAL DEVELOPMENT
THIS th DAY OF , 20
ADOPTED THIS th DAY OF , 20

_____ _____
SECRETARY CHAIRPERSON

HORNBY ISLAND OFFICIAL COMMUNITY PLAN

Schedules

SCHEDULE A
HORNBY ISLAND OFFICIAL COMMUNITY PLAN

SECTION I— BACKGROUND

1.1 Context and Interpretation

This plan is an update to the Hornby Island Official Community Plan Bylaw No. 104, 2002 and has been assigned a new bylaw number to denote the update. An update, in contrast to a review of the plan, focuses on updates to legislative references and clarification of the text where previous use of objectives or policies have identified lack of clarity. A review was undertaken of Section VI – Objectives and Policies for Sustainable Land Use" with a focus on housing and the economy and amendments are incorporated into this plan. Other areas of review included new objectives and policy on wind energy and amendments to land use designations on some properties.

The Plan update distinguishes between "Policies" and "Advocacy Policies". "Policies" are those that are within the authority of the Hornby Island Local Trust Committee to implement. Community goals and objectives included in this Bylaw that address matters that are outside the jurisdiction of the Hornby Island Local Trust Committee are considered "advocacy policies". These advocacy policies encourage others to take actions that the Local Trust Committee believes would contribute to the goals and objectives of the plan. This Bylaw cannot and does not represent a commitment from other agencies or persons to act according to community goals, objectives or policies.

Properties are noted with a land use designation on Schedule B attached to this Plan. Each designation is referenced in the text of this Plan with stated objectives and policies. In addition there are sections of the text of this Plan that apply to all properties on Hornby Island. If a property has more than one land use designation as defined on Schedule B to this Plan, then the objectives and policies applicable to each designation shall apply to that property.

The term "Information Note" is used periodically within the Plan. An information note is not part of the official community plan bylaw. An information note is added to the published bylaw document after adoption of the bylaw to assist in the understanding and interpretation of the Plan.

1.2 Purpose

The purpose of this official community plan bylaw is to further the object of the *Islands Trust Act* through long-range land use policies for the Hornby Local Trust Area. This bylaw provides a statement of local government goals, objectives and policies. It is intended to provide policy guidance for the Hornby Island Local Trust Committee and the public regarding the existing and proposed land use and development in the Local Trust Area.

1.3 Islands Trust Authority

The *Islands Trust Act* gives the Islands Trust, via its Local Trust Committees, essentially the same land use planning authority as a regional district board under the *Local Government Act*. Bylaws must be submitted to the Islands Trust Executive Committee for approval and must not be

approved if they are contrary to or at variance with the Trust Policy Statement. In the case of Official Community Plans, approval by the Minister of Community, Sport and Cultural Development is also required before adoption by the Local Trust Committee.

The Hornby Island Local Trust Committee is the Local Trust Committee with responsibility for land use planning and regulations within the Hornby Island Local Trust Area. This committee has three members; two locally elected trustees and a member of the Executive Committee appointed by the chairperson of the Islands Trust Council.

The purpose of the Trust Council, Executive Committee, and Local Trust Committees, is to carry out the object of the Islands Trust which is:

> *To preserve and protect the trust area and its unique amenities and environment for the benefit of the residents of the trust area and of the Province generally, in cooperation with municipalities, regional districts, improvement districts, other persons and organizations and the government of the province.*

The legislated object defines the purpose of providing authority to the Islands Trust for land use regulation. The Trust Policy Statement is a general statement of policies to carry out the object of the Trust. Local Trust Committees employ the available planning powers of the *Local Government Act* to preserve, protect, and effectively maintain the rural nature, health, natural environment and vitality of the Trust Area.

1.4 Historical Perspectives

Someone has said "a people without a history can have no vision". The people of Hornby Island are standing on history. It is to be found in the remnants of snake fences, and in the derelict orchards, in the blackened shell-flecked soil around the shores, and in the indigenous trees and shrubs from which the first people took their sustenance. It is to be found in the soil and in the sandstone and conglomerate sedimentary rocks, in the pebbles on the beaches, and in the basement rock on which the Island rests.

The rocks of Hornby Island are part of the island arc Wrangellia, which started its life as molten lava, three hundred and fifty million years ago, south of the equator. The arc, the result of one ocean plate meeting another and subducting, journeyed north on the back of the Pacific Plate, eroding gathering limestone. On reaching the latitude of present-day Mexico, about one hundred and seventy million years ago, another set of volcanic eruptions added more volcanic rock to the terrain.

From these two major geological events came the Island's basement rock, and later, 65 to 70 million years ago, most of the ingredients for the Island's sedimentary rock, the pebbles in the conglomerate and the eroded rock from the tumbling hillsides, came from the recycled substance of Wrangellia's earlier geological history. Also in the sediment are found fossils of sea creatures, and pieces of petrified wood dating from trees that grew at that time.

Continuing tectonic plate pressure first folded and then faulted the layers of sedimentary rock. The movement of glaciers and the rising and falling of seas in the interglacial periods, scoured the rock and then padded the dips and valleys with clay, sand, and glacial till. Some of the boulders and cobbles were brought from as far away as the Coast Range Mountains.

Ten thousand years ago, three thousand years after the last glacier retreated, the receding seas started slowly to reveal Hornby Island with much the same shape that it is today. Vegetation started to grow and by five thousand years ago people from Deep Bay were visiting the Island gathering the Island's bounty and fishing from its shores.

Hornby Island and its surrounds, immediately prior to the advent of western civilization, was the territory of the Pentlatch, a people belonging to the Coast Salish group of West Coast people. They and their ancestors, being semi-nomadic, used the Island seasonally and cyclically nine months of the year and became part of the Island's ecosystem. The island could provide for nearly all their needs.

In 1791 A.D., the Spaniards named the Island, Isla de Lerena but in 1850 the British renamed it Hornby Island, after Rear Admiral Phipps Hornby, at that time Commander of the Pacific Station. Ten years later Mt. Geoffrey and Phipps Point were named after the Admiral and his son, Captain Geoffrey Hornby of HMS Tribune while the officers of his ship had their names immortalized in other Island promontories.

By 1850 there were practically no Pentlatch left. Sickness, slave raids, the movement of people into their territory from the land further north, and the collapse of their world from the compounding of these misfortunes, finally wiped out the people to whom the natural life of Hornby Island was a part. The lands on Hornby Island continue to be recognized today as part of the traditional lands of the Coast Salish people through discussions with representative First Nations such as the K'omoks First Nation.

The K'omoks First Nation have been in treaty process since 1993 and signed an Agreement In Principle (AIP) in March 2012 with the governments of Canada and British Columbia. A Final Agreement (Treaty) is anticipated to protect the rights of the K'omoks members.

During the 1860's Hornby Island was virtually empty of people. It was the sight of the island on fire at the end of the decade that decided George Ford, one of the earliest recorded settlers, to move from his settlement in Comox to Hornby Island. Fires made clearing land easier. Other settlers followed. In 1870 a whaling company moved its base of operations to Hornby Island, but in less than two years it went into liquidation and one hundred acres at Whaling Station Bay with wharf, sheds and other buildings were auctioned off.

The early settlers were able to choose land which was sheltered, amply provided with water, and having deep fertile soil. By the turn of the century Hornby had become a fairly prosperous farming community, although many who came to farm found the sale of logs from the clearing of land more profitable than the farming itself.

Hornby Island, like all islands, promised a dream. The Island challenged, dared, and offered an escape. Not everyone who came succeeded and even those who did succeed, often found their children seeking dreams elsewhere. By 1960 most land had changed hands several times. Families had come and gone. Some orchards were derelict and many fields were overgrown. The 150 people on the Island were made up of fishermen, subsistence farmers, resort owners, their children and one or two retired intellectuals. Towards the end of the sixties developers discovered the Island and three farms were turned into small lot residential subdivisions.

To avoid more indiscriminate carving up of the Island, a policy restricting subdivision to a ten-acre minimum lot size was introduced. in 1969 through a provincial cabinet Order-in-Council known as the "Ten-Acre Freeze", applying it to all of the Gulf Islands. The decree permitted no further

subdivision creating lots under 10-acres in size, with a maximum of two dwellings per parcel, and was to continue to apply until zoning and subdivision bylaws could be enacted by the local governments for each island. As well, in about 1972, using existing soil analysis mapping, the Province established the BC Agricultural Land Reserve (ALR), and its Commission known as the ALC, covering all the known useable farm and grazing land in BC to prevent further subdivision or development of the Province's remaining farmland, except through application to the ALC (this was estimated to include no more than 3% of the province's land mass). In 1973, the Comox-Strathcona Regional District responded to the call for land use regulation by assisting the Hornby community to develop and pass its first set of local land use and subdivision bylaws (Bylaws Nos. 137 and 139). This coincided with the arrival of the counter-culture people, and the Island flowered with artists, craftsmen and academics seeking a more meaningful life. In 1974 the Islands Trust was formed to preserve and protect the Gulf Islands, which include Hornby Island, against inappropriate use and development. In April 1977, the new Hornby Island Local Trust Committee, following lengthy discussion with Hornby residents, approved the first Official Community Plan for the Island.

Legislation does not ensure the spirit of a place. Hornby Island itself with its beauty, with its history deep into the past, its tranquility, its changing light and seasons, must be allowed to capture the hearts of those who dwell here. Hornby will endure although it has not always been an island and one day may not be again. It has traveled a long way and gone through many changes. It will be here long after the human population has gone. Every person who owns land holds it as a temporary tenant, in trust for future generations.

1.5 The Natural Setting

Terrestrial Ecosystems

Hornby Island is within an ecological region unique in Canada. The Coastal Douglas Fir (CDF) zone is one of the smallest biogeoclimatic zones in British Columbia, occurring only on the Gulf Islands, southeastern Vancouver Island and small portions of the Sunshine Coast and Fraser Delta. It is a region of exceptionally high biodiversity but also one that has been profoundly and adversely affected because of its accessibility for logging and suitability for settlement. Less than 1% of this ecosystem remains relatively undisturbed; 12% of provincial ecosystems are generally considered a minimal protection target to achieve ecological representation. Even if all the remaining remnants of old-growth forest can be preserved, areas of older second-growth forest must also be protected and allowed to recover to an old-growth state to ensure adequate representation of this forest type in the future.

The original Coastal Douglas-Fir forests had a relatively open canopy dominated by gigantic Douglas-Firs, which can live more than 750 years. About 100 species of other trees, shrubs, vines, herbs and mosses are indigenous to these forests.

On Hornby only about 104 hectares (260 acres) of relatively undisturbed stands of older forest have been identified. This is about 3.5% of the island's area. However, there are also at least 572 hectares (1330 acres) of older second-growth forest (19% of the Island). As these recovering forests reach about 80 years old, they start to develop a structure and composition that allows much of the natural biodiversity to become re-established. These areas can provide important connectivity, allowing the movement and dispersal of forest plant and animal species. Within the Coastal Douglas Fir zone, Garry Oak Woodlands cover about 0.6% of the landscape. They often occur on south-facing slopes where summer moisture is low and shallow soils are common.

These open woodland ecosystems support a very high biodiversity of plants. Less than 5% of the historic Garry oak woodlands remain and many of these are seriously degraded. The woodlands provide habitat for a variety of birds, rare moths and butterflies and the Northern Alligator Lizards. This ecosystem includes 93 species at risk.

On Hornby, the Garry oak ecosystem is near the northern extremity of its range. There are about 16 hectares (40 acres) of woodlands, the principal sites being west of Helliwell Park and above the Ford Cove Hill. There are many other smaller stands of Garry oaks.

Terrestrial herbaceous ecosystems (natural grasslands rich in wildflowers) are found in rocky, exposed areas near the shoreline and above coastal bluffs. Hornby has about 24 hectares (60 acres) of these sensitive ecosystems. They contain many rare and uncommon plants—and also support other species, such as the endangered Taylor's Checkerspot Butterfly. However, they are very susceptible to disturbance and degradation because they occur in areas that attract residential development and recreation.

Indigenous human communities have been part of this area's ecosystems as they evolved through shifting climatic conditions since the last ice age. Settlement communities have brought change, not only through logging, development and recreational use but also by interrupting preexisting processes (such as periodic fire) and by introducing invasive non-native species that displace native vegetation. In the 1980s the non-indigenous Virginia opossum was introduced to Hornby and is likely having a significant impact upon the preexisting ecology of the Island.

Fresh Water

Because Hornby Island has a self-contained hydrological system; fresh water is a critical element of its natural setting. Wetlands are extremely productive ecosystems, supporting a large number of species. They are also holding areas for fresh water which can incrementally recharge surface and groundwater systems during the dry season. Hornby, in common with most of the Gulf Islands, has few wetlands. Many of these have already been drained or damaged as a result of logging, agriculture, road-building and landscaping.

Three of the largest wetlands are on the "bench" above Lambert Channel, near Ford Cove and north of Helliwell Park. There are also significant wetlands in the upland Crown land. The only sizable lake on Hornby was in the Strachan Valley; it was established in the 1990's by beaver activity resulting in a significant increase in biodiversity in the area and a more consistent year-round flow in Ford Creek. The dam has now been abandoned and surface water is categorized as a wetland. Surface drainage is generally through many small seasonal creeks. Only Beulah Creek and Ford Creek (both draining the eastern escarpment of Mount Geoffrey) are fish-bearing. Riparian areas, along the margins of streams, lakes and marshes, are very important in providing habitat for a variety of species and maintaining the productivity of fish-bearing streams. Many of these areas have been affected by logging, road-building and settlement.

Groundwater on Hornby is found in open fractures or breaks within the sedimentary rocks underlying the entire island. These openings occupy less than 1% of the rock volume and allow the water to move from one part of the island to another. About 20% of Hornby's annual precipitation of approximately 1,174 mm, which occurs principally in the fall and winter, infiltrates the subsurface to replenish the groundwater supply.

This is the only source of groundwater recharge. This recharge generally takes place on the higher areas of the island and in stream beds. Outflow is to wetlands, creeks and the ocean. Groundwater is the major source of potable water on the island. In 1989 it was reported that in

the main residential areas the demand has reached more than 80% of the available water. Since then, the summer population of the island has expanded to several thousand people. Excessive draw down of aquifers in coastal areas can lead to saltwater intrusion or replacement by contaminated run-off. Over-development, inappropriate land use practices, inadequate waste treatment and improperly constructed or abandoned wells can all have an impact on the quantity and/or quality of groundwater. Most water, used or unused, eventually reaches the ocean and any contamination can negatively affect marine life.

The Marine Environment

The waters around Hornby are part of an internationally recognized Important Bird Area (IBA), designated because the area supports globally significant numbers of waterbirds in winter. The waters also support a high diversity of marine life including a variety of sponges, anemones, sea stars, nudibranchs crabs and fish. A unique feature of the marine ecology is the presence of six-gilled sharks, normally a deep-water dweller, at relatively shallow depths near Flora Islet.

The Hornby-Denman area is the site of the largest and most consistent herring spawn in British Columbia. This spawning is important to a variety of species, including Stellar and California sea lions (that spend the winter in these waters using rocks and islets to the south-east of Hornby as haul-outs), hundreds of bald eagles that congregate here each spring and the West Coast's largest concentration of Harlequin ducks.

Several species of groundfish are present, including quillback, copper, black, Puget Sound and yelloweye rockfish, lingcod, kelp greenling and cabezon. Rockfish and lingcod are now in serious decline throughout the Strait. There are areas of kelp-covered terrain and eel grass around Hornby that provide excellent habitat for juvenile rockfish. Salmon populations have declined significantly and whales, once fairly common, are now rarely seen.

Hornby has large inter-tidal areas which have a particularly rich ecology. The health of these areas is likely supported by the waters around Hornby being relatively pristine compared to other areas of the Strait, but the accessibility and development of Hornby's shoreline also make it vulnerable to disturbance.

Coastal areas of the island are important for the well-being of many species that are part of the marine ecosystem. Pelagic cormorants roost on rocky bluffs; bald eagles depend on large trees around the island for perching or nesting; herons require a suitable stand in which to establish a heronry; salmon spawn in Beulah Creek; river otters use much of the coastline; Harlequin ducks and other sea birds are susceptible to disturbance from on-shore activity. Pollution originating on land (including from septic seepage) can contaminate bivalve shellfish. Thus there is a strong connectivity between the terrestrial environment and the marine environment of Hornby.

The natural setting of Hornby Island is rich, varied and of provincial importance. Despite heavy impacts from human use over the past century or so, a significant representation of natural ecosystems remains intact, though at risk from development and recreation pressures. The island's year-round population seems to have stabilized but, if Hornby continues to be a popular location for tourists and seasonal residents, protecting these remaining ecosystems—and restoring those already degraded—will be a crucial challenge.

1.6 Socio-economics of Hornby Island

A permanent population of 958 persons in 2011 represents a population decrease of 10.8% since 2001. The population is generally aging with a median age of 58 years. The population is

characterized by lower than average incomes and higher than average education. If trends continue, the challenges of ensuring housing affordability and safety, mobility and security will increase and efforts to provide for supportive services will be of concern.

The economy follows a seasonal cycle and is highly dependent on a population of visitors that is estimated to quadruple the island population in summer months. There are an estimated 100 businesses on Hornby Island, of which about 80% operate as home based businesses. Tourism is the major economic driver manifested in the range of accommodations, services, arts and crafts, performing arts and alternative health experiences that are available. There has been a long history of homeowners renting their homes to others for short periods of time (vacation home rentals) as a means of creating an income or to offset some home ownership costs. This activity has made a significant contribution to the island's economy. The construction industry, some public service positions and an increasing number of caregivers rounds out an integrated economy.

The Hornby Island Community Profile (March 2010) provides more detailed information.

1.7 Principles

The principles behind the development of this Plan are based on the mandate of the Islands Trust Act, "to preserve and protect, the trust area and its unique amenities and environment for the benefit of the residents of the trust area and of the Province generally, in cooperation with municipalities, regional districts, improvement districts, other persons and organizations and the government of British Columbia."

Based on that mandate, the objectives of the Hornby Island Community Plan are somewhat complex and focus on two main priorities. A first priority is to provide a balance between preservation of the natural environment and development associated with human settlement and economic activity. A second priority is to preserve the unique personality of the community while providing for its needs and those of its visitors in a manner and at scale that does not overburden the limited resources of the Island or its residents.

This Plan helps ensure that decisions related to the use of land on Hornby Island will not be made on the basis of expediency but rather will be based on the features of the natural environment and their inherent capacity to support a particular use or development. In addition, this Plan helps ensure that any proposed change in land use will be evaluated in terms of its impact on the social environment of the whole Island and on the associated needs of future generations.

Hornby Island offers unusual scenic beauty, sandy beaches, interesting geologic formations, clean air, a gentle climate and a community that has a rural lifestyle. The relative isolation of the Island has contributed to the self-sufficient character of the community. However, the increasing urban density of the lower mainland and eastern Vancouver Island makes the Island attractive to thousands of visitors whose demand for use of the Island threatens the very qualities that make the Island special.

It is recognized that human settlement on Hornby Island is constrained by the Island's size and its limited supply of fresh water. The fragility of its natural environment constitutes another less obvious and less widely understood constraint to development and use by visitors. Hornby Island offers many outstanding natural and historic features valued today by residents and visitors alike. If these features are to be enjoyed tomorrow, they must be protected today. It is only through community concern and understanding along with a sense of stewardship and responsibility that

the Island will be effectively protected and preserved. This Plan presents a well-defined community consensus about what is valued and should be protected and it is hoped that the Plan will influence governing agencies to respect the policies of the Plan.

These general objectives express the basic values held by the people of Hornby Island:

1. To ensure that all human activities on the island respect the natural environment and preserve the fragile ecosystems.
2. To ensure the quality and quantity of the groundwater is not compromised through human activities.
3. To maintain a rural community that is safe, creative, self-reliant and diverse.
4. To develop and support the Official Community Plan to guide the actions and decisions of residents, visitors and all levels of government with respect to Hornby Island.

From these general values, the Official Community Plan gives detailed objectives and policies to ensure that changes are suitable in the long term and have broad community support.

Since the original preparation of this Plan the Hornby community has also developed a collective vision titled the "*Ideal Hornby Island in the year 2020"* that is contained in the *Hornby Island Community Profile*. (listed in Schedule G). This statement of vision transcends land use planning and encompasses the broader vision of a community that is invaluable as a reference as decisions are made. The community vision statements can provide a useful reference in amplifying the meaning behind the principles, objectives and policies of this plan.

SECTION II — PRIMARY OBJECTIVES AND POLICIES

2.1 Broad Community Objectives

The following statement of general objectives express the values that are significant to the people of Hornby Island and together with the specific objectives listed in each topic area sets the direction to be followed when interpreting and implementing the policy statements.

To promote the conservation, preservation or restoration of:

a) areas of natural, scenic, historical, archaeological or scientific value,

b) watershed and groundwater recharge areas,

c) public land and parks,

d) areas of significant vegetation, the forests, the wildlife and their habitat,

e) land with agricultural potential,

f) shoreline, foreshore and the Island's surrounding marine ecosystem, and

g) water courses and riparian areas.

To ensure all human activities are carried out in a manner that is sensitive to the protection of fresh water resources and to the fragility and interaction of natural ecosystems, are compatible with activities of surrounding neighbours, and are in keeping with the rural scale of land use on the Island.

To minimize pollution of air and water.

To limit or reduce present and future stresses upon natural and community resources, particularly those generated by increasing seasonal uses.

To encourage a self-reliant rural community based on agriculture, low impact businesses and home occupations that are sustainable and non-polluting.

To ensure changes, growth and development are gradual and support the sustainability of the community.

To maintain the community's sense of unity and to promote a residential development pattern consistent with the rural character of the Island.

To encourage residents and visitors to take an active role in the preservation of natural and social values on the Island.

To encourage consultation with and participation of the public in local government decisions and in the management of Provincial resources by appropriate agencies.

To protect through sound long-range planning policies and strategies, the agricultural potential of lands, foreshore and intertidal areas, forested areas and groundwater recharge areas.

To support community awareness and participation in achieving lifestyles and buildings which ensure energy efficiency.

To preserve the rural character of the Island.

2.2 Objectives and Policies for All Land Use

Background:

The importance of preserving the sensitive ecosystems of the Island and the need to protect the groundwater resource were recurrent themes during the public review of the Community Plan.

Sensitive Ecosystems and Biodiversity

Hornby Island is located within the Coastal Douglas-fir biogeoclimatic zone, which is a relatively rare zone within British Columbia, occupying only 0.25% of the province. Sensitive ecosystems are considered sensitive because of their rarity and their fragility to disturbance. The protection of sensitive ecosystems is important to maintain biodiversity. Hornby Island has 573.7 hectares of sensitive ecosystems covering 19.2% of the island. However, the island has the second highest percentage of land in the Trust Area (29%) converted to human use. Garry oak woodlands, herbaceous areas, mature forest stands, cliffs and wetlands provide habitat for a variety of plants and animals, including about a dozen species at risk.

The Islands Trust has used various types of ecosystem mapping for planning and conservation purposes since its inception. Early sources of information were compiled from various studies while more recent efforts focused on development of ecosystem mapping products. The most recent mapping included:

ITEM – Islands Trust Ecosystem Mapping – This mapping was captured from 2000 and 2002 digital orthophotos. There was no groundtruthing and ecosystem features were representative of a bird's eye view of the landscape.

SEI – Sensitive Ecosystem Inventory – This was a joint initiative between the Federal and Provincial Governments to map rare and fragile ecosystems. Information was derived from aerial photos produced in the early 1990s, supported by selective field checking. An audit, done in 2004 using 2002 orthophotos, outlined the loss of sensitive ecosystems that had occurred in the 10 year time span.

SEM- Hornby Island Sensitive Ecosystem Mapping, 2010 - This is the latest initiative and is based upon 2001 aerial photography and recent selective groundtruthing. It is similar to SEI mapping and is based upon Terrestrial Ecosystem Mapping (TEM). It identifies areas which are fragile and/or rare because of diversity of species they support. They are deemed sensitive as they are easily impacted by human activities. The inventory includes old forest, woodland, herbaceous, wetland, cliff, freshwater as sensitive ecosystems; mature forest as a rare ecosystem and young forest, seasonally flooded agricultural fields and non-sensitive areas as other mapped ecosystems. Mapping of mature forest ecosystems, freshwater and wet forest ecosystems and dry soil ecosystems has also been developed based upon the sensitive ecosystem mapping to facilitate analysis.

Other ecosystem resources are listed in Schedule G – List of Community References.

About 25% of Hornby Island is preserved by provincial and regional parks and another 9% is Crown land managed to protect groundwater recharge. The remaining 66% of the island is divided between Agricultural Land Reserve (28%), large lot residential (30%) and small lot residential, commercial activity and community service use (8%).

Achieving sustainable biodiversity throughout the island will require stewardship on the part of landowners based upon having knowledge of the ecosystems and understanding of their importance. Land Use regulations and the establishment of Development Permit Areas can play a role in protecting key features.

Groundwater

Groundwater is the primary source of potable water supply on Hornby Island. Studies (refer to Schedule G for a list of these studies) have identified the importance of protecting the groundwater supply, ensuring that catchment areas are protected to provide for effective groundwater recharge, that groundwater is not contaminated from development and that the rate and use of groundwater does not exceed the rate of replenishment both in localized areas of the island and for the island in general. Effective planning and land use management are identified as some of the most effective means to address groundwater management.

Over-riding Land Use Objectives:

The objectives that apply to all sections of this Plan are:

(1) to preserve the natural ecosystems and biodiversity of the Island, and

(2) to protect the groundwater resource.

Over-riding Land Use Policies:

Policies 2.2.1 and 2.2.2 apply to all sections of this Plan.

2.2.1 In order to preserve the natural ecosystems and biodiversity of the Island the following should be addressed: a) wherever possible through zoning and land use regulations and where appropriate through Development Permit Areas; b) when considering applications for permits, rezoning and subdivision; and c) through information and advocacy directed to residents, property owners and agencies with jurisdiction on Hornby Island:

i) protecting identified sensitive ecosystems and important habitat from the adverse effects of development;
ii) conserving relatively undisturbed natural areas;
iii) retaining areas of native vegetation on each property wherever possible, especially along lot lines;
iv) managing undeveloped public land so as to maintain or restore natural biodiversity and ecological integrity;
v) securing connectivity between natural areas whenever the opportunity arises;
vi) sustaining the forested areas of the island through timber harvesting practices that retain tree cover and forest ecosystems; and
vii) preventing the spread of invasive species.

2.2.2 In order to protect the groundwater resource of the Island, the following should be addressed: a) wherever possible through zoning and land use regulations and where appropriate through Development Permit Areas; b) when considering applications for permits, re-zoning and sub-division; and c) through information and advocacy directed to residents, property owners and agencies with jurisdiction on Hornby Island:

i) maintaining the recharge of the groundwater resource in identified recharge areas by restricting extensive logging, modification of natural drainage features, residential, commercial and industrial developments, extensive road

development, excavation, quarrying and soil removal, ditching and drainage works;

ii) maintaining the quality of the groundwater resource by preventing contamination from: sewage and used water, concentrated animal feeding operations, intensive fertilizer or pesticide application, improper use or storage of toxic chemicals, improper waste disposal, such as burning and open dumps, inadequate protection of wells, inadequate sealing of abandoned wells, over-pumping of groundwater in areas where salt-water intrusion is likely to occur;

iii) maintaining the quantity of the groundwater resource by: limiting new development and land uses that will put an additional demand upon the groundwater resource in areas where availability is already a problem, using rainwater catchment and storage systems wherever possible in new and existing developments, establishing water conservation measures and practices; and

iv) supporting the implementation of a groundwater protection plan, including innovative and remedial programs.

SECTION III—OBJECTIVES AND POLICIES FOR PROTECTION OF THE ENVIRONMENT

3.1 Environmental Stewardship

Background:

The Hornby Island Trust Committee recognizes the need to protect the environment and finite resources of an isolated and fragile ecosystem from polluting activities in surrounding areas as well as those taking place on the island. Additional pressures are placed on the local natural systems by the influx of visitors in the summer months.

Hornby Island residents are generally aware of the need for personal diligence in minimizing the impact of human activities on environmental systems. The community is always seeking ways to encourage visitors to the Island and senior levels government with jurisdiction over resources on the Island to adopt the same commitment. There are currently no active mineral claims on the Island and any future development of metal or coal mines on the Island is inappropriate. The community encourages water conservation through water storage, catchment and water recycling.

Area

All areas within the Hornby Island Local Trust Area are subject to the following objectives and policies.

Objectives:

The objectives of this subsection are:

(1) to encourage senior governments to preserve and protect the environment;

(2) to inform residents and visitors of actions necessary to protect the island's ecosystems, freshwater resources, and preserve native biological diversity; and

(3) to ensure that permitted land uses do not threaten the sensitive environment of the Island and its native biological diversity.

Advocacy Policies:

3.1.1 A moratorium on oil and gas exploration in the Trust area is supported.

3.1.2 The Ministry of Energy, Mines and Petroleum Resources is requested to establish a reserve on the entire Island against exploration for mineral or petroleum resources.

3.1.3 The Local Trust Committee should encourage measures to reduce the risk of pollution from transporting dangerous materials by air, sea or land on or near the Island.

3.1.4 The Ministry of Transportation and Infrastructure and utility corporations are requested to replace the application of pesticides and herbicides on road allowances or other transmission routes with non-polluting practices such as manual trimming.

3.1.5 The hydro-electric utility company is requested to consult with the Local Trust Committee on any field operations involving the application of chemicals (such as remedial woodpole treatment programs).

3.1.6 The Comox Valley Regional District is requested to consider affordable and effective measures that will address the problem of uncontrolled dogs on Hornby Island.

3.1.7 The Comox Valley Regional District is requested to continue to maintain and enforce the following;

a) an effective noise bylaw to address noise disturbance originating from sound systems, musical instruments, barking dogs and other sources;

b) an effective unsightly premise bylaw; and

c) the “dark skies” in rural areas lighting standards.

3.1.8 All government and non-government agencies and private businesses involved in providing services for the resident and visiting public are requested to provide adequate toilet facilities and waste recycling containers for their clients and to make information available on water conservation.

3.1.9 Tourism-related businesses, real estate agents and other organizations that provide information to visitors or potential owners of island property are requested to include information on the legislated "preserve and protect" mandate of the Islands Trust and the objectives and policies of the Official Community Plan to protect the island's ecosystems and freshwater supply and to preserve native biological diversity.

3.1.10 All owners and land users are encouraged to comply with the “Develop with Care: Environmental Guidelines for Urban and Rural Land Development in British Columbia” of the Ministry of Environment and with the regulations of the Vancouver Island Health Authority, and the orders and discretion of the Fire Marshall.

3.1.11 Efforts to control the spread of invasive exotic plant species (such as Scotch broom, holly, ivy, daphne and Himalayan blackberry) and to eradicate them from environmentally sensitive areas to enable their replacement with native species are encouraged and supported.

3.1.12 Programs to control the population of opossums are supported.

3.1.13 The use of toxic herbicides and pesticides and heavy applications of fertilizers on lawns and gardens is strongly discouraged.

3.1.14 The dissemination of information about the risks of introducing invasive non-native species and pathogenic organisms harmful to indigenous species resulting from bringing biological material (including soil, bark mulch and firewood) onto the Island is supported and efforts to increase sustainable island self-sufficiency with respect to the provision of firewood and other biological material are encouraged.

3.2 Environmentally Sensitive Areas

Background:

Hornby Island has a diverse and fragile ecology with many significant natural features. The climate and soil conditions combine to allow diverse wildflower colonies, bird habitats, and Garry oak groves. The naturally eroded sandstone and conglomerate bluffs along much of the shoreline provide habitat for birds, wildflowers and rare plant species.

The Sensitive Ecosystem Mapping (SEM) completed by the Islands Trust in 2010 provides the most complete and up to date inventory of information on terrestrial based ecosystems. This mapping together with an updated Islands Trust Regional Conservation Plan will assist the Local Trust Committee in its decision making and in the development of land use, subdivision and development permit regulations as such programs develop.

Copies of the Sensitive Ecosystem Mapping (SEM) and the Regional Conservation Plan are available on the Islands Trust website (www.islandstrust.bc.ca) and the SEM map will be readily available electronically and in hard copy for reference. .

The Islands Trust Regional Conservation Plan identified the following Sensitive Ecosystems and their distribution on Hornby Island:

Sensitive Ecosystems (August, 2010):

Sensitive Ecosystem	**Area (ha)**	**Portion of Local Trust Area (%)**
Cliff	26.6	0.9
Freshwater	1.2	<0.1
Herbaceous	47.5	1.6
Mature Forest	179.6	6.0
Old Forest	0	0
Riparian	0	0
Woodland	62.8	2.1
Wetland	256.1	8.6
TOTAL	**573.7**	**19.2**

Protected areas identified in the Regional Conservation Plan were listed as follows:

Protected Areas Distribution (November, 2010):

Type of Protected Area	**Area (hectares)**	**Area as % of Local Trust Area**
Conservation Covenant (Conservancy held)	3.9	0.1
Ecological Reserve	0	0
Nature Reserve	0	0
Park – Municipal	0	0
Park – Community	6.7	0.2
Park – Provincial	333.9	11.2
Park – Regional	335.6	11.2
TOTAL	**680.1**	**22.7**

Other noted features identified in the Regional Conservation Plan include:

At Risk Species (September, 2010):
The B.C. Conservation Data Centre has recorded sightings of Coastal wood fern (blue listed), Western Screech-Owl, *kennicottii* subspecies (blue listed), Coast microseris (red listed), Propertius Duskywing (blue listed), White-top aster (blue listed), Macoun's meadow-foam (red listed), Nuttall's quillwort (blue listed), Fragrant popcornflower (red listed), Peregrine Falcon, *anatum* subspecies (red listed), White-top aster (red listed) and Great Blue Heron, *fannini* subspecies (blue listed) in the Hornby Island Local Trust Area. There may be additional species at risk in the Hornby Island Local Trust Area that are not recorded with the B.C. Conservation Data Centre or whose locations are considered confidential information.

Forested Ecosystems (August, 2010):
The Hornby Island Local Trust Area is located in the Coastal Douglas-fir Zone. No Old Forest ecosystems were found in the 2008 Terrestrial Ecosystem Mapping (TEM) of the local trust area used for this report, however, 2001 TEM of Helliwell Provincial Park does indicate some small old growth patches. The mapping for Helliwell Park is currently being reviewed and will be updated accordingly. The breakdown of forests by age class is as follows (note: this includes woodland sensitive ecosystems, so percentages will vary from the sensitive ecosystems section above):

Forest Type	**AREA (ha)**	**AREA (%)**
Pole/Sapling Forest (<40 yrs.)	366.65	7.3%
Young Forest(40-80 yrs.)	1506.72	29.8%
Mature Forest (80-250 yrs.)	255.62	5.1%

N.B. See note above regarding Old Forest (>250 yrs).

Marine Ecosystems (September, 2010):
Hornby Island Local Trust Area has two submerged provincial marine parks and two Rock Fish Conservation Areas in its local trust area waters.

Type of Marine Protection	**Name of Area**	**Area (hectares)**
Provincial Park	Helliwell	2,736.6
	Tribune Bay	27.0
Rock Fish Conservation Area	Savoie Rocks – Maude Reef	174.4
	Ajax/Achilles Bank	1,622.5
	TOTAL	**4,560.4**

Modified Ecosystems (August, 2010):

Type of Modification	**Area (ha)**	**Portion of Local Trust Area (%)**
Cultivated Field	287.6	9.6
Rural	421.7	14.1
Urban	51.0	1.7
Road	106.8	3.6
TOTAL	**867.1**	**29.0**

Threats to Ecosystems:

The threats to biodiversity found in the Islands Trust Area are described in the Islands Trust Fund Regional Conservation Plan. These threats are pertinent to the Hornby Island Local Trust Area. In particular, the Hornby Island Local Trust Area may be vulnerable to degradation of natural

ecosystems from existing agricultural and residential lands if landowners are not sensitive to the impacts of their land use on the surrounding landscape. Education about ecologically friendly agricultural practices and residential land uses may be beneficial within this local trust area. Biological threats to the Garry oak ecosystem also include conifer encroachment. Local organizations should be consulted prior to initiating education programs to avoid duplication of efforts."

A Nature Conservancy of Canada Study of the Islands Trust area, completed in 1995, classified about three quarters of the shoreline and associated beaches as containing moderate to high natural feature value for wildlife, marine and aesthetic features.

Other inventories, fieldwork carried out by biologists and local knowledge have identified the following habitat areas and features:

a) Important Terrestrial Habitat:
   i) cormorant nesting area on the bluff**s** of Helliwell Park,
   ii) heron rookery at Tralee Point and other current or potential heron nesting areas,
   iii) eagle, osprey and peregrine falcon nesting locations,
   iv) large older firs providing eagle habitat, particularly along the coastline and the inland bluffs,
   v) old growth trees and large snags (providing habitat for a variety of species) throughout the island,
   vi) wetlands and ponds throughout the island providing important habitat,
   vii) Beulah Creek (salmon habitat), its riparian corridor and feeder creeks,
   viii) Ford Creek (fish bearing), its riparian corridor and feeder creeks,
   ix) meadows in the south western part of Helliwell Park providing habitat for the only extant colony of Taylor's Checkerspot butterfly, and
   x) buildings providing established habitat for Townsends big-eared bat;

b) Important Marine Habitat:
   i) shoreline near Saint John's Point/Whaling Station Bay and other areas where Harlequin ducks gather during their flightless phase,
   ii) saltwater marsh north of Texada Road providing valuable waterfowl habitat,
   iii) Norris Rocks and rocks near Flora Islet where sea lions haul out,
   iv) islets and rocks around the Island where sea birds nest or gather,
   v) Whaling Station Bay and other bays around the Island providing waterfowl habitat,
   vi) the area of the underwater wall by Flora islet providing habitat for many marine species and frequented by six-gilled sharks,
   vii) the area surrounding Norris Rocks and Heron Rocks providing habitat for juvenile rock fish and other species, and
   viii) areas of marine vegetation important for herring spawning.

Area

All areas within the Hornby Island Local Trust Area are subject to the following objectives and policies.

Objectives:

The objectives of this subsection are:

(1) to ensure maximum protection of areas with ecological, natural, aesthetic or heritage value;

(2) to ensure protection of sources of fresh water and groundwater recharge areas;

(3) to allow for public access to such areas only when there is no danger of damage to sensitive features or ecosystems; and

(4) to maintain native biodiversity and connectivity of the natural habitat areas.

Policies:

3.2.1 Notwithstanding policies contained elsewhere in this Plan where they apply to land identified here, this section takes precedence.

3.2.2 Where areas are designated as environmentally sensitive on Sensitive Ecosystem Maps or on Schedule D1, the sensitive area may be protected by covenants at time of rezoning, subdivision or other change in land status in favour of an appropriate third party such as the Islands Trust Fund, or other organizations with the capacity to hold and monitor effective conservation covenants.

3.2.3 In areas of water collection and aquifer recharge, natural drainage patterns should be retained, and any removal of forest cover or other physical changes should be conducted so as to preserve the ability of the ground to retain water to recharge the aquifers, and may be regulated by Development Permit.

3.2.4 Development should be prohibited or restricted in areas identified by a hydrogeological study as being vulnerable with respect to water catchment, recharge or storage functions.

3.2.5 Any development in areas with sensitive ecosystems or important habitat may be regulated by Development Permit to protect the identified features, including establishing buffer areas in accordance with Sensitive Ecosystem Inventory recommendations or Environmental Guidelines for Development.

3.2.6 Development along coastal areas adjacent to foreshore with significant marine values (such as shellfish resources or migratory bird habitat) may be regulated by Development Permit.

3.2.7 Fish-bearing streams, their riparian areas, tributary creeks and wetlands feeding them will be protected and enhanced in accordance with the Provincial *Fish Protection Act* through regulations and through supporting enhancement programs.

3.2.8 Connectivity of relatively undisturbed natural areas should be maintained wherever possible including between the shore and the interior forested uplands.

Advocacy Policies

3.2.9 Where significant ecological, natural or historical areas or significant habitat areas are located on Crown land, the Ministry of Sustainable Resource Management and the Ministry of Environment are requested to secure these areas in protective reserves, Parks or through transfer to the Islands Trust Fund, and to keep them in the public domain with access appropriate to the level of sensitivity.

3.2.10 Voluntary covenants or easements to protect natural features and the donation or sale of sensitive areas to a conservation land trust such as the Islands Trust Fund are encouraged.

3.2.11 Voluntary stewardship programs that provide information, support and recognition to landowners with respect to protecting natural areas on private land are encouraged.

3.2.12 Educational efforts to protect coastal rock formations and other natural features from disturbance are supported.

Policies relating to protection of the marine environment are included in subsection 3.6 Marine Conservation.

3.3 Parks and Protected Areas

Background:

The natural features of the Island provide many opportunities for recreational use by members of the local community and visitors. A large area of Crown land and a system of traditional trails through private land have provided access to forest areas and scenic viewpoints. In addition, the public has access to three Provincial Parks and two Regional Nature Parks There are also four small community parks; four water accesses managed by the Comox Valley Regional District as neighbourhood parks and a number of other water accesses and unused road dedications under the jurisdiction of the Ministry of Transportation and Infrastructure that provide public open space and/or contribute to the trail system. The K'omoks Agreement in Principle, signed by the governments of Canada, British Columbia and K'omoks First Nation in March 2012, states that a new protected area (the present vacant Crown land on Mount Geoffrey) will be established on Hornby Island and named by K'omoks.

Hornby Island's Provincial and Regional Nature Parks provide recreational opportunities in the context of preserving ecological values. These parks are all located where there are high natural values and together contain a representative cross-section of the Island's ecological systems thereby offering valuable educational potential. Apart from Tribune Bay Outdoor Education Centre, none of the parks are developed for artificial use, reflecting a long-standing community interest in seeing minimal disturbance in these areas.

Hornby Island's Provincial Parks are Helliwell, established in 1966, Tribune Bay, established in 1978 and Mount Geoffrey Escarpment, established in 2004. There is evidence of traditional use of the Helliwell Park area by First Nations. All of the parks are designated "Class A' Parks under the *Park Act*. Helliwell Park contains a 69-hectare (173-acre) terrestrial component on the peninsula culminating in St. John's Point and a 2803-hectare (7008-acre) marine component. Most of the terrestrial area is heavily forested; grasslands extend inland from the shore-line, which mostly consists of rocky bluffs.

The "Sensitive Ecosystem Inventory: East Vancouver Island and Gulf Islands, 1993 - 1997" records the following sensitive ecosystems within Helliwell Park: Terrestrial herbaceous, Woodland, Wetland, Older Forest, as well as areas of Second Growth Forest with general bio-diversity values. Flora Islet is almost entirely covered with a sensitive terrestrial herbaceous ecosystem. Threatened vascular plants (red and blue listed by the BC Conservation Data Centre) have been recorded within the Park. The cliffs provide important nesting habitat for cormorants. Norris Rocks and the rocks adjacent to Flora Islet are important haul-outs for large numbers of Stellar and California sea lions resident during the winter. A significant population of Harlequin ducks is present in the inshore areas.

The underwater component of Helliwell Park provides habitat for a rich variety of marine species. The main feature is the rock wall adjacent to Flora Islet near where six gilled sharks are regularly observed at unusually shallow depths. The primary attractions of the terrestrial component of Helliwell Park are the spectacular bluffs topped by open meadow areas, the older forest (including particularly large examples of Douglas-Fir and arbutus) and the opportunities to observe wildlife and flowers in bloom. The primary attractions of the marine component are recreational diving to view the rich underwater ecosystem, kayaking and traditional sports fishing areas. There are commercial fisheries in and/or immediately adjacent to the Park area.

The fragility of the Park's ecosystems together with its popularity for recreation poses challenging conservation and management problems. In 1999 a Conservation Stewardship Agreement was established between BC Parks and Conservancy Hornby Island to enable local involvement in practical and educational conservation measures. In 2000, BC Parks initiated the Helliwell Ecosystem-based Planning Project.

Tribune Bay Park covers 96 hectares (240 acres), of which 23 hectares (58 acres) are foreshore of Big Tribune Bay. The Park's vegetation consists of about 70% second-growth forest and about 30% grassland resulting from former cultivation. The broad white sand beach, backed by the open meadow area, is the primary attraction of the Park. The Tribune Bay Outdoor Education Centre operates under a Park Use Permit in the north-east corner of the Park and provides educational programs to youth, mostly school groups. Infrastructure includes the old lodge, other buildings, a climbing wall and a high ropes course. A tennis court is also located in this area. A pilot constructed wetland providing alternative waste treatment has been established at the Centre.

The Mount Geoffrey Escarpment Park covers 187 hectares (462 acres) and offers both historic values associated with the Leaf House and the Ford Family farmstead and together with the Mount Geoffrey Regional Nature Park, covers approximately 25% of the island containing coastal bluffs, forested benches, wetland, and rugged shoreline.

The Mount Geoffrey Regional Nature Park was established by the Comox Valley Regional District on 303 hectares (758 acres) of what was formerly vacant Crown land. It includes the upper and western part of the Mount Geoffrey escarpment as well as lower land below and to the west of the escarpment. Within the Park are sensitive ecosystems - Older Forest (below the escarpment) and Sparsely Vegetated long the edge of the escarpment) - which have been identified in the "Sensitive Ecosystem Inventory: East Vancouver Island and Gulf Islands, 1993 - 1997". Most of the park's vegetation is second growth forest. The escarpment of Mount Geoffrey is an important part of the Island's groundwater recharge area.

The main attractions of the Park are the spectacular viewing opportunities from the edge of the Mount Geoffrey escarpment, the well-developed trail systems for hiking and mountain-biking and the older (and moister) forest ecosystem below the escarpment. The Comox Valley Regional District has adopted a Management Plan, developed with much community involvement; management is carried out through a contract with the Hornby Island Residents' and Ratepayers' Association.

Small Regional Parks exist near Tralee Point, near the top of Mount Road, at the end of Arthurs Road and adjacent to Helliwell Park. There are about 30 water access parcels under the Ministry of Transportation and Infrastructure jurisdiction and six or more other unused road dedications that are or could be utilized as trails or retained as undeveloped green space.

Area

All areas within the Hornby Island Local Trust Area are subject to the following objectives and policies.

Objectives:

The objectives of this subsection are:

(1) to ensure that parks remain in an essentially natural state and that the bio-diversity, sensitive ecosystems and wild life habitat are preserved;

(2) to allow for recreational and educational opportunities for visitors and residents that are managed and monitored to ensure minimal environmental degradation and to fully protect fragile areas;

(3) to encourage a system of walking, bicycling and horseback trails, with minimal development, through forested areas, to and from parks and across and around the island; and

(4) to encourage community and neighbourhood involvement in the planning and stewardship of parks.

Policies:

3.3.1 At the time of subdivision and if park dedication is required under the *Local Government Act*, preference is generally for park dedication, not cash-in-lieu. This could take the form of trails, or parkland.

3.3.2 The following areas are suitable for acquisition, dedication, and preservation and are identified as candidates for parks or protected areas:

a) land that is shown on Schedule B as park, groundwater or ecological reserve (GW/EPA & GW/GP) for existing areas;

b) land that contributes to a community trail network that connects residential areas, commercial areas, the community hall and school area, parks, beaches and ferry terminals;

c) land that is designated as Environmentally Sensitive Areas, as shown on Schedule D1 or is environmentally sensitive as determined by more recent mapping of sensitive ecosystems;

d) land that provides access to the ocean;

e) land that provides low impact recreational opportunities for the community and visitors;

f) areas of undeveloped lands;

g) land contiguous with existing parks and protected or undeveloped areas, particularly where it may provide a buffer for an ecologically sensitive site;

h) designated water accesses as parkland; and

i) land that provides habitat connectivity

3.3.3 The Local Trust Committee, when considering applications for zoning amendment or subdivision, should pursue any opportunities to secure protected areas, parkland or trails through dedication, easement, covenant or donation.

3.3.4 The subdivision, donation or sale of a parcel of land (or interest in land) for park, trail or conservation purposes may be considered a community amenity. Amenity Zoning and Density Transfer provisions may be established by the Local Trust Committee on a site specific basis and upon application.

3.3.5 Park and preservation uses should be permitted in all land use designations and may be zoned to specify the type of park or protected area.

3.3.6 Setbacks on properties adjacent to parks should be established by regulation to protect the visual amenity of parks.

3.3.7 Park land dedication, public accesses to and along foreshore and rights of ways should be maintained for public use, and remain free of encroachments.

3.3.8 The Local Trust Committee may consider amenity zoning of properties adjacent to existing parks to allow subdivision if the applicant is proposing an addition of part of the lot to the adjacent park.

Advocacy Policies

3.3.9 Owners of properties on which there are established public trails and appropriate organizations are encouraged to work together to achieve the long term protection of the trails through covenants or other means.

3.3.10 The Ministry of Environment is requested to:

a) maintain the natural values and not permit development, other than those required for public health and education in Helliwell and Tribune Bay Provincial Parks;

b) continue to regularly consult with the community's parks committee and/or the Local Trust Committee on matters relating to the management and infrastructure of the parks on Hornby in particular to address community, conservation, aesthetics and safety concerns;

c) involve the community in stewardship programs with respect to the parks;

d) prohibit camping uses in the Parks except those associated with the Outdoor Education Centre at Tribune Bay Park; and

e) implement ecosystem-based management plans for Helliwell, Tribune Bay and Mount Geoffrey Escarpment Provincial Parks.

3.3.11 The Comox Valley Regional District is requested to:

a) continue to manage Mount Geoffrey Regional Nature Park as an undeveloped Park, for low-impact, nature-oriented uses, with only those minimal facilities necessary for public health and safety. The Master Plan for this Nature Park should continue to emphasize protection of ecosystems, retention of vegetation, and protection of fragile areas and existing water sources;

b) continue active community involvement in the planning, stewardship and management of parks and other undeveloped parcels under its jurisdiction on Hornby; and

c) investigate and report on options for acquiring tenure of the adjoining vacant Crown land including management of this parcel as an addition to either the existing provincial or regional park.

3.3.12 The Ministry of Transportation and Infrastructure is requested to:

a) work with the Local Trust Committee to develop a plan for all water accesses, unopened road allowances and other such properties under the Ministry's jurisdiction on Hornby Island;

b) support tenure by Comox Valley Regional District of those parcels that the community and the Comox Valley Regional District consider appropriate for management as parks;

c) establish a stewardship arrangement with an appropriate community organization, or organizations, to act as stewards for the remaining properties once a plan has been developed for them; and

d) maintain the unopened road allowances in their natural state, prevent unpermitted alienation by adjacent land owners and discourage overnight camping by means of signage.

3.3.13 Motorized vehicles should not be allowed outside designated parking areas in any park, or on unopened road allowances, except for park service vehicles and emergency vehicles.

3.3.14 The Ministry of Environment is requested to work with the federal government and the Canadian Coastguard to develop measures to ensure that motorized vessels are excluded from that part of Tribune Bay that is within the Provincial Park.

3.3.15 The Ministry of Environment and the Department of Fisheries and Oceans Canada are requested to introduce regulations and other measures to fully protect marine species and habitat in the marine component of Helliwell Park.

3.3.16 Agencies with jurisdiction over parks are supported in restricting or controlling access to areas in parks where this is required for the protection or restoration of sensitive ecosystems and habitats.

3.3.17 Community organizations and land owners are encouraged to work together using available tools such as covenants and easements to secure and extend the existing network of trails according to the Parks and Trails plan.

3.3.18 Owners of land located adjacent to established parks are encouraged to dedicate land or to provide trail easements to add to the park amenity.

3.3.19 Where a park contains public well, parks authorities are requested to maintain the well and to post water quality analysis information.

3.4 Groundwater Protection-Sustainable Ecosystem Management Area (Mount Geoffrey Area)

Background:

This forested upland area at the centre of the Island has been identified by BC Environment as an important natural groundwater storage and catchment area providing groundwater recharge to wells in highly settled lowland areas. "A Preliminary Groundwater Assessment of a Crown Land Parcel on Hornby Island" (1994) carried out by BC Environment recommends that this land should be protected as a community watershed area to ensure preservation of the quantity and quality of groundwater on Hornby Island. In 1994, the Water Management Division established a Notation of Interest over this parcel to record its interest in the area due to its importance for protection of the groundwater resource.

The Final Report of the Hornby Island Groundwater Pilot Project (1994) recorded inter-agency agreement that "the Crown land parcel be considered a watershed reserve" and stated that "once more detail and definition of the groundwater catchment area becomes available, and a suitable legislative vehicle is found which can provide for protection of the land to ensure unchanged water quality and quantity, then another tenure can be considered by the community and agencies involved."

As immediate protection, The Water Management Division established a Notation of Interest (1994) over this parcel. A recommendation of "Water Stewardship and Wastewater Management on Hornby Island (2000)", a report prepared by Royal Roads University, includes the recommendation to "pursue legal protection of the crown lands as a groundwater recharge area".

The forest cover has been subject to severe unnatural disturbance through logging and fire from the latter part of the 19th century until the mid-20th century. The forest (classified as Coastal Douglas -Fir Moist Maritime) is now in various stages of recovery but contains scattered veteran Douglas-Firs and cedars. The "Hornby Island Sensitive Ecosystem Mapping (2010)" records areas of "old forest" - forest ecosystems with an average age of 250 years or greater and "mature forest" - - forest ecosystems with an average age of 80 years or greater within this parcel. (Older Coastal Douglas-fir forests in the region now account for only 4% of the area they occupied 150 years ago).

A report by Triton Environmental Consultants entitled *"Ecological Inventory of Proposed Woodlot #0032" (1998)* commissioned by the Ministry of Environment states that "old growth attributes (stand, structure, species composition, soil characteristics) should be enhanced or maintained .... as they have the potential to sustain representative features as stands develop". The report contains recommendations to protect or enhance wildlife and bio-diversity and to manage recreational impacts values. This preliminary survey indicates the need for a more thorough ecological inventory. Detailed accurate mapping by the Hornby Island Residents and Ratepayers Association and a preliminary ecological survey by Cascadia Resource Consultants (2000) constitutes a beginning of this work.

In coordination with Comox Valley Regional District and the Ministry of Forests and Range, the local community has instituted forest fighting and prevention programs. The large number of small, dead trees in some areas (fuel over-loading) has been identified as a significant fire risk.

The Island's two main water courses - Beulah Creek and Ford Creek, both fish-bearing streams - pass through this area. At one time, a beaver dam established a large wetland or lake in Strachan Valley; however the dam is now abandoned. The Strachan Valley area contains a number of small wetlands and seasonal and ephemeral streams.

The area has long been valued for its recreational attributes and was previously designated by map reserve for the Use, Recreation and Enjoyment of the Public. Former logging roads have been maintained as trails by residents and are well used by walkers, cyclists and equestrians - including for cross-island travel and access to the adjacent Mount Geoffrey Regional Nature Park.

A report prepared by an ad-hoc Committee of the Hornby Island Residents and Ratepayers Association *"The Heart of Hornby Island—A Forest, a Watershed (2000)"* reports on the mapping project and explores in detail the tenure options available to the community. A report prepared by the Advisory Crown Lands Committee for the Local Trust Committee "The Heart of the Island" submitted in July 2000 outlined historical, community and ecological issues and provided recommendations. A central theme of all of this work is the protection of the land under local control.

Area

All areas identified as Groundwater Recharge/Environmental Protection Area (GW/EPA) on Schedule B (Map Designations) are subject to the following objectives and policies.

Objectives:

The objectives of this subsection are:

(1) to protect and enhance the groundwater recharge function of the area;

(2) to enable the continuing recovery, restoration and protection of the forest so that the natural structure, composition and bio-diversity characteristic of a Coastal Douglas-fir forest ecosystem are re-established;

(3) to protect the forest from major disturbance by fire;

(4) to maintain the aesthetics/visual qualities of the forest;

(5) to encourage tenure arrangements that enable community control and stewardship of this area;

(6) to provide for low-impact recreation activities that are compatible with the first three objectives; and

(7) to ensure that any silvicultural activities or extraction of forest products are compatible with and subordinate to the first four objectives.

Policies:

3.4.1 This area should be conserved as a forested area and all planning should be undertaken with the perspective of a forest-based rather than a human-based time scale.

3.4.2 This area should not be subdivided except to create nature reserves or other land-holding arrangements for the protection of the natural environment.

3.4.3 No permanent buildings should be permitted on the land; other structures should be limited by regulation to those required in pursuit of the objectives of this sub-section

3.4.4 Sensitive ecosystems within this area should be fully protected. Transfer of this area to conservation or park is supported in order to protect the wetlands.

Advocacy Policies

3.4.5 The use of fertilizers and pesticides and the storage and disposal of waste material, hazardous chemicals and other potential pollutants should be prohibited to protect the groundwater resource and natural ecology.

3.4.6 Excavation, quarrying, soil removal, road development, ditching and drainage works should be regulated to protect against alteration of natural surface drainage or groundwater catchment and storage functions and against impacts upon identified ecological values.

3.4.7 Studies that provide additional data on the groundwater catchment and flow system should be supported.

3.4.8 The Ministry of Environment is requested to consider acquisition of the Mount Geoffrey area identified by the GW/EPA designation on Schedule B for a provincial park or other type of protected area.

3.4.9 As a preferred alternative tenure option, the Minister of Environment is requested to propose legislation that would enable the designation of this area as a community groundwater recharge area for the protection of the community's groundwater resource, to be managed through community stewardship with objectives and policies compatible with this Official Community Plan.

3.4.10 As an alternate tenure option, the Comox Valley Regional District is requested to investigate in consultation with the Local Trust Committee, the community and relevant First Nations, the appropriate options for obtaining tenure that would be compatible with the objectives and policies of this Official Community Plan.

3.4.11 Ministry of Forests, Lands and Natural Resource Operations is requested to only consider dispositions of this land or interests in this land that is compatible with the objectives and policies of this Official Community Plan.

3.4.12 The Ministry of Forests and Range is requested to only establish tenures that enable the implementation of the objectives and policies of this community plan.

3.5 Groundwater Protection—Gravel Pit Area

Background:

The area designated as Groundwater Protection/Gravel Pit (GW/GP) is under the jurisdiction of the Ministry of Transportation and Infrastructure as a gravel resource area.

Area

All areas identified as Groundwater Protection/Gravel Pit (GW/GP) on Schedule B (Map Designations) are subject to the following objectives and policies.

Objective:

The objective of this subsection is to ensure that this area becomes included in the Groundwater Protection-Environmental Protection Area when no longer required by the Ministry for gravel.

Policies:

3.5.1 The sand and gravel deposits on the lands designated GW/GP in this plan are deemed suitable to address the requirements of Section 877(1)(c) of the Local Government Act.

Advocacy Policies:

3.5.2 The Ministry of Transportation and Infrastructure is requested to use this land only for gravel extraction as required for the development and maintenance of roads on Hornby and to not allow its use for the storage of flammable material or potential pollutants.

3.5.3 The Ministry of Transportation and Infrastructure and Ministry of Forests, Lands and Natural Resource Operations are requested to support the transfer of any unused portion of the gravel pit parcel in Strachan Valley (and the whole of that parcel when it is no longer required for gravel extraction) for inclusion in the Groundwater Recharge-Environmental Protection Area land use designation.

3.6 Marine Conservation

Background:

The marine conservation area addressed by this Plan within the Hornby Local Trust Area extends up to 1000 metres from the natural boundary of the island. The coastline and offshore waters here are rich and varied. There are large expanses of sand beaches, gravel flats, underwater and exposed rocky reefs, sandstone shelves and deep water habitat where over 175 species of marine fauna have been recorded, including rare species. Of particular significance is the presence of six gill sharks in relatively shallow depths; the annual herring spawn; migrating salmon and killer whales.

Most of this area is contained within the marine component of Helliwell Park. It has also been proposed as a Marine Protected Area under the federal *Oceans Act*.

Sewage pollution, whether it originates from boats or from land can have negative impacts on water quality, even when releases are limited and seasonal. Dumping of materials or discharge of petroleum products and other chemicals can also contaminate the marine environment.

Area

All areas identified as Marine Conservation (MC) on Schedule B (Map Designations) are subject to the following objectives and policies.

Objective:

The objective of this subsection is to ensure the continued viability of marine ecosystems and species.

Policies:

3.6.1 Areas along the coastline that provide nesting, feeding and resting for birds should be protected. This may be accomplished by sign-posting, significant building setbacks and required retention of vegetation.

3.6.2 Programs to reduce land-sourced pollution should be supported.

Advocacy Policies

3.6.3 The Provincial and Federal governments are requested to develop existing and new programs, such as harvest refugia, which protect and enhance the populations of native marine species and ecosystems.

3.6.4 Ministry of Forests, Lands and Natural Resource Operations and the Federal Department of Fisheries and Oceans are requested to ensure that foreshore uses or developments that might deplete or disturb migratory wildfowl feeding areas, shellfish communities, fish nursery areas and herring spawning areas not be permitted.

3.6.5 The Federal Department of Fisheries and Oceans and the Ministry of Environment are requested to fully protect through conservation measures, including fisheries closures, any vulnerable species of marine fauna and flora and important habitats such as the area where six-gilled sharks come near the surface near Flora Islet and areas supporting juvenile rockfish or herring spawning.

3.6.6 The Federal Department of Fisheries and Oceans is requested to protect fully the marine component of Helliwell Provincial Park through conservation measures such as prohibiting the taking of marine life by diving, closures of fisheries as required and the establishment of a Marine Protected Area.

3.6.7 The Federal Department of Fisheries and Oceans is requested to regulate, police and monitor any harvesting of shellfish to ensure that wild stocks are sustainable.

3.6.8 The Federal Department of Fisheries and Oceans is requested to ensure that no activities should be permitted in the Hornby Island Local Trust Area that will degrade the sea bed.

3.6.9 The Vancouver Island Health Authority is requested to prohibit outfalls for sewage and used water on Hornby Island.

3.6.10 Transport Canada is encouraged to require holding tanks for sewage and used water in all commercial and recreational vessels.

3.6.11 The designation and enforcement of Tribune Bay as a no sewage discharge area under Federal Sewage Pollution Prevention Regulations is supported. The designation of additional areas where sewage discharge problems have been identified is also supported.

3.6.12 The Federal Ministry of Environment, Transport Canada, Fisheries and Oceans Canada, the Ministry of Defense and other relevant agencies are requested to prohibit the disposal of domestic, industrial or military waste or the discharge of waste from vessels (including cruise ships) into waters within or adjacent to the Hornby Island Local Trust Area.

3.7 Heritage Features

Background:

The community supports the concept of preservation of areas of unique or representative natural systems and of preserving heritage resources. Numerous petroglyphs have been found and documented on the sandstone benches along the shoreline of the Island. The origin and age of these picture symbols remains uncertain.

The Island was once used by First Nations, predominately from the east coast of Vancouver Island, as a summer camping area to collect and dry venison, berries, fish and shellfish for use in their villages throughout the winter. The Island may also have provided a source of cedar for building canoes. Fossils and middens are found in many locations. Archives have been established in the community and there has been interest in establishing a museum to include artifacts and fossils. New Horizons Society currently stores Hornby Archive's substantial acquisitions and is planning construction of a separate archives structure on its property.

Various road locations are also considered of heritage value either because of their historic use or by the nature and design of the roadway.

Area

The Hornby Island Trust Area and heritage road locations identified on Schedule C (Land Status and Road Designations) are subject to the following objectives and policies.

Objective:

The objective of this subsection is to protect the Island's heritage sites and resources, including heritage roads, and to promote the preservation and public availability of artifacts and historical records.

Policies:

3.7.1 All cemeteries should be considered community heritage sites and some mechanism of protecting them in perpetuity should be sought.

3.7.2 Development should be located away from areas of known archaeological sites wherever possible until an archaeological assessment has been done and suitable management options are developed.

3.7.3 Development Permits should be required and guidelines developed once heritage areas are accurately identified and designated or otherwise protected.

Advocacy Policies

3.7.4 A program to identify buildings and sites of historical significance and outstanding or typical examples of local architecture is supported and where appropriate, the Comox Valley Regional District or the Province are requested to designate or otherwise protect and preserve these resources.

3.7.5 The Ministry of Tourism, Culture and the Arts is encouraged to assist in further identifying all archaeological sites on the Island and to ensure those sites are protected from disturbance under the provisions of Section 13 of the *Heritage Conservation Act*.

3.7.6 The Ministry of Transportation and Infrastructure and hydro-electric and telephone utility companies are requested to consult with the Islands Trust before undertaking any widening, clearing or installation of poles and lines along Central Road particularly that portion designated a heritage road.

3.7.7 The Ministry of Transportation and Infrastructure is requested, in addition to the already designated Ford Cove hill section of Central Road, to designate Savoie Road and Little Tribune Bay Road as heritage roads, as noted on Schedule C, in accordance with the Island Trust and the Ministry of Transportation and Infrastructure Agreement (1992 and as amended in 1996) and the existing 33 foot road allowance should be retained.

3.7.8 The establishment of covenants held by the Islands Trust Fund to protect heritage sites is supported.

3.7.9 The establishment of a local museum and/or archive involving appropriate societies is supported.

3.8 Hazard Areas

Background:

The *Local Government Act* enables local governments to regulate setbacks of structures and septic systems in hazard areas through Development Permit. A study of soil stability may be required before new construction commences. The safe location of a residence is the owner's responsibility and not that of the local government. Based on greater than 30% slope, possible hazards are shown on Schedule F (Hazardous Areas Map). The sandy areas of Tribune Bay and Whaling Station Bay are active erosion areas due to severe storms and high water. The bluffs of Mt. Geoffrey and along certain shoreline areas may be subject to sloughing.

Area

The Hornby Island Local Trust Area and areas noted specifically on Schedule F (Hazardous Areas Map) as slope > 30% and the "Mt. Geoffrey slump area" are subject to the following objectives and policies.

Objective:

The objective of this subsection is to control development in hazardous areas.

Policies:

3.8.1 Areas identified as hazardous to development including the slump area on the south-west side of Mount Geoffrey and other areas that may be particularly vulnerable to earthquake activity may be designated Development Permit Areas and added to Schedule E of this Plan.

3.8.2 The development and use of the upland and foreshore in Whaling Station Bay should be regulated to protect against loss of the sand in the area.

3.8.3 Subdivision and development under the face of Mt. Geoffrey bluff that may contribute to erosion because of removal of vegetation or changes in natural drainage patterns should be extremely limited and controlled by regulation.

3.8.4 The Local Trust Committee should consider ways to further refine the identification of Hazardous areas identified on Schedule F in cooperation with other relevant agencies.

Advocacy Policies:

3.8.5 The Ministry of Transportation and Infrastructure is encouraged to ensure there is no road construction along edges of the shoreline, the bench, or the Mt. Geoffrey escarpment.

SECTION IV—OBJECTIVES AND POLICIES FOR THE STEWARDSHIP OF RESOURCES

4.1 Farming

Background:

The early development of Hornby Island included agriculture as a primary occupation, supplying agricultural produce to Vancouver Island. At present, small scale farming operations serve primarily local needs with some specialty production. Seasonal water supply can be a challenge and the need to protect water resources is a concern.

Area

The Hornby Island Trust Area is subject to the following objective and policies.

Objective:

The objective of this subsection is to encourage farming and local food production in ways that are compatible with the Island's environment.

Policies:

4.1.1 Co-operative farming and community gardens should be encouraged.

Advocacy Policies:

4.1.2 The development and implementation of a Hornby Island food and farm action plan is supported.

4.1.3 Sustainable and organic farming is supported, including efforts to ensure that water supplies used by farmers remain uncontaminated.

4.1.4 The Ministry of Agriculture is encouraged to maintain and promote sustainable agricultural and organic farming techniques and to discourage the use of toxic pesticides or other toxic chemicals and the inappropriate application of fertilizers.

4.1.5 The use of genetically engineered seeds or plants is strongly discouraged in order to protect the genetic integrity of food and crops and other plants growing on the Island.

4.1.6 The use of chemicals or farming methods that can result in the contamination of the soil, other organisms, groundwater or surface water is strongly discouraged.

4.1.7 Agriculture that utilizes rainwater for irrigation, practices water conservation and protects water quality is encouraged.

4.2 Forestry

Background:

Hornby Island was logged extensively up until the middle of the last century and most forested areas now consist of recovering second and third growth with some stands of old growth and scattered veteran trees. Most privately-owned forest is in relatively small holdings. The cost of transporting logs over two ferries to an off-island market (and conversely bringing wood products to the Island) can make the provision of wood products for on-island use a natural focus for forestry activity. Sustainable forest management has been described as "forest management regimes that maintain the productive and renewal capacities, as well as the genetic, species and ecological diversity of forest ecosystems."

Area

All areas below the natural boundary of Hornby Island within the Hornby Island Local Trust Area are subject to the following objective and policies.

Objective:

The objective of this subsection is to ensure all forestry is carried out in a way that protects ecological values and sustains the resource.

Policies:

4.2.1 Logging on steep slopes such as those identified on Schedule F (Hazardous Areas Map) on private lands (not subject to the Private Managed Forest Land Act) should be strongly discouraged and regulated by the appropriate authority.

4.2.2 Cutting of forest land that leaves large openings is considered inappropriate except when agricultural land is being cleared in accordance with a plan for farming the land.

4.2.3 Industrial scale logging is considered inappropriate for Hornby Island.

4.2.4 Maintaining buffers on all forested lots is encouraged to minimize the impacts of blow down, drainage alteration and other negative impacts on adjacent lots and to maintain connectivity of forest ecosystems.

4.2.5 The Local Trust Committee should assist landowners in achieving the objectives of this section by making information available on forest stewardship and sustainable management.

Advocacy Policies

4.2.6 The need for local firewood supplies is acknowledged and the careful management of firewood harvesting in order to improve the forest resource should be encouraged.

4.2.7 Low-impact sustainable forestry that maintains the essential forest cover and bio-diversity values is supported.

4.2.8 Owners of forested land are encouraged to ensure that forestry activities do not significantly alter natural drainage patterns.

4.2.9 The Ministry of Forests and Range is encouraged to consider the objectives and policies of this Official Community Plan and the policies of the Islands Trust Policy Statement in recognition of Hornby Island's location within the Island Trust Area and should be requested to:

a) promote management practices that ensure the protection of native biodiversity, valued environmental features and groundwater recharge areas; and

b) encourage management plans that involve the maintenance of continuous tree cover and that use native species in planting programs.

4.2.10 The extensive planting of non-native species for silviculture is strongly discouraged.

4.3 Mariculture

Background:

The relatively unpolluted water surrounding Hornby make it an attractive area for aquaculture. The alienation of areas for commercial operations can conflict with the interests of residents, the visiting public and boaters requiring anchorage. There is also concern about impacts upon the natural ecology of large-scale or intensive operations or of a large proportion of the foreshore used for mariculture. In 2009 the assessment rolls listed six aquaculture operations on the Island.

Area

All areas below the natural boundary of Hornby Island within the Hornby Island Local Trust Area are subject to the following objective and policies.

Objectives:

The objectives of this subsection are:

(1) to ensure the negative impact of commercial mariculture uses on the upland owners is minimized;

(2) to ensure maximum protection of the foreshore and of the native life forms inhabiting it;

(3) to support low impact mariculture operations; and

(4) to ensure commercial use of marine resources does not pollute the foreshore and surrounding waters, nor preclude the use or enjoyment of the shoreline by the public or upland property owners.

Policies:

4.3.1 Fish farms such as finfish net pen aquaculture operations should not be permitted.

4.3.2 Intensive mariculture, nori farms and long-line oyster culture requiring floats, buildings and structures should not be permitted in front of residential neighbourhoods of Sandpiper, Whaling Station Bay and Galleon Beach.

4.3.3

4.3.4 All new mariculture sites, including bottom culture, should be subject to redesignation, rezoning and subsequent regulations.

4.3.5 The areas from Collishaw Point Ford Cove has potentially suitable biophysical conditions and proposals for Mariculture use may be considered by the Local Trust Committee upon application for rezoning

4.3.5 Rezoning for mariculture should only be considered after there has been a review of the coastal area to identify significant and representative ecosystems, species, habitat and features, and the measures required to protect them such as processes required under the *Canadian Environmental Assessment Act* (CEAA).

4.3.6 Mariculture operations should be regulated to ensure that a 2 metre (7 ft.) leave space is retained for public enjoyment of the beaches.

Advocacy Policies

4.3.7 The Ministry of Forests, Lands and Natural Resource Operations is requested to prohibit:

a) mariculture in areas fronting provincial parks, regional parks or nature reserves: and

b) tenure in areas which have been used traditionally as moorage for local vessels or for landing of sea planes.

4.3.8 The Ministry of Forests, Lands and Natural Resource Operations is requested to:

a) ensure that mariculture operations are restricted to below the 2 metre (7 ft.) tideline and that adequate space is retained between lease areas to ensure public access to the shoreline;

b) consider the policies contained in this subsection relating to the location of new lease areas whenever it is considering the renewal of existing lease areas, and

c) monitor the impact of mariculture on other marine resources.

4.3.9 The Ministry of Forests, Lands and Natural Resource Operations, the Ministry of Agriculture and the federal Department of Fisheries and Oceans are requested to ensure that areas of natural occurrence of oysters and clams are available for public use and remain free of private or commercial leases.

4.3.10 The Ministry of Forests, Lands and Natural Resource Operations is requested to provide an assessment of potential environmental impacts, such as processes required under the *Canadian Environmental Assessment Act* (CEEA), prior to any proposal for additional mariculture tenures being considered by the Local Trust Committee.

4.3.11 The Ministry of Agriculture is requested to encourage development of new technology in shellfish production techniques that minimize use of structures.

4.4 Energy

Background:

The cost and environmental impact of using non-renewable energy resources has made increasing self-reliance in the supply and conservation of energy of particular interest to the Island community. Many homes rely on wood as a major source of energy. Wind energy is gaining recognition as a notable renewable energy source, and there is community interest in the responsible use of wind energy systems.

Residents of Hornby Island have long supported the phasing out of radioactive weapons and materials in the entire world and so declared the Island a nuclear free zone in 1985.

Area

The Hornby Island Local Trust Area is subject to the following objectives and policies.

Objectives:

The objectives of this subsection are:

(1) to encourage the conservation of energy; and

(2) to encourage the use of renewable energy sources with low environmental impact and safety risk.

Policies:

4.4.1 The use of all forms of renewable energy sources, such as small scale wind turbines and solar panels appropriate to the rural environment for generation of power for onsite consumption with limited noise and visual impacts and safety risk, should be encouraged.

4.4.2 The development of renewable energy sources that allow for the sale of power to the Hydro grid and for individual site and local community use may be examined through zoning regulation, provided that such sources are reviewed to ensure there are no negative environmental impacts or increased safety risks.

Advocacy Policies:

4.4.3 The use of low emission wood stoves should be encouraged.

4.4.4 Community initiatives to establish educational and informational programs on energy conservation on the Island including demonstration and experimental projects are supported.

4.4.5 The conservation of energy in buildings through adequate insulation and thermal glazing is supported.

4.4.6 Community transport, carpooling, ride sharing and the use of alternative fuel and non-motorized vehicles are encouraged.

4.5 Water

Background:

Surface water sources are managed by Ministry of Forests, Lands and Natural Resource Operations. Water Rights Branch through the allocation of surface water rights under the *Water Act*. Hornby Island has 43 surface water licenses issued for domestic, irrigation and storage uses. Groundwater is currently the primary source of water supply. Its availability and quality vary considerably around the Island and seasonal shortages are common. In some areas of the Island there is a high level of development in relation to aquifer productivity. There are reports of salt water intrusion in some locations. Dry or abandoned wells on private property that were not properly sealed are conduits for introducing contaminants into the aquifer from surface water. Hornby Island's fractured bedrock aquifers exist under unconfined conditions which makes them highly vulnerable to contamination introduced at the land surface. Of particular concern is contamination from inadequate treatment of sewage and used water and improper utilization, storage and disposal of chemicals used domestically or in trades, crafts, agriculture, industry and transportation. Where water supply is a problem, bottled water is purchased, water is obtained from other public or private wells or water is trucked for a fee from productive wells elsewhere on the Island. Household treatment of water also takes place. Irrigation can be a significant use of water in the summer with potential impacts upon availability during the low flow period.

Groundwater is a communal resource but it is not yet subject to management or regulation. In 1996, the Water Stewardship Project, sponsored by the Heron Rocks Friendship Centre Society, began to monitor creeks, ditches and beaches for fecal contamination levels, lobby for necessary changes and educate the public. In 1998, the Ministry of Environment and the Islands Trust established a Pilot Voluntary Groundwater Protection Pilot Project for Hornby Island which has been coordinated locally by an Advisory Committee. This project has compiled and reviewed existing and new information (including a Geochemistry Study and an Aquifer Classification) which is being used as a basis for developing a Groundwater Protection Strategy for the Island in consultation with other organizations and agencies, local experts and the community at large.

Groundwater is a limited and vulnerable resource that requires restrictions on land use and development. However, the water supply situation can be improved significantly by three measures that are being increasingly utilized: water conservation, water re-use and the direct catchment and storage of rainwater. Because groundwater concerns need to be taken into account in all land uses and development, policy 2.2.2 applies to every section of the plan. This section includes additional or more specific policies to protect the resource.

Area

The Hornby Island Trust Area is subject to the following objectives and policies.

Objectives:

The objectives of this subsection are:

(1) to encourage water conservation to ensure that existing users of the water supply do not deplete the supply;

(2) to ensure that new demand for water does not stress the groundwater resource;

(3) to ensure that activity pertaining to use of land does not lead to degradation of the current supply of fresh water;

(4) to enable more local involvement in the protection and management of groundwater;

(5) to encourage the use of effective alternative systems and technologies;

(6) to encourage the use of shared systems that provide water, store water and treat used water; and

(7) to encourage protection of water in wells.

Policies:

4.5.1 The establishment of a community-based water resource protection/management committee is supported to provide a coordinated and proactive approach to the protection and careful use of the Island's water resources.

4.5.2 A Groundwater Protection Strategy, based upon available technical information, community and agency consultation, should be developed and implemented.

4.5.3 Development should be restricted in areas where groundwater limitations have been identified by a groundwater geochemistry study, aquifer classification, hydrological report or other technical information.

4.5.4 Watersheds, wetlands, lakes, water courses and riparian areas should be protected through development permit or regulation, including requirements for protective setbacks.

4.5.5 Sources of potable water should be protected through "water supply protection area" designation and covenants and/or regulations that restrict land uses to those that are compatible with protecting the water source.

4.5.6 Activities that would pollute fresh water or salt water should be prohibited and land uses that may involve a potential for pollution should be regulated.

4.5.7 Alternative water source methods such as rain water catchment, lined dugouts and well reservoirs should be used for large scale uses such as for filling swimming pools.

4.5.8 Enclosed cisterns and ponds for storage of rainwater to supplement water supply for individual or group household use and fire protection and irrigation are encouraged.

Advocacy Policies:

4.5.9 The Vancouver Island Health Authority is requested to ensure that surface or groundwater is not contaminated by deleterious liquid discharges.

4.5.10 The Ministry of Forests and Range and the Ministry of Forests, Lands and Natural Resource Operations are requested to require that any tree cutting be carried out according to a management plan designed to fully protect the groundwater recharge function of the area based upon hydrological information and that draft management plans be referred to the Local Trust Committee for community review.

4.5.11 The Ministry of Transportation and Infrastructure is requested to review ditching practices with respect to maximizing groundwater recharge and retention and to work with the Local Trust Committee and the community to identify and carry out pilot projects involving alternative management of run-off in appropriate locations.

4.5.12 The Real Estate Board is requested to require from land owners disclosure of septic and well conditions and locations at the time of property transfer so that prospective buyers are informed of the water/septic situation.

4.5.13 Sellers of properties and their real estate agents are requested to disclose water and septic information to prospective buyers of property on the Island.

4.5.14 Any education program directed toward the conservation of Island water supplies, the re-use of water and the utilization of rainwater catchment and storage systems is supported.

4.5.15 The use of chemical fertilizers, pesticides, and herbicides by any agency or individual is strongly discouraged.

4.5.16 Property owners with wells on their property that are dry or contaminated (including by saltwater intrusion) are encouraged to back fill those wells.

SECTION V — OBJECTIVES AND POLICIES FOR A SUSTAINABLE INFRASTRUCTURE

This section reflects the concern that environmental considerations be applied to all settlement activities on the Island. The concept of sustainability is fundamental to decisions on the level and characteristics of services. The responsibility for regulating and monitoring the effect of providing services is commonly shared between government agencies and the Local Trust Committee. Issues addressed include transportation, water supply, waste disposal and energy.

5.1 Water Supply Systems

Background:

There is one Water Improvement District in the Whaling Station Bay area. There is informal or limited sharing of wells on a privately negotiated basis. It is recognized that the availability of ground water varies considerably over the Island and residents of distressed areas may wish to consider forming local water districts. In addition, there are natural water flows that could be captured from artesian springs. Reports by F. Chwojka (1984) and W. S. Hodge (1993) suggested establishing community wells in inland areas.

Area:

The Hornby Island Local Trust Area is subject to the following objectives and policies.

Objectives:

The objectives of this subsection are:

(1) to ensure the self-sufficiency of the Island with regard to a supply of freshwater;

(2) to ensure the maintenance of safe potable water sources for residents on the Island;

(3) to encourage the capture of rainwater for domestic use; and

(4) to encourage conservation and used water treatment to allow for re-use and recycling of water.

Policies:

5.1.1 Piping of water from a source off-island should be prohibited.

5.1.2 Large-scale desalination plants should be prohibited. Small-scale desalination plants using technologies that do not involve the returning of concentrated brine to the environment and other negative impacts to the environment, natural coastal processes or marine or coastal habitat may be permitted and regulated.

5.1.3 The Local Trust Committee should encourage and support efforts to establish community-managed water sources that could be made available to water delivery operators under appropriate arrangements and which would be monitored by a publicly-accountable organization.

5.1.4 A well may be used for the extraction of ground water for transportation off the lot from which it is extracted where permitted by zoning regulation or Temporary Use Permit.

Advocacy Policies:

5.1.5 The Vancouver Island Health Authority is requested to monitor water quality of community water systems and wells and to post the results on a regular basis for user's protection.

5.1.6 The Ministry of Environment is requested to:

a) regulate the use of groundwater for community systems; and

b) identify and assess and then maintain and monitor on a regular basis community wells established at the time of subdivision.

5.1.7 Ministry of Forests, Lands and Natural Resource Operations and the Ministry of Environment are requested to give consideration to:

a) identifying and reserving areas on Crown land that may be used as remedial sources of freshwater to supply existing residential uses only; and

b) establishing community wells in inland areas.

5.1.8 Small scale privately installed water systems and shared wells are encouraged, particularly for areas designated small lot residential.

5.1.9 Rainwater collection and storage are encouraged to provide domestic or commercial water supply for any new construction (and for incorporation into existing developments).

5.1.10 The provision of clean, safe public water supplies for the use of visitors is supported.

5.1.11 Dissemination of information on options for water conservation and recycling is supported.

5.1.12 The Comox Valley Regional District and other authorities are requested to work with the Local Trust Committee and the community to develop a strategic plan for providing a continuous safe supply of potable water for all residents of Hornby Island.

5.2 Water Supply Protection Areas

Background

The Whaling Station Bay Improvement District owns and operates a water collection system that provides water to about 35 property owners in the Whaling Station Bay area. There are public wells (some of them now disused) located on public land at Grassy Point, Sollans Road, Anderson Drive (two) and Jerow Road. There is also a public well within Tribune Bay Provincial Park that is now capped.

Area

All areas identified as a Water Supply Protection Area (WSPA) on Schedule B (Map Designations) are subject to the following objectives and policies.

Objective:

The objective of this subsection is to protect the Whaling Station Bay water collection system and other existing public wells as present or future sources of community water supply.

Policies:

5.2.1 Lot A Plan 19879 Section 9, owned by Whaling Station Bay Improvement District is designated as a Water Supply Protection Area to ensure its protection as a site specific water supply zone and land uses on this lot should be restricted by regulation.

5.2.2 Land uses on properties within the catchment area of this water supply system may be restricted by regulation or covenant to protect the water resource on the basis of a professional hydrological study.

5.2.3 Land uses on or near parcels containing public wells should be regulated to ensure protection of the water source.

5.2.4 Where indicated by a professional hydrological study, land uses on adjacent properties may be restricted by regulations or covenant to protect the water source.

5.2.5 The establishment of additional public wells in appropriate inland locations should be considered; parcels containing new public wells should be added to this designation.

Advocacy Policy

5.2.6 Public wells are subject to requirements of the *Water Act* and other provincial legislation. Designated purveyors or other agencies responsible for such wells must comply with provincial regulations and should protect the well head, ensure regular maintenance and testing of the well, post the test results and monitor draw down and water availability, or enter into an agreement with a community organization to carry out this work.

5.2.7 Agencies with jurisdiction over land parcels containing wells are encouraged to seal wells that are no longer being used or maintained.

5.3 Sewage Treatment and Disposal

Background:

The terms "liquid waste or sewage" is usually used to refer to waste that comes from toilets (black water) and from sinks, baths, washing machines, dishwashers, etc. (grey water). In conventional septic systems these wastes are treated and disposed of together. Other systems, such as composting toilets, are designed to treat only human waste (fecal matter) and this requires separate treatment for grey water. Water is a precious resource and can often be recovered and recycled with appropriate treatment. To reflect this, the terms "fecal matter" and "used water" are used in this plan rather than "liquid waste".

The disposal of sewage is governed by the Ministry of Health through the Public Health Act Regulations and administered by the Vancouver Island Health Authority. The Ministry of Environment and the Ministry of Agriculture also have relevant regulatory authority.

Hornby Island has high density subdivisions (Whaling Station Bay, Sandpiper Beach, Galleon Beach and Shingle Spit areas) which are not serviced by community sewerage systems. Fecal matter and used water must therefore be dealt with on each lot. A program of testing for fecal coliform in wells, ditches, creeks and beaches (carried out by the Water Stewardship Project in 1996 to 1999) indicates that there is a widespread lack of adequate treatment which is already causing contamination and could lead to serious health problems. There has never been an assessment made by the Vancouver Island Health Authority of the impact of all the septic systems on the area as a whole.

Small lots, lack of adequate percable soil, heavy winter rains, water shortages in summer and many property owners being non-resident present challenges to the effectiveness of conventional septic systems. Other treatment systems for fecal matter such as composting toilets, may provide appropriate alternative solutions, but these require proper installation and operation and separate treatment for greywater. (Composting toilets are addressed through the *Environmental Management Act* and not under the sewage disposal regulations.)

A number of pilot projects are being conducted on Hornby Island under the Innovative Designs Policy of the Vancouver Island Health Authority.

Area

The Hornby Island Local Trust Area is subject to the following objectives and policies.

Objective:

The objective of this subsection is to ensure that the disposal of sewage and used water does not lead to a health hazard through pollution of the groundwater or the waters surrounding the Island.

Policies:

5.3.1 All owners should be alerted when applying for a Siting and Use Permit to the need for considering the location of sewage disposal fields before wells are drilled and buildings are constructed and to meet provincial requirements.

5.3.2 The feasibility of facilities to fully treat sewage or to complete the treatment of material from composting toilets may be investigated through a comprehensive planning process, such as a Liquid Waste Management Plan process. Potential sites should only be

considered in appropriate locations away from residential areas and proposed operations must be in compliance with all applicable regulations.

Advocacy Policies

5.3.3 The Vancouver Island Health Authority is encouraged to apply strict standards in monitoring waste treatment systems.

5.3.4 The Vancouver Island Health Authority and the Ministry of Environment are requested to enable the use of proven innovative technologies for sewage and used water treatment methods where conventional systems are not appropriate.

5.3.5 The Province and the Vancouver Island Health Authority are requested to:

a) encourage the use of technologies that improve treatment and/or enable it to take place with a smaller foot print on the land (e.g. The use of effluent filters, tank access risers, package treatment plants and sand filters);

b) encourage the use of approval alternate systems where these are appropriate to particular situations; and

c) ensure regulations are enforced to prevent inadequate treatment of waste from threatening the quality of groundwater.

5.3.6 The Federal Government departments with authority are requested to require the use of holding tanks for sewage on vessels docked or moored in the waters surrounding the Island.

5.3.7 Provincial Ministries are requested to support research, development and application of alternative waste treatment systems through community-based pilot projects.

5.3.8 Public sewerage and sewage treatment systems are considered a remedial measure in existing high-density residential areas.

5.3.9 Consideration should be given to securing appropriate land (vacant Crown land or vacant private lots) that may be used in future for neighbourhood full treatment systems in the small lot subdivisions.

5.3.10 The Land Title and Survey Authority, the Real Estate Board and local realtors are encouraged to require from land owners disclosure of septic and well conditions and locations before property transfer so that prospective buyers are informed of the water/septic situation.

5.3.11 Programs designed to educate the public on appropriate approvable methods and management of sewage and used water disposal systems are encouraged.

5.3.12 Efforts to provide information to visitors that there are no pump-out facilities for recreational vehicles or boats on the Island are supported.

5.4 Recycling and Disposal of Solid Waste

Background:

Hornby Island has no outside garbage pick up but there are recycling and garbage disposal services at the Recycling Depot funded by the Comox Valley Regional District through local property taxes. The Recycling Depot is situated within a groundwater recharge area upslope from one of the Island's major residential areas.

Hornby Island has been diverting recyclable and reusable material from landfill since 1978 and is presently diverting up to 70% of the solid waste generated on the Island. Diversion is attained through reuse of all possible materials through the Free Store, situated at the Recycling Depot, and through the collection of recyclable materials which are transported to markets on Vancouver Island and, in some cases, the Lower Mainland. The non-recyclable materials are transported to the regional landfill at Pigeon Lake near Cumberland on Vancouver Island. The Recycling Depot functions also as a rural garbage transfer station. The Depot is located on Crown land under a License of Occupation maintained by the Comox Valley Regional District. The Solid Waste Management Program is designated as a Public Service and Utility on Schedule B of the land use map.

Area

The Hornby Island Local Trust Area is subject to the following objectives and policies.

Objectives:

The objectives of this subsection are:

(1) to encourage maximum diversion from land fill through reuse, recycling, and composting solid waste;

(2) to ensure that the collection, handling and storage of materials does not contaminate the environment; and

(3) to continue public education on waste diversion methods.

Policies

5.4.1 The use of the waters around Hornby Island for the dumping of any waste, especially toxic waste, should be prohibited.

Advocacy Policies:

5.4.2 Continued recycling of solid wastes on the Island, including waste generated by the commercial sector, is supported.

5.4.3 The recycling depot and any site for storage or dumping of solid waste should continue to be managed so as to protect the environment in compliance with the Comox Valley Regional District Waste Management Plan through consultation with the Ministry of Environment.

5.4.4 Any necessary burning of waste should comply with the strictest interpretation of the standards of the Ministry of Environment designed to minimize air pollution.

5.4.5 Household hazardous wastes not suitable for reuse should be disposed of in accordance with policy established by the Comox Valley Regional District Waste Management Plan.

5.4.6 The Comox Valley Regional District and the Ministry of Environment are requested to regularly review the operations and location of the Recycling Depot to ensure that there are no adverse impacts upon the environment and, in particular, upon surface water and groundwater.

5.4.7 Waste materials generated off-Island should not be accepted at the present Recycling Depot on Hornby Island nor in any future alternate disposal facility on the Island.

5.4.8 Managers of waste materials are encouraged to apply the standards established in the Comox Valley Regional District Waste Management Plan.

5.4.9 The Comox Valley Regional District is requested to:

a) continue to monitor down hill wells for landfill leachate in accordance with the Ministry of Environment directives on the management of closed, capped landfilled sites;

b) to regularly review the operation of the Recycling Depot to identify and address any adverse impacts upon the environment (including upon surface water and groundwater) and to ensure that it complies with Provincial and the Comox Valley Regional District standards; and

c) continue to support the development of local markets for recycled materials.

5.4.10 Managers of petroleum products and other hazardous substances such as contained in machinery (including derelict vehicles) are requested to ensure that such materials do not enter and contaminate the ground and groundwater.

5.5 Public Utilities and Services

Background:

Highways maintenance is provided by a private contractor from a highways maintenance yard on Hornby Island. Hydro and telephone services are available on the Island. The Recycling Depot is a community-based service operated by the Hornby Island Residents' and Ratepayers' Association under contract with the Comox Valley Regional District.

The highways maintenance yard and Recycling Depot are situated within a groundwater recharge area inland from one of the Island's major residential areas.

Area

All areas within the Hornby Island Local Trust Area, and in particular the areas designated Public Utilities and Services (PS) where noted, are subject to the following objectives and policies.

Objective:

The objective of this subsection is to provide for adequate utilities and services with regard for the Island's character and environment.

Policies:

5.5.1 Should an alternative site need to be found for the recycling depot in the future, any location should be considered and assessed in terms of environmental impact and site suitability for appropriate zoning in conjunction with the Comox Valley Regional District.

5.5.2 Locations for service depots such as for telephone or hydro may be considered upon application.

5.5.3 Transmission towers for community radio and/or to enable high-speed internet access for the community should be permitted in the community service use area and on larger lots provided the towers are below the height for which Transport Canada requires navigation lights and should be regulated to protect the visual amenity of the residential neighbourhood.

Advocacy Policies

5.5.4 All public service and utility installations on the Island should be for servicing Hornby Island only.

5.5.5 Industry Canada is encouraged to prohibit commercial microwave towers and satellite antennae on Hornby Island.

5.5.6 Federal and Provincial ministries and public and private corporations that provide public utilities and services are requested to ensure that measures are in place to ensure that the storage of materials and the maintenance of vehicles do not result in chemicals entering the ground that might contaminate the groundwater resource.

5.5.7 BC Hydro is requested to consult with the Local Trust Committee with respect to the installation of any new hydro services to minimize impacts in environmentally sensitive

areas and scenic areas and is encouraged to consider installing lines underground where appropriate to preserve viewscapes.

5.5.8 The provision of high-speed internet access to facilitate educational and commercial opportunities for residents is supported.

5.6 Air Transport

Background:

The map Schedule "B" does not show air travel facilities, as only occasional use is anticipated in areas not dedicated solely to air travel, but does show roads and wharfage. Air travel to and from Hornby Island is limited to float planes which usually land near the only existing docks at Ford Cove and Shingle Spit. There are no established commercial air strips or airports. The Island is close to flight paths for air traffic landing and taking off at the Comox airbase and Courtenay air park which sometimes creates a noise nuisance from low-level over-flights.

Area

The Hornby Island Local Trust Area is subject to the following objectives and policies.

Objectives:

The objectives of this subsection are:

(1) to minimize the disturbance of quiet enjoyment of property; and

(2) to ensure that potentially productive use of land is not alienated by air strips.

Policies:

5.6.1 Land-based airports, private or commercial airstrips, or heliports are not considered suitable or compatible with the rural lifestyle and agricultural potential of the Island and should not be permitted.

5.6.2 Emergency helicopter landing areas may be permitted at appropriate locations.

Advocacy Policies

5.6.3 The landing and taking off of helicopters, ultralight aircraft, and other manned aircraft on the Island is strongly discouraged.

5.6.4 Transport Canada is requested to designate Hornby Island as a "noise sensitive area" and to issue an annual advisory to this effect to pilots and operators.

5.6.5 Transport Canada and the Federal Department of National Defense are requested to ensure flight paths and areas for military and civilian air traffic are directed away from the Island.

5.6.6 Operators of float planes are encouraged to land and take off adjacent to marine service areas and to avoid other areas around the Island, especially parks or public swimming beaches where there may be a potential impact upon wildlife or upon public safety and recreational activities.

5.7 Water Transport

Background:

Access to the Island is focused through two protected wharfage areas, the ferry dock and the Ford Cove government wharf. The Island has few safe anchorages and sheltered bays. The resort near the ferry terminal (Shingle Spit area) offers seasonal summer day-use wharfage. The Federal government in 2010 made substantial investments to improve the wharfage at Ford's Cove. The wharf at Ford Cove is under Federal lease to the Ford Cove Harbour Authority and offers the only year-round protected wharfage. Limited summer anchorage is possible in several bays.

The regulation of sea transport falls generally under the authority of the Federal Government and the principal access is via BC Ferries Services Inc. Construction of private or commercial docks require approval of a lease from the Province. This Plan can therefore define only broad objectives for the management of all water access to the Island except that upland and water zoning regulations must also be satisfied before a private individual can proceed to install any structures for a private wharf or moorage.

Area

All areas in the Hornby Island Local Trust Area, and in particular the areas designated Marine Transport (MT) where noted, are subject to the following objectives and policies.

Objectives:

The objectives of this subsection are:

(1) to protect the limited sheltered bays for temporary anchorage;

(2) to provide boat access to the sea;

(3) to maintain a ferry service directed toward the needs of the local community;

(4) to promote adequate sewage, used water and solid waste disposal for users of all marine facilities according to Provincial Health standards;

(5) to encourage measures to reduce the number of vehicles that travel on the ferry; and

(6) to support the continuing provision of wharfage at Ford Cove or at Shingle Spit.

Policies

5.7.1 Private wharfs and/or breakwaters should be prohibited by regulation.

5.7.2 Expansion of wharfage at Ford Cove by the Ford Cove Harbour Authority may be supported provided negative environmental and visual impacts can be demonstrated to be minimal.

5.7.3 Expansion of moorage at Shingle Spit may be considered provided negative environmental and visual impacts can be demonstrated to be minimal.

5.7.4 Mariculture should not be permitted in Ford Cove or at Shingle Spit.

5.7.5 The existing marine transport (MT) points as shown on the land use map Schedule B should be maintained for current identified uses.

5.7.6 Public launching slips for canoes, kayaks, row boats and dinghies may be considered upon application to allow for safe and easy water access.

Advocacy Policies

5.7.7 The Ford Cove Harbour Authority and the Department of Transportation are requested to continue to maintain and improve the wharfage at Ford Cove including provision for parking, toilet facilities and the collection of recycling and garbage.

5.7.8 Safe methods of transporting dangerous materials around, to or on the Island should be required.

5.7.9 The Ministry of Environment and Department of Transportation are requested to establish boating speed restrictions within the Hornby Island Trust Area to ensure that public safety and environmental concerns are addressed.

5.7.10 BC Ferry Corporation and the Ministry of Transportation and Infrastructure are encouraged to:

a) achieve a level of service that follows rather than precedes community needs and that is established in consultation with community representatives;

b) encourage carpooling and non-automotive land transportation;

c) ensure that all vessels and associated upland facilities meet all the standards of the Vancouver Island Health Authority and the Ministry of Environment;

d) consult on a regular basis with a local advisory committee (or in the absence of such a committee, the Hornby Island Local Trust Committee) with respect to future planning for and any changes to ferry service between Hornby Island and Vancouver Island; and

e) consider the impact of the level and structure of tariffs upon the social and economic viability of the community.

5.7.11 All marine fuel services should meet all federal and provincial requirements.

5.8 Roads

Background:

Hornby's roads fall into four categories: main rural, minor rural, residential rural and heritage rural. The Island's principal artery (Shingle Spit Road-Central Road) is a "Main Rural" road from the Ferry Terminal to just beyond Strachan Road. The remaining section of Central Road to Ford Cove is "Minor Rural" and is designated as a Heritage Road requiring protection of its character, the views and the fine maples, Garry oaks and Douglas Firs along its length.

A second "Main Rural" road is St Johns Point Road from the Co-op crossroads to Whaling Station Bay. "Minor Rural Roads" connect through the residential areas: Sandpiper-Arthurs-Porpoise-Seawright, Sollans-Harwood-Gunpowder-Cowie-Carmichael and Anderson-Gurney. The remaining roads are "Residential Rural". Most roads are paved, the main exceptions being Sea Dollar, Strachan, Euston, Marleybone, Slade, Lea Smith, Little Tribune and Savoie. Savoie Road and Little Tribune Road are proposed Heritage Road designations.

There are no proposals for extending the road system. The former extension of Shingle Spit Road to Ford Cove was closed after a major slump and there is no longer a right of way along its route. The trail along "the Bench" is not considered a potential through route for a road because of the area's high environmental and scenic values.

An agreement between the Islands Trust and the Ministry of Transportation and Infrastructure has established an ongoing consultation process to deal with issues of construction and maintenance. This process also provides for negotiated agreements on the designation of Scenic/Heritage Roads and a Cycle Route Plan. A Cycle Route Plan allows for the adjustment of shoulder width standards when roads are upgraded.

Although most residents rely upon private motor vehicles to travel around the Island, there are a significant number of cyclists, pedestrians and equestrians, particularly in the summer when motor traffic is heavy. This poses safety concerns, as most sections of road do not have shoulders to accommodate these travelers. Paved cycle lanes have been added to Central Road between the Co-op crossroads and Seawright Road, a section which had been a priority safety concern. Through volunteer effort (and with support from the Ministry of Transportation and Infrastructure) paths for non-motorized traffic are being built parallel to roads on the right-of-way or on adjacent private land and along some unopened road allowances (see subsection 3.3: Parks and Protected Areas where policies address the acquisition and establishment of trails).

Area

All areas in the Hornby Island Local Trust Area and as referenced on Schedule C (Land Status and Road Designations) are subject to the following objectives and policies.

Objectives:

The objectives of this subsection are:

(1) to maintain the rural character of roads on the Island;

(2) to ensure safe, convenient transportation routes that do not encourage excessive speed;

(3) to encourage safe bicycle and pedestrian travel as an alternative to vehicle use; and

(4) to establish scenic/heritage road designations for unique and valued roadways and the appropriate consultative process when improvements are to be undertaken.

Policies:

5.8.1 Central Road is designated as the major road for Hornby Island and is classified as Main Rural.

5.8.2 The following should be designated as Cycle Routes: a) from the ferry terminal to the Outdoor Education Centre (Shingle Spit-Central-St. Johns Point), and b) from the Co-op crossroads to Strachan Road (Central Road).

5.8.3 Shared accesses onto roads from private driveways should be encouraged and subdivision layouts should be designed to consolidate access points.

5.8.4 A linked network of trails for non-motorized vehicle travel, including cycle paths, should be established through Crown lands, Parks, highways dedications, and private-land by easements or agreements.

Advocacy Policies

5.8.5 The Ministry of Transportation and Infrastructure is requested to implement and maintain the following road standards:

Main Rural:
Posted maximum speed: 60 km/hr, except consideration to be given to:

- 50 km/hr on Central Road between the junctions with Sollans Road and Seawright Road to enable the use of Neighbourhood Zero Emission Vehicles between the main residential neighbourhoods and the central commercial and institutional areas; and
- lower speed limits in busy congested areas such as adjacent to the entrance to Tribune Bay Outdoor Education Centre and at Whaling Station Bay.

Paved Width: 6.7 m (7.3 m on a curve)

Shoulder Width: 0.6 m paved, with increase to 1.2 m to provide for a paved bicycle lane on Central Road between the junctions with Sollans Road and Seawright Road and in other locations determined through community consultation.

Minor Rural:
Posted maximum speed: 40-50 km/hr
Paved width: 6.1 m
Shoulder width: no paved shoulder unless on a cycle route

Residential Rural:
Posted maximum speed: 30-40 km/hr
Paved width: 5.5 m
Shoulder width: no paved shoulder

Heritage Rural:

Posted maximum speed: 30-40 km/hr
Paved width: 5.5 m
Shoulder width: no paved shoulder

5.8.6 The Ministry of Transportation and Infrastructure and B.C. Hydro are requested to:

a) ensure the road system follows natural contours of the land wherever possible;

b) continue the major road pattern as shown on the land use map, which does not connect across the bench under Mt. Geoffrey;

c) retain unused road dedications as greenways and, where appropriate, as pedestrian and bicycle trails for access to beaches, Crown land, parks and other trails and roads;

d) retain as much natural vegetation along the roadside as possible and especially to protect wildflowers, rare plants, dogwood, arbutus and Garry Oak trees;

e) provide for safe travel of non-motorized traffic along Central Road and other busy sections of road (this should preferably take the form of paths adjacent to but separated from the existing roadway);

f) ensure signage along the roads is minimal and in keeping with a rural atmosphere;

g) consult with the Local Trust Committee on setting priorities for annual road work and ditching programs;

h) work with the Local Trust Committee to address public parking provisions in community service use areas;

i) ensure that ditching of roads is carried out so as to reduce impact upon natural groundwater and surface water flow patterns;

j) work with the Local Trust Committee and community organizations to develop a trails and greenways plan and establish local stewardship arrangements for water accesses and unopened road allowances;

k) provide written referrals to the Local Trust Committee with respect to any proposed works on roads, right-of-ways, water accesses and unopened road allowances;

l) refer any disposition of road allowances to the Local Trust Committee;

m) provide adequate dust control on gravel roads and consider in consultation with the community paving heavily traveled sections such as the lower portion of Strachan Road; and

n) consider, in consultation with the community, traffic calming measures where these can address neighbourhood safety concerns.

5.8.7 The Ministry of Transportation and Infrastructure is requested to work with the community to address ways to improve safety in the area of high activity at the intersection of Sollans Road, and Central Road and the intersection of Central Road and Shields Road at the Hornby Co-op.

5.8.8 The Ministry of Transportation and Infrastructure is requested to ensure that road development does not compromise agricultural land or significant forest areas.

5.8.9 The Ministry of Transportation and Infrastructure is requested to ensure that waste material (particularly flammable material) is not allowed to accumulate in gravel pits and other land under its jurisdiction.

5.8.10 The Ministry of Transportation and Infrastructure is requested to make old gravel pits available for community uses when the gravel resource has been exhausted.

5.8.11 Programs to educate cyclists, motorists and pedestrians on road safety issues are supported.

5.8.12 The RCMP is encouraged to enforce highway regulations in order to help maintain the safety of the roads.

5.8.13 The Comox Valley Regional District is requested to maintain regular transit service to Buckley Bay from the Comox Valley and to expand the transit service across Denman to Hornby Island.

SECTION VI — OBJECTIVES AND POLICIES FOR SUSTAINABLE LAND USE

6.1 Objectives and Policies for Development

Background:

One of the main functions of the Community Plan is to designate the patterns of future land uses. The designations are based on historic development patterns, physical features or constraints, other government agency comments and specific objectives defined by the community. Land is divided into various land use categories and shown on Schedule B, the land use map. Policies for each use are contained in this Section.

There are currently 1351 parcels in the Hornby Local Trust Area, including Park and Crown land. There are 30 parcels that could potentially be created, from 11 of the current parcels. The addition of these new parcels would result in a total of 1370 parcels on the Island and excludes the subdivision potential of Crown land, industrial and institutional parcels, and park land. Of these parcels, 80.7% of the land use is used for residential, 2.5% for farm, 1.3% for commercial 0.6% for transportation, communications, and utilities and 2.4% for civic institutional and recreational purposes. The remaining 12.5% is composed of other designations, vacant land, and lots with outbuildings using BC Assessment Authority classifications for land use. (Community Profile 2010).

A review of the current and proposed parcels located within the land use categories contained within this plan and the level of land development activities in those categories indicate that there remains a sufficient inventory of lands to allow for sustainable future land use needs over the next five years and beyond.

Area

The Hornby Island Local Trust Area is subject to the following objectives and policies.

Objectives:

The objectives of this section are:

(1) to protect the physical environment and natural features;

(2) to ensure that all land uses are regulated equitably;

(3) to ensure all development of the land base is self-sufficient for services and does not impose or create load on surrounding land uses; and

(4) to consider the community benefit in any significant rezoning application.

Policies:

Policies in Section 6.1 apply to all sections of the Plan.

6.1.1 The maximum size of buildings and structures on all lots should be regulated.

6.1.2 A minimum parcel size should be established for a parcel that may be subdivided pursuant to section 946 of the *Local Government Act* (subdivision for a relative) so as to uphold the objectives of the applicable designation in this Plan.

6.1.3 All applications for subdivision considered by the Local Trust Committee should demonstrate that there is sufficient water supply and waste disposal capability for serving the property both at the time of application and at ultimate projected growth levels.

6.1.4 Increasing net residential density through rezoning should not be permitted in the Small Lot Residential designations of Sandpiper, Galleon Beach and Whaling Station Bay areas.

6.1.5 Applications for amenity rezoning or density transfer may be considered by the Local Trust Committee for purposes of environmental and groundwater protection, community housing, removing growth pressures and consolidating lots. Eligible situations include dedication of land for park purposes and donation of land for conservation or community land trust. It must be demonstrated that the property proposed for receiving the density can do so without significant impact upon the land base including water resources, environmental values and neighbourhood character.

6.1.6 The Local Trust Committee may consider proposals for covenants for the purposes of protecting the environment and specifically the groundwater resources, upon receipt of a rezoning, subdivision, or a temporary use permit application from the land owner. The covenant may contain restrictions on the use of the land in order to protect and enhance the groundwater recharge capabilities, to ensure that groundwater contamination is avoided, to address groundwater shortages, or to prevent further subdivision of the parcel. To ensure that any covenant is enforced, the covenant should be held by the Local Trust Committee (or the Trust Fund Board where appropriate) and should be monitored regularly.

6.1.7 Subject to Ministry of Environment and the Ministry of Agriculture regulations, specified agricultural and horticultural activities should be permitted and should be regulated by bylaw to ensure that water resources are protected and that agricultural activities on non-agricultural land do not disturb the quiet of residential neighbourhoods. The provincial guidelines address the following: storage and use of agricultural waste, application and composting of agricultural waste, agricultural emissions, agricultural machinery noise, storage and use of wood waste, on-farm disposal of mortalities, feeding areas, access to water and use and storage of agricultural products.

6.1.8 Recommendations from the Ministry of Environment Stormwater Management Guidebook regarding the maintenance of pre-development infiltration and drainage regimes should be considered in the development of land use regulations.

6.1.9 Lot coverage should not exceed 15 % on lots less than one hectare (2.5 acres) and 10% on lots greater than one hectare (2.5 acres). Lot coverage for lots within the Agricultural Land Reserve should not exceed 20% with the additional 10% to be used only for structures required for agricultural production such as barns and greenhouses.

6.1.10 All development of property should include provision for appropriate off-road parking as specified in regulation.

6.1.11 A recreational vehicle, manufactured or mobile home, caravan, studio, boat or a travel trailer, if used as a residence, should be considered as a dwelling unit and be subject to density regulations.

6.1.12 In order to protect the natural environment and maintain neighbourhood viewscapes, screening and natural landscaping should be maintained on all parcels and along all lot lines in accordance with land use bylaw regulations.

6.1.13 Materials that could contaminate water resources should not be stored unless with proper provision for preventing contact of potential contaminants with the ground.

6.1.14 The storage of hazardous wastes or dangerous goods should not be permitted except when stored in accordance with the Ministry of Environment regulations. Safe storage of material used in conjunction with normal agricultural practices should be permitted on land within the Agricultural Land Reserve.

6.1.15 The protection of the Island from fire hazard should be considered when developing land use regulations.

6.1.16 Security lights and exterior lighting should be regulated so as not to intrude on surrounding properties and roads.

Advocacy Policies

6.1.17 The Local Trust Committee encourages all land owners to identify areas (including significant features) on each property to be left undisturbed before proceeding with any site development.

6.1.18 The Local Trust Committee encourages all land owners to discuss proposed developments and other land use activities with neighbours at an early stage of planning.

6.1.19 The Local Trust Committee encourages land owners to work with the Islands Trust Fund to fully protect special features and both natural and cultural values as identified in the Islands Trust Fund Regional Conservation Plan, 2011-2015. (The Islands Trust Fund, a conservation land trust established by the *Islands Trust Act*, can acquire land for nature reserves and hold conservation covenants on private land.)

6.1.20 The Local Trust Committee encourages all land owners to address potential impacts upon groundwater and surface water before proceeding with any site development.

6.2 Community Service Use

Background:

An island community isolated by two ferries from any major centre requires a degree of self-sufficiency in the provision of public services.

The community is fortunate to have a large area of Crown land in the central part of the Island and most community services are located in this vicinity. School District #71 owns the land on which the Community School, "Room to Grow" and the Preschool are located. The Hornby Island Residents' and Ratepayers' Association owns the land on which the Community Hall, Union Bay Credit union-Hornby Branch, Art Centre, the Teen Centre, the "Kitchen", and the RCMP office are located; the Fire Hall is on land owned by the Comox Valley Regional District; New Horizons Centre (including the Public Library), The Community Health Care Centre, including the new medical clinic and the Athletic Association facilities are all on leased Crown land.

The areas previously designated "light industrial" land are now included in the "community service use" areas which could provide for future public institutions and community trades and services. The community will continue to work with the Ministry of Forests, Lands and Natural Resource Operations to identify the best uses of this area. The land in this designation is in a groundwater recharge area upslope from a residential area and, therefore, requires careful development and use.

A 10 hectare portion of the land zoned 'Community Service Use' fronting on both Central Road and Sollans Road is under discussion as part of the land claims negotiation with the K'omoks First Nation.

Area

The areas identified on Schedule B (Map Designations) as COM (Community Service Use) and other areas where noted in policy are subject to the following objectives and policies.

Objectives:

The objectives of this subsection are:

(1) to ensure that the central community service lands are managed as an integrated unit for the benefit of the community as a whole;

(2) to protect the groundwater resource from degradation for purpose of water supply;

(3) to design development to accommodate anticipated traffic and parking needs,

(4) to encourage the clustering of public buildings in this area ;

(5) to encourage the sharing of utilities such as parking, sewage and used water systems, vehicle access, and water supply;

(6) to encourage the continued use of building styles, materials, landscaping and the retention of treed areas which are in keeping with the rural landscape;

(7) to ensure that there is ample sewage treatment and water supply for the anticipated uses;

(8) to use community resources efficiently and to allow for development of community facilities as needed;

(9) to ensure that the existing community use and service areas are maintained;

(10) to recognize the importance of keeping long-term residents of the Island within the community by enabling community housing; and

(11) to support community acquisition or lease of parcels of Crown lands in this area that may be required to provide public services.

Policies:

6.2.1 A Community Trades and Services Area, intended as an area where multiple businesses or other facilities for the creation of artisan products and the provision of services such as personal, business, food preparation, repair and professional services has been designated as Community Service Use Development Permit Area No. 2 as shown on Schedule E and will be regulated by development permit and land use bylaw regulations.

6.2.2 All land within the community service use designation and public utilities and services designation directly north of the GW/EPA designation on Schedule B is designated as part of Water Resource Protection Development Permit Area No.3 for the purpose of protecting the groundwater resource on Schedule E. A development permit will be required for any new development that involves: significant water use, sewage and used water treatment, alteration of the land or vegetation, or use of potential contaminants, including residential, commercial, industrial or trades and service developments, new recreational or service facilities such as a swimming pool or fire hall and road building.

6.2.3 Community facilities, such as schools and recreational facilities should continue to be clustered in the central area near the Community Hall.

6.2.4 Fire protection, clinic, ambulance and other public services should continue to be located centrally.

6.2.5 The Royal Canadian Mounted Police should continue to be located in a central location, and should be requested to provide a structure in character with other public buildings on the Island.

6.2.6 The development of affordable rental housing or special needs housing for Island residents, including facilities for seniors, displaced year-round residents and summer workers, operated non-commercially, should be permitted on land designated community service use and be regulated land use bylaw regulations. Other residences should only be permitted for the purpose of accommodating a caretaker or operator.

6.2.7 Limited commercial activities such as a farmers' market for locally-produced foods and goods; community arts facility or a credit union, preferably operated under the jurisdiction of a community non-profit society, should be permitted on community service use lands subject to adequate off-street parking being provided and should be addressed through land use bylaw regulations.

6.2.8 Member use services provided non-commercially, such as community kitchens, gardens, public showers and laundry facilities should be permitted.

6.2.10 Signage and lighting should be regulated by bylaw to ensure maintenance of the rural landscape.

6.2.11 All buildings should be finished in natural products such as wood, stucco, stone or brick or other materials that would fit in with the ambience of the community and neighbourhood; roofing materials that are appropriate for water catchment may be utilized.

6.2.12 Off-road signage and lighting should be regulated to provide a safe environment in keeping with the rural landscape.

6.2.13 The Crown land parcel containing the gravel pit on Central Road should be considered for a mix of community service uses should this land no longer be required for use by the Ministry of Transportation and Infrastructure or subject to a final Treaty agreement.

6.2.14 As much as possible, natural forest vegetation should be retained or re-established throughout this area.

Advocacy Policies

6.2.15 Organizations involved in administering and using property in the area designated for "community service use" are encouraged to work together to develop a master plan for future facilities and uses in this area.

6.2.16 Ministry of Forests, Lands and Natural Resource Operations is requested to:

a) only consider dispositions of land designated for community service use that are compatible with the objectives and policies of this Official Community Plan;
b) consult with the Local Trust Committee to ensure that any dispositions are in accordance with a master plan for the area;
c) retain this land in public community management; and
d) ensure public access to the Crown land is maintained.

6.2.17 The Ministry of Transportation and Infrastructure and Ministry of Forests, Lands and Natural Resource Operations are requested to make available for public use any unused portion of the gravel pit parcel on Central Road (and the whole of the remaining parcel when this is no longer required for gravel extraction).

6.2.18 The provision of facilities for junior and senior high school students is supported.

6.2.19 School District #71 is encouraged to make all educational facilities available for use by the whole community.

6.2.20 Availability of facilities such as the school and hall for a variety of functions is encouraged.

6.2.21 The acquisition of land in this area by a community land trust, in the context of an overall master plan is supported.

6.2.22 Studies that provide additional data on the groundwater and catchment flow system in this area is supported.

6.3 Residential

6.3.1 Residential—General

Background:

The residential component of land use is of major significance. Most of the residential land use is located around the shoreline of the Island with the bulk of the interior, including most of the high ground, being in public ownership, mostly as parks.

Historically, the Island has had a rural character with predominately large acreages. The small lot subdivisions were created prior to the Islands Trust assuming planning authority for the Island and all potential areas for subdivision into that lot size are already subdivided. By 1990, approximately 60% of all residential parcels on the Island were 0.2 hectares (about 0.5 acre) or less. In 2009 more than 95% of the private dwellings are single-detached and 18% are rented.

Residential land uses are supported on lands designated in Schedule B as Small Lot Residential, Rural Residential, Forest, Community Housing and Land Co-operatives. Residential use is also authorized in policy for land designated as agricultural, commercial and community service use. Under existing bylaws some lots have some potential for subdivision. However, the subdivision of additional small lots is not endorsed in the Plan. Problems with the quantity and quality of water supply have been identified in the small lot areas where on-site sewage treatment and groundwater wells are present on most lots.

The BC Assessment Authority in 2009 identified 1,088 properties assessed for residential purposes. A total of 322 of the properties are also assessed as agriculture and likely also have a residential use whereas 134 properties are vacant land or only have outbuildings.

The 2011 census records 886 dwellings and a resident population of 958 persons. There are three major housing challenges facing the community in the next five years:

a) a substantial proportion of the long-term resident population is now in the older age brackets; some may appreciate the availability of special housing in their senior years while others may wish to be supported while remaining in their own homes;

b) property prices are out of scale with the incomes that can be derived on the Island, making it difficult for younger people to become established here; and

c) the majority of properties are owned by non-residents and most of these are occupied and/or rented seasonally thereby limiting the availability of year-round rental accommodation.

Notwithstanding these challenges the location, amount, type and density of current residential lands; in conjunction with the designation of new lands for community housing and the addition of new policies enabling secondary suites and temporary housing; are deemed sufficient to meet anticipated housing needs over the next five years and beyond.

As a Local Trust Area designated under the *Islands Trust Act* this document has as its focus the preservation and protection of the Trust Area and is not premised on the unlimited accommodation of housing demands but rather places priority on the preservation and protection of the natural environment of the local trust area.

Area

The areas identified on Schedule B (Map Designations) as SR (Small Lot Residential), RR (Rural Residential), F (Forest), CH (Community Housing) and LC (Land Co-operatives) or any combination thereof are subject to the following objectives and policies.

Objectives:

The objectives of this subsection are:

(1) to ensure that a variety of housing options are available;

(2) to ensure that the scale of residences and other buildings are appropriate to the Island and neighbourhood context;

(3) to recognize the importance of keeping long-term residents in the community; and

(4) to provide for community initiatives to address housing needs for the foreseeable future.

Policies:

Policies in subsection 6.3.1 apply to all subsections of subsection 6.3

6.3.1.1 Setbacks of buildings, structures and uses should be regulated to ensure that the natural aesthetics and the environmental integrity of adjacent foreshore, creeks and ecologically sensitive sites are not adversely affected. (This Plan acknowledges that geographical constraints prevent significant setbacks from the foreshore between Shingle Spit and Phipps Point.)

6.3.1.2 Setbacks and heights of buildings should be regulated to ensure that the environmental integrity and amenity of adjacent lots, public roads and public land are not adversely affected.

6.3.1.3 Screening around derelict vehicles and other stored materials should be required by regulation.

6.3.2 Small Lot Residential

Background:

Lots in this category are smaller than 0.8 hectares (two acres) and generally range around 0.24 hectares (about 0.5 acre) in some subdivisions to 0.1 hectares in areas on the peninsula of the island. As these lots become increasingly developed and used, the already evident problems with sewage disposal and water supply could become more acute.

The peninsula at the north–east end of the island, which includes the Anderson Drive/Whaling Station Bay area, has a separate aquifer which has the highest vulnerability classification in the Province: 1A (highly developed with high vulnerability). This is reflected in the area's water quality and quantity problems, including salt water intrusion, sulphurous water and poor-yielding wells.

Area

The area identified on Schedule B (Map Designations) as SR (Small Lot Residential) is subject to the following objectives and policies.

Objectives:

The objectives of this subsection are:

(1) to ensure that any construction on existing vacant lots can be supported by the land base and does not lead to health hazards or degradation of the environment;

(2) to minimize the negative impacts associated with small lot development;

(3) to protect the water resource in the Whaling Station Bay/Anderson Drive aquifers classified as heavily developed, highly vulnerable and

(4) to ensure that the land uses do not have an adverse effect upon the quality and quantity of water draw down from the Whaling Station Bay Improvement District water collection system nor upon other wells on adjacent properties.

Policies:

6.3.2.1 The principal use should be residential with any accessory uses consistent with the residential character.

6.3.2.2 The minimum parcel size should be one hectare (2.5 acres).

6.3.2.3 Existing Small Lot Residential designations of Sandpiper, Galleon Beach and Whaling Station Bay/Anderson Drive, as shown on Schedule B, will not be expanded and no new small lots will be created except for the purposes of park dedication, neighborhood waste water treatment or to create ecological reserves.

6.3.2.4 One dwelling unit should be permitted on each lot.

6.3.2.5 The keeping of animals should be limited and regulated to protect the quiet of the neighbourhood and the quality of the groundwater resources and the well-being of wildlife populations.

6.3.2.6 Additional development of the groundwater resource should be strongly discouraged.

6.3.2.7 The use of water catchment and storage systems for household and garden use should be encouraged.

6.3.2.8 The Local Trust Committee supports the regular monitoring of the groundwater resource in these areas and should consider further restrictions upon land use if there is a documented threat of contamination or if aquifers become classified as "highly developed".

6.3.2.9 Consolidation of small lots should be encouraged. To recognize the reduction in density and other impacts resulting from the consolidation of lots, the following should apply for any lot over 1 hectare that is the product of the consolidation of smaller lots: the maximum floor area of a residential dwelling or an accessory building may be permitted to be one and a half times the size permitted on standard lots in the small lot residential designation.

6.3.2.10 Bed and Breakfasts home occupations and vacation home rentals may be permitted providing the number of guests does not exceed the design capacity of the approved sewage treatment system and with the number of guests limited based on lot size.

6.3.2.11 Home occupations should be permitted but limited by regulation to those having little impact on the neighbourhood character and environmental qualities.

Additional Policies for small lots in the Anderson Drive/Whaling Station Bay area:

6.3.2.12 The provision for shared water supply systems and/or sewage and used water treatment involving two or more lots is supported where appropriate to local situations and in accordance with the Vancouver Island Health Authority standards.

6.3.2.13 One lot, Lot 11 Plan 25736, is adjacent to a water collection system that provides water to property owners in the Whaling Station Bay area. The following policies apply to Lot 11:

a) residential development should be restricted to the north-western half of the property;

b) the south-eastern part of the property (as identified in hydrological report by Piteau Associates Engineering Ltd. (2002)" should remain in an undisturbed state (except for measures such as ditching that are required to protect the water resource) and should be protected by a covenant or through transference to local government for protection purposes; and

c) before any development is permitted, an impact assessment report setting out a site drainage plan should be prepared and implemented in accordance with recommendations from the Piteau Associates Engineering Ltd. (2002) report.

6.3.2.14 Home occupations should be limited to those occupations that would result in no increase in sewage treatment requirements.

6.3.2.15 Vacation home rentals should only be permitted if the number of guests does not exceed the design capacity of the sewage treatment system.

6.3.2.16 The use of water catchment and storage systems should be particularly encouraged where Bed and Breakfast home occupations and vacation home rentals are taking place.

6.3.2.17 The Local Trust Committee should encourage and support initiatives to monitor and address impacts of concentrated development upon health, safety and the environment in this area.

6.3.3 Rural Residential

Background:

The Rural Residential designations are intended to promote the retention of large parcels of land, while still providing an opportunity for cooperative land sharing. These rural residential areas are intended to maintain rural aesthetic appeal while permitting home occupation and minimizing the impacts on surrounding land parcels.

In the previous Plan the Rural Residential designation was further divided into a Large Lot Residential designation that was used to identify properties that could be subdivided if there were two long-standing homes built and the owners were owners in common prior to 1991, and a

Large Lot Residential/Water Resource Protection Area on a 6.5 acre parcel where one additional lot could be created and it was so designated to recognize its role in community water supply.

The retention of large parcels is now considered a primary objective. Property owners had the opportunity to resolve joint ownership issues in the past and it is now considered appropriate that the primary objective be to retain the large lots. Some options may still be available to allow subdivision in those situations of lots owned as tenants in common.

Area

The areas identified on Schedule B (Map Designations) as RR (Rural Residential) are subject to the following objectives and policies.

Objectives:

The objectives of this subsection are:

(1) to promote retention of large parcels of land and existing densities;

(2) to provide some limited opportunity for land sharing without encouraging subdivision;

(3) to enable some residents to resolve existing land sharing challenges; and

(4) to allow for a wide diversity of home occupations subject to regulations which ensure maintenance of the rural residential character of the areas designated rural residential and to ensure minimal negative impact on neighbouring properties.

Policies:

6.3.3.1 For subdivision of properties in the Rural Residential designation where two dwellings are permitted, a minimum lot size of one hectare (2.5 acres) should be maintained with no more than one dwelling per lot. A lot size less than one hectare may be considered if the subdivision is for the purpose of creating park, ecological reserve, community land trust or other community service use.

6.3.3.2 Exceptions to policy 6.3.3.1 may apply on property described as Lot 10, Plan 48077 designated large Lot Residential / Water Supply Protection Area in the previous plan, a minimum lot size of 0.4047 hectare (1 acre) with an average lot size of one hectare (2.47 acres) may be considered for subdivision.

6.3.3.3 The principal use in this category should be residential with any accessory uses consistent with the residential character.

6.3.3.4 Only one dwelling unit should be permitted on parcels smaller than 3.5 hectares (8.75 acres) and a maximum of two dwellings should be permitted on lots 3.5 hectares (8.75 acres) or greater.

6.3.3.5 Home occupations may be permitted but should be limited to those having little impact on the rural residential character of the area and its environmental qualities.

6.3.3.6 Bed and Breakfasts and vacation home rentals should only be permitted if the number of guests does not exceed the design capacity of the sewage treatment system.

6.3.3.7 Public access to the existing trail system should be secured wherever possible through dedication, covenant or easement.

6.3.3.8 New road development in association with subdivision in this designation is discouraged and the use of road allowances developed as public trails to provide vehicle access to lots created by subdivision in this designation is not supported.

6.3.3.9 The use of water catchment and storage systems should be particularly encouraged where Bed and Breakfast home occupations and vacation home rentals are taking place.

6.3.4 Forest

Background:

Land in this category has high scenic, aesthetic and ecological value and includes some of Hornby's highly visible elevated land. It is made up of important forested water catchment areas and areas of very steep slope (which are identified on schedule F).

There are many long established and well-used trails enabling public enjoyment of the forest landscape and the scenic viewpoints on the escarpments. Potential for land slippage exists in the steeply sloping areas, evidenced by the closure of the shoreline road from Ford Cove to Shingle Spit due to persistent slides. Public access for recreation is of prime importance to the community. The uniqueness of these areas is intended to be preserved while allowing residential use. Because these areas are vital for water catchment, ground disturbance should be minimized and forest cover retained in order to protect the groundwater recharge function. The whole of the west side of Mt. Geoffrey, known as The Bench, is a slump area particularly vulnerable to earthquake activity.

Area

The areas identified on Schedule B (Map Designations) as F (Forest) are subject to the following objectives and policies.

Objectives:

The objectives of this subsection are to:

(1) preserve scenic, aesthetic and ecological values;

(2) minimize ground disturbance and retain forest cover in order to protect water catchment areas;

(3) preserve traditional public trail access through forested areas especially to escarpment view points;

(4) promote retention of large parcels of land;

(5) provide some limited opportunity for land sharing without encouraging subdivision,

(6) maintain the visual quality of the residential neighbourhoods; and

(7) allow for a wide diversity of home occupations subject to regulations which ensure maintenance of the rural residential character of the areas designated Rural Residential and to ensure minimal negative impact on neighbouring properties.

Policies:

Policies in subsections 6.1 and 6.3.1 apply to this subsection.

6.3.4.1 For any subdivision of properties in the Forest designation, an average lot size of 16 hectares (40 acres) should be maintained, with a minimum lot size of four hectares (10

acres) when subdivision averaging takes place unless the subdivision is for the purpose of creating a park, ecological reserve, other community service use or a community land trust.

6.3.4.2 Residential use of land should be permitted in the Forest designation.

6.3.4.3 Only one dwelling unit should be permitted per parcel and two dwellings if the parcel is over four hectares (10 acres).

6.3.4.4 Setbacks of buildings and uses from cliff edges and retention of vegetation should be required to protect the slopes from erosion.

6.3.4.5 Home occupations may be permitted subject to land use bylaw regulations and should be limited to those types having a low impact on the natural forested character of the area or other environmental qualities.

6.3.4.6 Public access to the existing trail system should be secured wherever possible through dedication, covenant or easement.

6.3.5 Housing

Background

A 2008 report entitled *Housing Needs on Hornby and Denman Island* prepared by Eberle Planning and Research notes that "the recent prolonged boom in vacation property sales has affected both islands with steadily rising house prices". In the last census period, median house prices on Hornby Island increased by 116% while incomes increased by only 7%. (An income of $60,000 is required to buy an average non-waterfront home. The median household income is $37,689.) The number of rental units declined by 7% in this period and now only 18% of dwellings are rented compared with 30% for BC. The average Hornby renter has moved 12 times. While 90% of elders own their homes, almost half of these need repairs.

The report estimated that at least 97 Hornby households were in need of housing . The report recommended that a) approximately 30 affordable housing units could address the needs of Hornby renter households in need who prefer ownership, b) ten elder housing units are required to meet anticipated need over the next 10 years, c) secondary suites / dwellings could address the housing requirements for the minimum 17 single-person renter households in need and renters without year-round accommodation and d) provision for emergency/temporary housing would help address housing shortages in the summer and housing crises in the winter. It also proposes support for renters, repair assistance for elder home-owners and home care for elders. The 2004 Hornby Island Advisory Housing Committee Report included recommendations with respect to secondary units, temporary summer accommodation and the formation of a community land trust.

In recognition of the findings of the 2008 report new lands have been designated for the development of community housing, and new policies which allow for both secondary suites and temporary housing have been included in this Plan to assist in addressing the identified housing needs.

There are two Hornby Island organizations with a housing focus: Hornby Island Elder Housing Society and the Islanders' Secure Land Association. Two properties are currently zoned for community housing.

For purposes of interpretation the following terms are used in this section:

"Affordable Housing" – housing that is by intent and policy more affordable than identical housing that is or could be provided elsewhere in the community and is housing that by design and size provides for residential accommodation that can be acquired with 30 per cent of the median gross income of families or individuals on Hornby Island.

"Rental Housing" is housing that is available by payment of rent for occupancy for a minimum of one month and can include any form of housing that is available for rent.

"Special Needs Housing" is housing to accommodate persons who may have special needs due to age, health, disability or other factors that may require special housing characteristics.

"Community Housing" is housing that is provided specifically by bylaw to address affordable or special needs housing requirements, including housing that is provided on land designated for community services use, but community housing does not include housing that may be provided as part of a land cooperative; as a secondary suite; as part of a mixed use development such as in association with a commercial land use or as a secondary dwelling on a property; even though such housing may contribute to the provision of housing that is affordable, available for rent or that accommodates the needs or persons with special needs. The Community Housing designation is intended to designate areas that are considered suitable for such housing.

Land Co-operatives involve co-operative ownership of some large parcels which have been viewed as consistent with the character of the community. The co-operative lifestyle on rural large parcels of land has required fewer roads, allowed sharing of resources, and made the acquisition of property more affordable for members. The Land Co-operative designation is intended to promote the retention of larger parcels and rural character, while still providing an opportunity for cooperative land sharing and the benefits it provides in terms of affordable housing. Land in this designation may be held by organizations such as community land trusts, co-operatives established under the *"Cooperative Association Act"* or under a corporate ownership structure owned by resident shareholders.

Area

All areas with the CH (Community Housing) and LC (Land Cooperative) designations are subject to the following objectives and policies.

Objectives:

The objectives of this subsection are:

(1) to provide for a range of housing opportunities including the creation of affordable, rental and special needs housing;

(2) to enable affordable, rental and special needs housing options that are compatible with the Island's environment and character;

(3) to provide for community initiatives to address the housing needs associated with age, disability, and/or moderate and low income through the provision of community housing;

(4) to provide opportunity for non-profit housing situations to meet the needs associated with age, disability, and/or moderate and low income; and

(5) to support land cooperatives with the intention of providing opportunity for common ownership through co-operative land tenure.

Community Housing Policies

Policies in Section 6.1 and section 6.3.1 apply to this subsection.

6.3.5.1 The principal use of lands designated for Community Housing (CH) should be affordable or special needs residential.

6.3.5.2 Parcels designated Rural Residential (RR) that have demonstrated ability to meet Provincial Ministry standards of water, used water (sewage and waste water) treatment and other health and environmental requirements, may be considered upon application for a site specific rezoning (See Section 7.3). A development plan is required upon application rezoning that includes information regarding future development phases, projected densities, impacts on the land and neighbourhood including the provision of waste supply, waste disposal and retention of natural vegetation.

6.3.5.3 A housing agreement may be required upon application for rezoning to Community Housing.

6.3.5.4 Criteria that should be addressed in the provision of community housing includes:

(a) the form of tenure of the housing units;

(b) the availability of the housing units to persons whose special needs are to be accommodated;

(c) the administration and management of the housing units, including the manner in which the housing units may be made available to persons with special needs referred to in paragraph (b); and

(d) rents and lease, sale or share prices that may be charged, and the rates at which these may be increased over time, as specified in an agreement or as determined in accordance with a formula specified in an agreement.

6.3.5.5 Community housing developments should be encouraged to be located where there is compatibility with existing and potential land use on neighbouring parcels.

6.3.5.6 Community housing developments should be of a scale and character that is compatible with the neighbourhood ambience and the natural environment.

6.3.5.7 Lot A, Section 11, Hornby Island, Nanaimo District, Plan VIP87054, designated (AG), may be used to provide affordable or special needs housing.

6.3.5.8 Universal access design principles should be incorporated into the built environment to support the provision of equitable access for all abilities.

Affordable Housing Policies

6.3.5.9 Shared land ownership is recognized as one means of providing a more affordable ownership of land and may be supported in land use regulation in lieu of subdivision of land where supported by policy in section 6.3.3 and section 6.3.6 of this Plan.

6.3.5.10 A non-commercial campsite may be considered within areas designated to permit Community Service Use as a means to provide temporary summer accommodation for summer workers, summer visitors and displaced residents who cannot otherwise find accommodation.

6.3.5.11 Housing should be permitted on land designated for community service use provided it is affordable housing or provides for persons with special needs.

Rental Housing Policies

6.3.5.12 Residential use should be an accessory use on land zoned commercial use and may be a means to provide rental housing opportunities.

6.3.5.13 A secondary suite, limited in size and contained within a permitted dwelling, may be permitted on larger rural lots (in accordance with policies in section 6.3.3 (Rural Residential) of this Plan), and despite section 6.3.3, on lots 2.0 hectares or larger in order to provide rental opportunities provided the owner or residential tenant occupies the principle residence.

6.3.5.14 A detached unit used to provide temporary accommodation for a relative or a care-giver or to provide temporary affordable rental accommodation under the *Residential Tenancy Act* may be permitted through a Temporary Use Permit (in accordance with guidelines specified in Section 6.10 (Temporary Use Permits)),

NOTE: The use of such a permit will only define the permitted use and the temporary nature of such use and cannot manage who man occupy the temporary accommodation.

Advocacy Policies for Rental Housing

6.3.5.15 Owners of land where a second dwelling is permitted are encouraged to provide the second dwelling as ongoing rental accommodation to increase the available rental housing supply unless the second dwelling is otherwise used or needed for use by the owner.

6.3.5.16 Written agreements under the *Residential Tenancy Act* are strongly encouraged for the rental of dwelling units.

Special Needs Housing (including housing for seniors) Policies

6.3.5.17 Lot B, Section 10, Nanaimo District, Plan 18085, which is zoned for elder housing, may be considered for zoning amendments to increase the number of units and may be expanded through the acquisition of adjoining land.

6.3.5.18 A supported living facility, a hostel and other facility for providing emergency and/or temporary accommodation should be permitted on land zoned for community service use (in accordance with policies in section 6.2 (Community Service Use) of this Plan).

6.3.5.19 The Local Trust Committee may explore opportunities for temporary accommodation for summer workers and/or displaced residents.

6.3.5.20 Parcels designated residential that have demonstrated ability to meet Provincial Ministry standards of water, used water (sewage and waste water) treatment and other health and environmental requirements, may be considered upon application for a special needs housing site specific rezoning. A development plan should be provided with any application for rezoning and shall include information regarding future development phases including projected densities, impacts on the land and neighbourhood including the provision of waste supply, waste disposal and retention of natural vegetation. (See Section 7.3)

Advocacy Policies for Special Needs Housing

6.3.5.21 Hornby Island residents are encouraged to provide and support home care and home repair assistance initiatives for seniors as a means of extending the opportunities for independent living.

6.3.5.22 Where appropriate to personal needs and preferences, Hornby Island residents are encouraged to make available in their homes opportunities for boarding and other joint living arrangements to expand the range of living opportunities for persons with special needs or who seek affordable housing.

Land Co-operative Policies

6.3.5.23 Upon application, properties 4 hectares or greater may be considered for “land co-operative” rezoning supported by submission of an impact assessment plan. (See Section 7.3)

6.3.5.24 Two properties have been designated as Land Co-operatives in this Plan. Subsequent land use bylaw regulations may be created to address historical situations where parcels are in common ownership with each member owning a share believing the share granted him/her the right to build a house.

6.3.5.25 The principal permitted uses in this designation should be residential and agricultural.

6.3.5.26 Home occupations subject to land use bylaw regulations may be permitted but should be limited to those having little impact on the area's character and environment.

6.4 Agriculture

6.4.1 Agriculture

Background:

The early development of Hornby Island included agriculture as a primary occupation. However by 2009 the Assessment Authority listed 190 parcels with an agricultural assessment. Many of the largest holdings with good soil have now been subdivided or are vacant. Residential uses of agricultural land has increased pressure for subdivision. Small-scale farming operations serving primarily local needs are prevalent.

Policies in this section refer to the use of any land for agriculture and do not necessarily deal with issues of preserving land in the Agricultural Land Reserve. Section 6.4.2 of this Plan contains policies on the preservation of the Agricultural Land Reserve which is considered a natural resource of the Island. Land Use Bylaws in Agricultural areas have a traditionally established a minimum subdivision potential of 16 hectares (39.5 acres) or greater unless otherwise noted.

Agriculture on Hornby has been declining and many prime agricultural regions have previously been subdivided or are not being actively farmed.

Area

The areas identified on Schedule B (Map Designations) as AG (Agriculture) are subject to the following objectives and policies.

Objectives:

The objectives of this subsection are:

(1) to support continuing agricultural use of land and associated activities;
(2) to ensure that the use of land in the Agricultural designation does not compromise the capability of the land for future food production;
(3) to encourage retention of large parcels of land for agriculture; and
(4) to ensure agricultural practices do not cause contamination of the groundwater resource.

Policies:

Policies in subsection 6.1 apply to this subsection.

6.4.1.1 For any subdivision of properties designated Agriculture a minimum parcel size of 16 hectares (39.5 acres) should be.

6.4.1.2 The principal uses in this designation should be agriculture and residential.

6.4.1.3 One dwelling (which may contain a secondary suite) may be permitted on lots smaller than 3.5 hectares (8.6 acres).

6.4.1.4 On parcels 3.5 hectares (8.6 acres) or greater the following should be permitted:
- a) one dwelling with a secondary suite within the dwelling; or
- b) two dwellings, with the second dwelling limited in size, and if the land is in the Agricultural Land Reserve the second dwelling should only be permitted if the second dwelling is necessary for farm use as determined by the Local Trust

Committee in consultation with a Provincial Regional Agrologist and is otherwise consistent with the Agricultural Land Reserve related enactments; or if authorized as a non-farm use by the Agricultural Land Commission.

6.4.1.5 Home occupations which do not impinge upon the principal farm use and which will not cause any degradation of the land nor reduce its capability for agricultural production should be permitted, subject to bylaw regulations and should comply with Agricultural Land Commission regulations where applicable.

6.4.1.6 All agricultural activities should be conducted in accordance with the Agriculture Waste Control Regulation, *Waste Management Act*, the *Farm Practices Protection (Right to Farm) Act* and the *Health Act* administered by Ministry of Environment.

6.4.1.7 Commercial land-based aquaculture operations should be regulated by zoning. Before any application for a rezoning to allow upland aquaculture (using freshwater or saltwater ponds or tanks) are be considered, a site specific analysis of the potential impacts of water consumption, waste disposal, drainage or potential spills on the surrounding land and upon surface water and groundwater may be required.(See Section 7.3)

Advocacy Policy

6.4.1.8 The spreading of agricultural waste should be regulated such that water courses or groundwater resources are not contaminated.

6.4.2 Additional Policies for Land in the Agricultural Land Reserve

Background:

Agriculture is the traditional land-based economic activity of Hornby Island. There are about 824 hectares (2060 acres), 27% of the land base, in the Agricultural Land Reserve, and subject to the Agricultural Land Commission Act, which was intended to preserve land with agricultural potential to provide a secure source of food for the future residents of the Province. Farming is encouraged in parcels within the Reserve and non-farming use is regulated by the Commission.

There are 102 parcels on Hornby located within the Land Reserve. The average area of these parcels is 7.2 hectares (18 acres). This land is of high to medium capability for agriculture and is reserved for present or future production. Schedule C, the land status map, identifies land in the Agricultural Land Reserve and Schedule B, the land use designation map, shows land used primarily for agriculture, most Agricultural Land Reserve land falls in that category.

Area

The areas identified on Schedule B (Map Designations) as AG (Agriculture) and lands within the Agricultural Land Reserve are subject to the following objectives and policies.

Objectives:

The objectives of this subsection are:

(1) to retain land with potential for agriculture;

(2) to ensure that agricultural land in the land reserve is not degraded; and

(3) to enable accessory uses that are compatible with farming and the preservation of agricultural land.

Policies:

6.4.2.1 The retention of the Agricultural Land Reserve and the Agricultural Land Commission to protect against the loss of the potential for self-sufficiency in agricultural production in the Province of British Columbia is supported.

6.4.2.2 Land designated agricultural which is proposed for non-agricultural uses deemed to be in the public interest by both the Agricultural Land Commission and the Local Trust Committee may be considered for rezoning and for removal from the Reserve, the latter being preferred if other land of comparable or better agricultural potential being added to the Reserve.

6.4.2.3 The minimum parcel size within the Agricultural Land Reserve designation should be 16 hectares (39.5 acres) but smaller lots may be created where a portion of a parcel has been leased to another farm operation for at least the five previous consecutive years and such subdivision is approved by the Agricultural Land Commission.

6.4.2.4 To support existing agricultural operations, accessory uses should be permitted where such uses do not impinge on the principal farm use and will not degrade the land nor reduce its capability for agricultural production, provided such uses are authorized by the *Agricultural Land Commission Act*.

6.4.2.5 Temporary non-agricultural uses of existing buildings on agricultural land involving no impact upon the land itself or the principal farm use, may be considered upon application for a Temporary Use Permit which may include specific conditions to address impacts such as noise, parking, water, supply and waste disposal.

6.4.2.6 Uses should be regulated in buffer areas on properties adjacent to land in the Agricultural Land Reserve to minimize any adverse impacts.

6.4.2.7 Soil removal except for purposes of improving the agricultural soil resource on Agricultural Land Reserve lands subject to provisions of the *Agricultural Land Commission Act* should not be permitted.

6.4.2.8 The processing and sale of farm products together with the retailing of some off-farm products as authorized by the Agricultural Land Commission should be permitted.

6.4.2.9 Farm Use as defined by the Agricultural Land Reserve Use, Subdivision and Procedure Regulation is permitted within the Agricultural Land Reserve and may be regulated by land use bylaw.

6.4.2.10 Education and research facilities except schools under the *School Act*, should be permitted, provided that the buildings and structures necessary for education and research do not exceed 100 m^2 on any parcel.

Advocacy Policies

6.4.2.11 The Ministry of Energy, Mines and Petroleum Resources is requested to ensure there is no extraction of gravel in areas designated agricultural.

6.5 Commercial and Home Occupations

Background:

Commercial use policies are classified into retail and personal service and visitor accommodation. In 2010 there were 14 properties zoned commercial on the Island. The two main classifications have very different criteria for location as defined in the objectives. Schedule B includes designations for three types of commercial land use: retail and personal service (CS), visitor accommodation (VA) and commercial general (CRG).

Home occupations also provide some opportunity for commercial activity and may involve the sale of products produced on site or provision of personal services. These uses are permitted in residential areas and so are not designated as a separate land use on Schedule B. Home occupations are permitted only if the residential character of the property is maintained and the product or service is produced by the resident. When a business retails products not produced on-site or at such a large scale that the impact on the property changes the residential character, then appropriate commercial zoning is required.

6.5.1 Retail and Personal Service

Background:

The three existing retail commercial areas on the Island (Co-op Corner, Shingle Spit, and Ford Cove as well as one limited commercial area {Syzygy}) are shown on the land use map, Schedule B. The Co-operative store, which has a large community membership, is located centrally on the Island near Tribune Bay. This is the busiest commercial area on the island and its services include groceries and hardware departments, post office, liquor outlet, gas bar and independent local merchants operating small-scale food and retail businesses. Ford Cove dock provides the only sheltered moorage on Hornby Island and historically this area has developed to provide marine-related services. It is accessed from land by a steep and narrow heritage road and the location imposes constraints, including for parking. Ford Cove store provides grocery and other retail services. The Shingle Spit commercial area is located at the ferry terminal and provides a restaurant, pub, liquor store and visitor accommodation units. A co-operative bakery operates at Syzygy on Central Road, with a number of associated small businesses including a popular pizza outlet.

Area

The areas identified on Schedule B (Map Designations) as CS (Retail and Personal Service) are subject to the following objectives and policies.

Objectives:

The objectives of this subsection are:

(1) to support the existing pattern of one major and three lesser centres for general or limited commercial uses;

(2) to protect the environment from degradation and resources from depletion while providing opportunity for commercial activities;

(3) to protect the integrity of quiet residential and rural neighbourhoods;

(4) to prevent commercial strip development; and

(5) to ensure the scale, form and character of all commercial developments harmonize with the natural surroundings and the rural character of the Island.

Policies:

6.5.1.1 The commercial development at the intersection of Central Road and Shields Road as part of the Co-op property should be retained as the major commercial service centre for Hornby Island.

6.5.1.2 Existing smaller commercial service centres with accommodation facilities should be retained at Fords Cove and at Shingle Spit Road near the ferry terminal (currently known as the Hornby Island Resort property).

6.5.1.3 Limited expansion of commercial zoning to allow for small scale retail and personal service use with secondary residential use may be considered based upon the following criteria:

a) close proximity to the major commercial service centre for the island to reduce travel requirements and greenhouse gas emissions or in locations as provided for in policy 6.2.7 (Community Service Use) of this plan;

b) protection of the rural character of the island and the area of proposed development;

c) minimization of impacts upon adjacent lands;

d) provision of a sustainable water supply, waste treatment and parking;

e) retention of trees and green space;

f) utilization of low-energy technologies; and

g) safe traffic pedestrian and vehicle traffic patterns and promotion of pedestrian friendly and bicycle use facilities and other green initiatives where practical such as home delivery.

6.5.1.4 The degree of servicing, including roads and parking, the provision of open space, signage and the form and character of any new commercial development shall be regulated through Development Permit.

6.5.1.5 The minimum parcel size should be one hectare (2.5 acres) for any subdivision of property designated for commercial use.

6.5.1.6 The principal land use should be small-scale commercial business.

6.5.1.7 Residential use may be permitted as a use secondary to a commercial use.

6.5.1.8 Regulations for any commercially-zoned lot may provide for a mix of compatible uses to enable a clustering of services on land designated as commercial.

6.5.1.9 Ribbon or strip development is not supported.

6.5.1.10 Temporary Use Permits may be permitted for:

a) temporary use;

b) a period of evaluation of a new commercial venture (that does not involve significant new development) prior to application for rezoning;

c) uses for a period of time to enable impacts to be assessed before any further permitting of the use; or

d) seasonal activities.

6.5.1.11 Land may be rezoned to supply an off-site parking lot to a commercial use within 100 meters of the property containing the commercial use without an amendment to this Plan provided the zone does not permit structures or habitation of vehicles.

6.5.1.12 To encourage small scale commercial operations that comply with community health and safety regulations and Islands Trust objectives.

6.5.2 Visitor Accommodations and Tourism

Background:

Hornby Island has become widely known for its scenery, recreational opportunities, ambience, and locally created crafts and art. The Island's increasing popularity as a summer destination has made tourism both a key component of the local economy and a cause for concern because of its impacts. Island services, such as ferries, roads and the recycling depot, become heavily loaded in the summer. Fragile ecosystems are susceptible to degradation. The greatest demand for water is generated at the time of declining groundwater availability while the adequacy of existing systems to handle the volume of sewage and used water is questionable. The large influx of people can be stressful to a small community and can present safety and law enforcement problems.

This creates the challenge of providing visitor accommodation in a manner and at a level that caters to visitors and provides much-needed employment while protecting the Island's environment, sustaining its resources and amenities and preserving the ambience and character of the community.

Unsupervised and unserviced camping is not considered desirable because of the impact on quiet residential or rural neighbourhoods, the risk of fire, and because public services are not readily available. The provision of such facilities as public washrooms and waste disposal sites could place a burden on the available water supply and thereby threaten the availability of those resources for use by the local community population. Currently, the Island is supplied with visitor accommodations in the form of five campgrounds, three resorts with rental cabins and a restaurant, and several Bed and Breakfasts. Short-term rental of residential units has been a long-standing means of providing visitor accommodation, but there is also concern about impacts, both in neighbourhoods and cumulatively. One existing property, Lot A Plan 38493 Section 13, known as “Bradsdadslands”, is designated rural residential but has a historical legal non-conforming use as a campground. The use would cease to be lawfully non-conforming if it is discontinued for more than 6 months during its regular seasonal use. As with any other property, legal and conforming campground use for this property could only be considered upon application for redesignation and rezoning.

The Whaling Station Bay/Anderson Drive area and other small lot areas have been identified as having ground water supply problems due to density of development and vulnerability of the aquifer. Limiting occupancy for any visitor accommodations (e.g. Bed and Breakfasts) to levels of an average household size (four persons according to Statistics Canada) may help address such water supply issues.

Area

The areas identified on Schedule B (Map Designations) as VA (Visitor Accommodation) are subject to the following objectives and policies.

Objectives:

The objectives of this subsection are:

(1) to provide an appropriate range of accommodation for visitors without incurring undue cost to the local taxpayers in providing basic facilities for visitors.

Policies:

6.5.2.1 Accommodation for visitors should be environmentally sensitive, small-scale and low density and may be dispersed around the Island. Convention centers or multi-room hotels should not be permitted.

6.5.2.2 “Destination resort" type development, designed to draw large numbers of tourists at one time, is considered inappropriate on Hornby Island and should not be permitted.

6.5.2.3 Applicants for visitor accommodation zoning should provide an impact assessment report, as defined in 7.3.1(f), to demonstrate that there is sufficient available water supply (including utilizing rainwater catchment and storage systems), effective and approved sewage and used water treatment, waste disposal capability and adequate provision for parking to serve the business and clientele both at the time of application and at ultimate projected growth levels. A hydrological study may be required in situations where there is reason to be concerned about impacts upon the groundwater resource.

6.5.2.4 Campgrounds and other tourist facilities should be permitted only by rezoning. Only campgrounds without individual hook-up of power and water services are considered appropriate.

6.5.2.5 Visitor accommodation may be considered in the following situations if enabled by other policies of this Plan:

a) Small resorts, hostels, lodges, cabins and camping facilities, guest houses or vacation home rentals on non-Agricultural Land Reserve land; and

b) vacation home rentals and agri-tourism accommodation on Agricultural Land Reserve Land in accordance with Agricultural Land Reserve policy and regulations if zoning allows such a use.

6.5.2.6 Small-scale Bed and Breakfasts should be permitted as a home occupation and should be regulated to ensure that the residential character of the site is maintained and that there is sufficient provision for parking, water supply and approved waste disposal and minimal impact on adjacent properties.

6.5.2.7 Due to the limited availability of restaurants at certain times of the year Bed and Breakfasts may be allowed to provide a full complement of meals to overnight guests only, subject to Vancouver Island Health Authority standards for water supply, food preparation and waste disposal.

Advocacy Policies

6.5.2.8 Rainwater catchment and storage systems and water conservation are encouraged for all types of visitor accommodation.

6.5.2.9 New developments and promoted events are encouraged to focus upon year-round and off- season activity rather than upon attracting more visitors during the summer peak season.

6.5.2.10 A position of "welcome with information" to tourism use of the Island is encouraged as a means to inform visiting tourists about best practices when visiting the island.

6.5.2.11 Information provided to visitors should emphasize the fragility of the environment, the limited resources (particularly the need to conserve water) and the appropriateness to the Island of low impact recreational activities.

6.5.2.12 Toilet facilities at beaches and the provision of safe fresh water from community wells is supported for the use of visitors to the Island.

6.5.2.13 The RCMP is requested to provide adequate policing on the Island particularly in the summer months to address issues of safety and public disturbance.

6.5.3 Vacation Home Rental

Background

Given the island's increasing popularity as a summer destination, there has been increasing demand for visitor accommodation and a tradition has been established of some home owners renting their cottages or homes for short periods of time predominantly during the summer months.

Property owners benefit from the opportunity to raise funds whether to assist with property costs or as a means to augment income while retaining their residence for its primary residential use for most of the year. Visitors benefit from a range of accommodation options to experience the Island's environment and amenities. The community benefits from the economic inputs from these visitors.

Area

The Hornby Island Local Trust Area is subject to the following objectives and policies.

Objectives:

The objectives of this subsection are:

1) to allow vacation home rental use while ensuring that the residential use of property and its residential character are retained; and
2) to address potential impacts of vacation home rentals.

Policies:

6.5.3.1 Where a dwelling is permitted on a parcel by the land use regulations, the rental of that dwelling as a vacation home rental should be permitted in the zoning regulations:

a) provided that the owner or tenant of the parcel is ordinarily resident on the property and the vacation home rental use is occurring during the temporary absence of the owner or tenant; or

b) where the owner or a residential tenant of the parcel resides seasonally in the dwelling and the vacation home rental use is occurring during the absence of the owner or tenant; or

c) where the owner or residential tenant is residing in another lawful dwelling on the property while the vacation home rental is occurring

6.5.3.2 Vacation home rental use should be subject to regulations which:

a) require a level of continuous occupancy that allows visitors to experience and develop an awareness of the local community and Hornby Island in general through a vacation experience;

b) limit the portion of year that a vacation home rental use may be in operation so as to ensure that the residential use of the property is retained;

c) limit the total number of bedrooms and beds which may be accommodated based on the area of the lot on which the dwelling is located so as to ensure that the scale of vacation home rental occupancy does not exceed what might otherwise be accommodated by normal residential use;

d) require adequate off-street parking spaces to limit vehicle crowding on public roadways;

e) ensure that the residential appearance and character of a property is not altered by the vacation home rental use; and

f) require that accommodation be within the permitted dwelling and prohibit camping or use of tents or recreational vehicles for vacation home rental use.

6.5.3.3 Owners of vacation home rentals, especially those located in the Whaling Station Bay/Anderson Drive area and other small lot areas are strongly encouraged to minimize impacts upon groundwater resources by:

a) utilizing a rainwater catchment and storage system;

b) installing water-saving fixtures; and

c) providing information about water conservation practices to all guests.

6.5.3.4 Vacation home rentals that do not comply with limitations imposed by land use regulations may be considered upon application for Temporary Use Permit.

6.5.3.5 Owners of vacation home rentals are encouraged to form an association to establish bylaws or best practices that would be required of all members in good standing and to consider informing owners, visitors and other interested persons of Local Trust Committee regulations. Any such association is encouraged to augment such regulations with other requirements that would assist in resolution of any potential issues that may arise such as requiring on-island contact information of association members or managers who could respond in a timely manner to neighbourhood issues.

6.5.3.6 Owners of vacation home rentals are encouraged, in the absence of any association membership, to provide contact information to visitors and neighbours and to provide timely response to issues that may be presented to them in relation to the vacation home rental use.

6.5.3.7 The Local Trust Committee should monitor the rate of use of vacation home rental development and be satisfied that such use is not increasing the commercial use of the housing stock so as to effectively displace the ability to provide residential housing.

6.5.3.9 The Local Trust Committee should consider reviewing with the community the regulations for vacation home rentals in 2017.

6.5.4 Commercial/Residential General

Background

The Fords Cove area contains three properties that have historically been zoned for broad range of commercial uses, ranging from retail to resort use. The properties are not generally used for these commercial purposes at the present time and the zoning reflects a historical circumstance. The current owners have secured the properties with the commercial zoning, generally use their properties for residential purposes and may be reluctant to relinquish the commercial zoning unless it is done in a fair manner and is equitably applied to all affected landowners. The Local Trust Committee also faces the challenge of seeking to balance the needs of the larger community regarding commercial land use and that of the individual property owners and to also think of the needs of future generations.

Area

The areas identified on Schedule B (Map Designations) as CRG (Commercial/Residential General) are subject to the following objectives and policies.

Objectives

The objectives of this subsection are:

(1) to recognize the historical commercial zoning of this area; and

(2) to encourage residential land use for this area with limited or no commercial use in consultation with all of the affected land owners.

Policies

6.5.4.1 Zoning regulations should allow for residential use and limited retail and personal service or visitor accommodation.

6.5.4.2 An increased density of residential development may be considered if other commercial land uses currently permitted by zoning are removed from the list of permitted uses in the zone applicable to this area or from a particular property that is subject to the rezoning application.

6.5.5 Home Occupations

Background:

Home Occupations are allowed to various degrees in most designations that permit residential uses. A home occupation is a type of commercial activity involving limited services and the sale of products crafted in the home or upon a property. General retail sale of fabricated products produced off the Island is not considered a home occupation. The retail sales of materials used in a home occupation (such as lumber, fabric and potting clay) is considered part of the home occupation. Home occupations must be clearly secondary to residential use and the character of the property must remain residential in appearance. There has not been any distinction in the type of permitted home occupation based upon lot size in zoning regulations to date but policies have existed that provide guidance in the development of new home occupation regulations.

Another form of home occupation is provision of accommodation as a Bed and Breakfast home occupation or as a second dwelling vacation rental home occupation on lots with more than one legal dwelling. There has been a tradition of offering Bed and Breakfast accommodation or the rental of one's home for short periods of time (a week or two). The Bed and Breakfast use and rental of a second dwelling on a property is addressed as a home occupation and vacation home rental of a primary residence is addressed in section 6.5.3 (Vacation Home Rental).

In order to provide a range of possible activities that are compatible with the neighbourhood and environment home occupations can be regulated differently on different sizes of lots or in different areas if the island. Furthermore as opportunities for affordable housing develop, opportunities for home occupations that are unique to the needs of such housing might be considered.

Area

The Hornby Island Local Trust Area is subject to the following objectives and policies.

Objectives:

The objectives of this subsection are:

(1) to encourage small businesses to enhance the economy and self-reliance of the Island community;

(2) to allow opportunities for residents to carry out limited businesses on the property of their residence;

(3) to ensure that there is no degradation of the environment or depletion of natural resources; and

(4) to retain a rural and/or residential character in all neighbourhoods.

Policies:

6.5.5.1 Home Occupation means an occupation or profession conducted for gain by a full-time or part-time resident of the lot on which the dwelling is located. Home Occupation use should be clearly incidental to the use of the dwelling or parcel for residential purposes. The types of home occupation uses are:

a) Limited Home Occupations are home occupations that are conducted entirely within a dwelling. They should be allowed on properties of any size including properties less than 0.1 hectares;

b) Basic Home Occupations are home occupations that are conducted entirely within a dwelling or in a permitted accessory building, or outdoors on the property if the use is screened. They should be allowed on all properties 0.1 hectare or larger; and

c) Extended Home Occupations, which should be allowed on all properties 2.0 hectares or larger designated on Schedule B for residential use, should be conducted within the dwelling, a permitted accessory building or outdoors on the property if the use is screened.

The conditions of use specific to the types of home occupations listed about may be found in the land use bylaw.

6.5.5.2 Home Occupations should be permitted as a secondary use to a permitted residential use and should be regulated by land use bylaw.

6.5.5.3 Any occupation involving significant use or production of toxic, odour causing or flammable materials and/or conducted at a scale or in a manner that may cause public or environmental health risks should not be permitted as a Home Occupation use.

6.5.5.4 Home Occupations should be regulated according to the nature of the enterprise and the potential impacts to the environment and surrounding properties such as water supply, waste disposal, noise, odours and visual impact.

6.5.5.5. Basic and Extended Home Occupation regulations should be designed as follows:

a) to protect groundwater catchment areas from pollutants;

b) to require screening that ensures that wide buffers of native vegetation are left along roads and property lines;

c) to ensure that no activity involving emission of toxic or irritant material should be permitted that does not conform to the Provincial regulations and guidelines;

d) to require that occupations that generate on-going noise (such as machine shops and woodworking shops) are conducted in fully enclosed and insulated buildings with sufficient setbacks from adjacent properties;

e) to require that operations that potentially create significant noise are restricted to larger lots with appropriate setbacks and/or buffering;

f) to address the size of buildings used for Home Occupations;

g) to ensure signage and lighting are compatible with the rural landscape; and

h) to exclude certain activities that may require a significant water supply, generate waste disposal, odour or noise or involve other potential environmental impacts.

6.5.5.6 Bed and Breakfasts operated within a dwelling should be permitted as a home occupation use and should be operated in accordance with land use bylaw regulations.

6.5.5.7 The rental of a second permitted residential dwelling unit for the temporary accommodation of paying guests while the first dwelling unit is occupied by the resident of the property should be permitted as an extended home occupation.

6.5.5.8 Coaching and teaching facilities with minimal environmental impact may be allowed as extended home occupations and should be operated in accordance with land use bylaw regulations.

6.5.5.9 Excluded activities may be considered following an application for a Temporary Use Permit which would carry certain conditions to address potential impacts.

6.5.5.10 Limited home occupations may be permitted on lots zoned for community housing and basic or extended home occupations may be established by site specific zoning.

6.6 Recreational

6.6.1 Outdoor Recreation

Background:

Most of the outdoor recreation opportunity is provided by the natural features of Hornby: the coastal waters, shoreline areas and the forested interior accessed through a long-established system of traditional trails. The Island is endowed with a rich variety of recreation options—from kayaking, sailing or scuba diving off shore, hiking, biking or riding on Mount Geoffrey, strolling along the trails of Helliwell, to relaxing on Tribune Bay's beaches. In addition to the Provincial and Regional Parks and properties under Ministry of Transportation and Infrastructure jurisdiction noted in subsection 3.3.12, the Community School playing field and the Joe King Park (Hornby Island Athletic Association) also provide opportunities for outdoor recreation.

In 2010 the Ministry of Transportation and Infrastructure divested beach access parks at Sandpiper, Hidden Beach, Grassy Point and Clamshell Place to the Comox Valley Regional District. The Hornby Island Residents and Ratepayer's Association is under contract with the regional district to manage these beach access parks.

Area

The Hornby Island Local Trust Area is subject to the following objectives and policies.

Objectives:

The objectives of this subsection are:

(1) to retain the traditional accesses to shoreline, beach areas, crown land, trails, parks, and viewpoints; and

(2) to ensure that outdoor activities are compatible with the natural environment and with the rural ambience of a small island.

Policies:

6.6.1.1 Present public accesses to the waterfront and Crown land, as shown on the Schedule C, should be continued and maintained in a safe condition and additional accesses should be obtained, where possible, as park at time of subdivision, or rezoning.

6.6.1.2 No activities that would restrict public access to or across the beaches should be permitted.

6.6.1.3 Overnight parking or camping on public land or beaches should be discouraged for health and fire protection reasons.

6.6.1.4 Viewpoints and access to them should be protected in any way possible.

6.6.1.5 Outdoor recreation activities that pose a threat to the environment or to public enjoyment of public amenities should not be permitted.

Advocacy Policies

6.6.1.6 The Ministry of Transportation and Infrastructure is requested to:

a) maintain and sign public accesses;

b) ensure that they are not used for camping, overnight parking or obstructed by adjacent land owners;

c) where required and formally requested by the community, construct and maintain safe steps made from natural materials such as stone and wood to access public beach areas;

d) prevent unauthorized encroachment upon or disturbance of these areas (such as structures, tree cutting, garbage dumping or obstruction of access);

e) support local stewardship arrangements for the water accesses and allowances not in use for roads.

6.6.1.7 Motorized outdoor recreation activities on the land, on the water adjacent to the shoreline and in the air above or adjacent to the Island are not considered appropriate and should be discouraged or restricted by bylaw where such restrictions can be enacted.

6.6.1.8 Organizers of outdoor recreation activities or events should ensure that these do not unduly interfere with the public access and enjoyment of the land and should provide adequate toilet facilities that comply with Provincial regulations.

6.6.1.9 Activities that have little or no impact upon the environment are considered preferable forms of outdoor recreation.

6.6.1.10 Initiatives to educate the public to prevent damage of natural features should be developed and supported.

6.6.1.11 The landing of seaplanes and helicopters in parks or public swimming areas should be discouraged.

6.6.2 Recreation Facilities

Background:

Because of the Island's distance from the nearest town, some residents of Hornby Island wish to have a range of recreational facilities of an appropriate scale provided on the Island. Residents are not able to use regional facilities without the additional cost of transportation and sometimes overnight accommodation off-Island. It is anticipated that if the year-round population grows, and as more people move to Hornby from urban areas, there will be an increased focus in the community upon providing additional recreational facilities. In particular, there has been continuing interest in establishing a public swimming pool. An increase in summer residents and visitors may generate requests for the provision of commercial recreational activities.

Area

The Hornby Island Local Trust Area is subject to the following objectives and policies.

Objectives:

The objectives of this subsection are:

(1) to encourage appropriate use of natural recreational opportunities rather than develop significant artificial infrastructure;

(2) to minimize the impact of recreation facilities on the natural environment;

(3) to ensure that any recreational facility is of a scale appropriate to the rural nature and size of the Island;

(4) to ensure that any new facilities are broadly supported and do not place a heavy burden upon taxpayers; and

(5) to ensure that facilities, if located on Crown land or publicly funded, be accessible to all of the community.

Policies:

6.6.2.1 All recreation facilities should be so located and of such scale that they do not stress the fragile ecology and limited water resource.

6.6.2.2 All public facilities should be within the ability of the taxpayers to pay for such services and subject to public involvement in planning and implementation.

6.6.2.3 Planning for recreational facilities should ensure that they do not alienate existing public uses nor involve significant removal of natural vegetation and should allow for re-habilitation or re-establishment of native vegetation where this has been disturbed.

6.6.2.4 Public recreational facilities should be located in the area designated for community service use near the Community Hall and any exceptions should be subject to a rezoning.

6.6.2.5 Commercial recreational facilities are not currently supported in this Plan. Any applications for such facilities should be carefully evaluated to ensure that they do not:

a) require an excessive supply of water;

b) include a land use that is likely to put additional stress upon transportation systems, Island resources and local infrastructure;

c) have adverse impacts upon the ecosystem, groundwater recharge areas and riparian areas (for example through the use of pesticides and fertilizers); and

d) have an adverse impact upon the neighbourhood and adjacent properties (including public areas) or upon Island character.

6.6.2.6 Activities that are noisy, potentially dangerous, polluting, or incompatible with the natural landscape such as amusement parks, shooting ranges, water slides or go-cart tracks should not be permitted.

6.6.2.7 Destination gaming facilities such as casinos and commercial bingo halls should be prohibited.

Advocacy Policy

6.6.2.8 Efforts to provide information that will encourage knowledgeable and minimal impact use of natural areas should be supported.

6.7 Marine

6.7.1 Foreshore

Background:

The foreshore zone is defined as the land located between the highest tide line and the lowest tide line. This is public land managed by Ministry of Forests, Lands and Natural Resource Operations. Although the Crown is not bound by local bylaws, any occupiers must comply with the bylaws. From time to time commercial operators acquire leases for part of the foreshore or other land covered by water for the cultivation of shellfish such as oysters. It is recognized that commercial oyster operators do not rely on naturally occurring stocks and by reserving areas between leases for use of the public, the commercial operators actually contribute to maintenance of the naturally occurring resource.

Area

The areas of the Hornby Island Local Trust area that are located between the highest tide line and the lowest tide line of the sea of Hornby Island, including areas designated MA (Mariculture) and MT (Marine Transport) and MC (Marine Conservation) are subject to the following objectives and policies.

Objectives:

The objectives of this subsection are:

(1) to ensure any use of the foreshore and ocean does not result in damage to the natural systems;

(2) to minimize the impact of uses and users on upland owners;

(3) to ensure owners of property on the shoreline do not pollute the foreshore areas;

(4) to ensure public opportunity to use the foreshore areas;

(5) to protect the scenic values of the foreshore areas; and

(6) to prohibit further alienation of the foreshore for private or commercial use.

Policies:

6.7.1.1 Foreshore zoning should be designed to protect against disruption of natural beach systems and pollution of the foreshore zone.

6.7.1.2 Any marine industrial operation that would alter or damage the foreshore such as boat ways or log dumps should be prohibited by regulation.

6.7.1.3 The use of structures, pens, cages, or other apparatus on the foreshore for mariculture or aquaculture operations should be regulated through zoning.

6.7.1.4 Private and commercial wharves, docks and/or breakwaters should be prohibited by regulation except as permitted at Shingle Spit.

Advocacy Policies

6.7.1.5 The Ministry of Environment and Ministry of Forests, Lands and Natural Resource Operations are requested to:

a) ensure commercial leases fronting on residential areas are located to permit public access to the water at regular intervals, and to ensure public right-of-way along all beaches is preserved;

b) designate community beaches to permit community cultivation of oysters and clams for recreational harvesting only; and

c) encourage and protect marine life by opposing any filling or excavation of sand, gravel or any natural deposit on the foreshore.

6.7.1.6 The Ministry of Forests, Lands and Natural Resource Operations is requested to refer any new shellfish lease applications or proposals for expansions of shellfish lease sites to the Local Trust Committee for consideration.

6.7.1.7 The Ministry of Forests, Lands and Natural Resource is requested to ensure that foreshore areas between leases and containing naturally occurring oyster populations be kept accessible for harvest by the general public.

6.7.2 Marine Conservation

Background:

The Hornby Local Trust Area extends out 1000 metres from the shoreline of Hornby except where it overlaps another jurisdiction such as Denman Island, when the boundary becomes a line mid-channel.

Area

The areas of the Hornby Island Local Trust area that are below the natural boundary of the sea of Hornby Island, including areas designated MA (Mariculture) and MT (Marine Transport) and MC (Marine Conservation) are subject to the following objectives and policies.

Objectives:

The objectives of this subsection are:

(1) to ensure that coastal uses are compatible with protecting the environment and amenities; and

(2) to protect the right of the public to access over waterways.

Policies:

Policies in subsections 3.8 (Hazard Lands) and 4.3 (Mariculture) apply to this subsection.

6.7.2.1 All uses of the waters within 1000 metres of the shoreline should be regulated by zoning.

6.7.2.2 Permanent anchoring of floating camps or houseboats and the residential use of any vessel moored or beached should not be permitted.

6.7.2.3 Temporary residential use of vessels should be permitted by regulation at the Ford Cove Marina provided there are adequate toilet facilities in place.

6.7.2.4 The Local Trust Committee should assist the Coast Guard in assessing effects of developments on rights protected by the *Navigable Waters Protection Act*.

6.8 Climate Change Adaptation and Mitigation

Background:

Although it is recognized climate change can occur as a result of naturally occurring phenomena, in the context of this Plan climate change refers to the impact of increasing concentrations of heat-trapping greenhouse gases in the atmosphere as the result of human activities— primarily the burning of fossil fuels and large-scale deforestation. A 2007 report from the Intergovernmental Panel on Climate Change states that between 1970 and 2004, greenhouse gas emissions have increased by 70%. According to this report, this dramatic rise in atmospheric greenhouse gas concentrations has in turn triggered an increase in the average temperatures of near-surface air and ocean water, with temperatures projected to rise 1.1° to 6.4° C over the next century. Although seemingly slight, these temperature changes will have dramatic and negative impact on ecological systems around the globe.

In response to concerns about human-induced climate change, the provincial government gave Royal Assent to Bill 27 [*Local Government (Green Communities) Statutes Amendment Act, 2008*] on May 29, 2008. Bill 27 amends the *Local Government Act* and other Provincial regulations to provide new tools for local governments. Most significantly, Bill 27 requires that all local governments include greenhouse gas emission reduction targets—and policies and actions to achieve those targets— in their Official Community Plans.

The following targets, objectives, policies and actions are the first step to ensuring that the reduction of greenhouse gas emissions specifically and the impact of climate change in general become part of the planning process for Hornby Island.

This part of the Plan contains objectives and policies relating to the reduction of greenhouse gas emissions and the broader topic of climate change adaptation and mitigation.
This Plan sets the following interim target:

- *Target: to reduce greenhouse gas emissions by 25% by 2020 and 80% by 2050 based on 2007 levels. Within the local trust area this reduction will be achieved by actions resulting from individual and community initiatives, the actions of other levels of government, technological changes, and changes to land use policies and regulations.*

Area

The Hornby Island Local Trust Area is subject to the following objectives and policies.

Objectives:

The objectives of this subsection are:

(1) to give consideration to the impacts of climate change in all land use decisions;

(2) to support actions in land use, site planning, and construction that will result in the reduction of greenhouse gas emissions;

(3) to focus on those actions that can be taken locally to mitigate and adapt to global changes; and

(4) to protect the natural landscape and minimize the carbon footprint of residents and guests on Hornby Island.

Policies:

6.8.1 The Local Trust Committee should work with the community to regularly review greenhouse gas emission targets to ensure targets (are locally based and that have a capacity for being monitored.

6.8.2 The Local Trust Committee should consider the development of new criteria for assessing official community plan or zoning amendment applications from the perspective of climate change adaptation and mitigation.

6.8.3 This Plan strongly encourages the retention of forest cover except for the clearing of land for farming in the Agricultural Land Reserve. Trees on private property should be maintained where possible to sequester carbon and provide habitat, although it is understood that some clearing is necessary for growing food to guard against forest fires and to create protected house sites.

6.8.4 The Local Trust Committee should consider any proposals for new development potential in the context of the overall development potential of the Island, and the global dynamics of climate change.

6.8.5 This Plan supports limitations on the size of buildings and opportunities for attached dwelling units and visitor accommodation units.

6.8.6 This Plan strongly encourages the incorporation of green building techniques and alternative energy systems (solar, wind, geothermal, or water based) into residential housing, whether it is new construction or renovations.

6.8.7 This Plan encourages the development and maintenance of safe multi use trails and bike lanes to facilitate non-motorized forms of travel.

6.8.8 The Local Trust Committee should consider supporting the local provision of services that residents presently travel off-island to access.

Advocacy Policies

6.8.9 This Plan encourages residents to participate in ride sharing and carpooling as simple but effective ways to reduce greenhouse gas emissions.

6.8.10 A number of Climate Change adaptation and mitigation actions are identified that can only be achieved through cooperation and initiatives resulting from individuals and the community, the actions of other levels of government, technological changes, and changes to land use policies and regulations. In order to foster such actions the Local Trust Committee should:

a. develop improved methods of determining and assessing the energy efficiency and climate change impacts of proposed development when it is processing land use applications. Application checklists should be revised to include climate change mitigation and adaptation criteria, such as energy efficiency, renewable energy and carbon sequestration impacts;

b. support opportunities for incentives to encourage “climate wise” actions, including water conservation, storm water retention, the use of alternative energy sources for home use, and the use of alternative transportation methods;

c. review land use regulations to provide for community gardens and community food processing and storage facilities in appropriate locations and encourage residents to pursue the establishment of such gardens and facilities;

d. encourage local food production and explore with the community options for creating a Farm Plan;

e. encourage residents, community groups, businesses and other entities to pursue alternative transportation options, such as a bus service or green bicycle program;

f. encourage the Province to reduce the maximum speed limit on Hornby Island to 50 kph and to consider measures that will enable and support the use of alternatively-powered vehicles;

g. encourage the Insurance Corporation of British Columbia to link insurance rates to the mileage actually driven in the previous year by means of a tamper proof odometer. This would also offer valuable information for the calculation of greenhouse gas emissions across British Columbia;

h. encourage BC Ferries and the Province to consider pricing strategies and services that will support car-pooling, the use of small energy-efficient vehicles and passenger travel on ferries;

i. encourage School District 71 to allow for the use of the school bus by residents of Hornby Island for traveling to and from the Island, should extra space be available on the bus;

j. encourage the Province to amend policies and legislation and allow rainwater collection as a source of potable water, and to require that all new development include systems for water catchment and treatment; and,

k. work with Trust Council to develop a web based carbon neutral calculator to assist residents in calculating their personal and household greenhouse gas emissions.

6.9 Development Permit Areas

Background:

Section 920 of the *Local Government Act* provides that in areas designated as Development Permit Areas in an official community plan; land shall not be subdivided, and construction of, addition to or alteration of a building or structure shall not be commenced unless the owner first obtains a Development Permit. . In some development permit areas, s. 920 of the *Local Government Act* prohibits any alteration of land, and/or buildings or structures, without a development permit.

Development Permits may be issued by resolution of the Hornby Island Trust Committee for land in designated Development Permit Areas. Each designation must include a description of the special conditions or objectives that justify the designation and must specify guidelines on how the objectives will be fulfilled. Guidelines are listed in the Hornby Island Land Use Bylaw No. XX, 201X.

Development Permits for this purpose may vary or supplement bylaw regulations, include requirements and conditions or set standards and impose conditions respecting the sequence and timing of construction in accordance with the adopted guidelines contained in this Plan or the land use bylaw that is applicable on Hornby Island.

Development Permits should be monitored by the Local Trust Committee on annual review basis as resources and priorities allow.

6.9.1 Development Permits to Define the Form and Character of Commercial Development

The Commercial Development Permit Areas are designated to identify and apply objectives and guidelines for the form and character of the commercial development permitted on the parcels in this area.

Areas: Commercial Centers (Retail and Visitor Accommodations)

The Commercial Centres (Retail and Visitor Accommodations) Development Permit Area is designated as the area shown on Schedule E.

Objective:

To ensure that the form and character of commercial development are compatible with the quiet rural atmosphere of the community and to encourage continuation of that trend and to maintain the island's rural atmosphere.

6.9.2 Development Permits for the Protection of the Natural Environment, its Ecosystems and Biological Diversity and for Promotion of Water Conservation

Development Permits for this purpose may vary or supplement bylaw regulations, include requirements and conditions or set standards and impose conditions respecting the sequence

and timing of construction in accordance with the adopted guidelines contained in this Plan or the land use bylaw that is applicable on Hornby Island.

6.9.2.1 Water Supply Protection Development Permit Area

Purpose:

The Water Supply Protection Development Permit Area is designated for the protection of the natural environment, its ecosystems and biological diversity and to establish objectives to promote water conservation.

Area
DPA 1 - Water Supply Protection Development Permit Area as shown on Schedule E.

Objective:

This area has a heavily developed, highly vulnerable aquifer. The objective of this development permit area is to ensure that any development and land uses do not negatively impact the water resources in this area, or any nearby water supply sources.

6.9.2.2 Community Service Use Development Permit Area

Purpose:

The Community Service Use Development Permit Area is designated for the protection of the natural environment, its ecosystems and biological diversity and to establish objectives to promote water conservation.

Area
DPA 2: Community Service Use Development Permit Area as shown on Schedule E.

Objective:

The community service use development permit area lies within a groundwater recharge area (identified in the *Groundwater Geochemistry Study on Hornby Island, B.C.* – Allen and Matsuo, SFU, 2001), which is upslope from one of the Island's main residential neighbourhoods. Developments within the community service use area could involve institutional or community buildings and activities that could have a potential impact upon the water resource.

6.9.2.3 Water Resource Protection Development Permit Area

Purpose:

The Water Resource Protection Development Permit Area is designated for the protection of the natural environment, its ecosystems and biological diversity and to establish objectives to promote water conservation.

Area:

DPA 3: Water Resource Protection Development Permit Area as shown on Schedule E.

Objective:

This area has been identified as a being within an IIA Aquifer (moderately developed – high vulnerability) and within a potential groundwater recharge zone. The objective of this development permit area is to protect groundwater resources, by maintaining the quantity and quality of ground water in this area.

6.9.2.4 Mt. Geoffrey Escarpment Development Permit Area

Purpose:

The Mt. Geoffrey Escarpment Development Permit Area is designated for the protection of the natural environment, its ecosystems and biological diversity, to establish objectives to promote water conservation and for protection of development from hazardous conditions.

Area

DPA 4: Mt. Geoffrey Escarpment Development Permit Area as shown on Schedule E.

Objective:

The Mt. Geoffrey escarpment area contains watershed, wetlands, areas of land slip, areas of high visibility and high scenic values. Any development could affect the water catchment capabilities and other natural values. The removal of tree cover could adversely affect all values and be hazardous for development in the area, as well as above and below the area.

6.9.3 Form and Character of Community Housing Development Permit Area

Area

DPA 5: Property described as Lot 1, Section 11, Hornby Island, Nanaimo District, Plan VIP87990 (5040 Central Road)

Justification

The intent of this development is to provide opportunities for ownership housing for community members for whom this would not otherwise be accessible. The build-out of this development is expected to occur in a series of phases. The designation of this property and the following guidelines are intended to ensure a consistent quality and form and character of development over the build-out period as well as provide the general community with an assurance as to the vision for the project.

Guidelines

1. Form and Character
    a. All buildings and structures shall be architecturally coordinated and shall give consideration to the relationship between buildings and open areas, circulation systems, visual impact and design compatibility within the development.
    b. The siting and location of all buildings and structures shall be in compliance with the drawings and schedules approved by the Hornby Island Local Trust Committee.

2. Landscaping
    All landscaping shall be required to be in general compliance with the landscaping provisions identified on any schedules approved by the Local Trust Committee.

3. Construction Phase
    a. All construction must be completed in accordance with an approved site/building plan and an erosion and sediment control plan.
    b. Construction of the development shall take place during the working hours of 7:00 a.m. to 7:00 p.m.

4. Outside storage
    a. Centrally located recycling facilities shall be provided for the use of all residents within the development.

5. Screening
    a. The character of the development shall be enhanced by landscaping of substantial proportions incorporating existing native vegetation,
    b. Buildings shall be sited to ensure that any adjacent residential structures have visual privacy, as well as protection from site illumination and noise. Security and other lighting shall not be placed so as to shine directly into adjacent residential structures or to reduce the separation effectiveness of any landscaped buffer.
    c. All waste disposal bins shall be completely screened within a solid walled enclosure not less than 2 metres (6.6 feet) in height.

6. Parking
    a. The location and number of parking spaces for the use of the residents shall be provided on the site development plans for the approval of the Hornby Island Local Trust Committee and shall be in compliance with the provisions of the Hornby Island Land Use Bylaw.
    b. Any visitor parking spaces should be clearly identified and provided within the development. Tree planting is encouraged in parking areas.
    c. Any paved parking areas or roadways shall be included within the context of the required stormwater management plan.
    d. Automobile parking areas may be covered with a select granular base approved by the Ministry of Transportation and Infrastructure and provide storm water controls by means of perimeter curtain drains.

7. Stormwater
    a) It is recognized that the clearing, grading and servicing of sites alters their natural hydrology patterns. In recognition of this fact; and the presence of Beulah Creek alongside the development; a stormwater management plan that strives to protect water quality, and to maintain post-development peak flows to those of pre-development flow patterns and volumes over the entire water season shall be required. This stormwater plan shall be prepared by a Professional Engineer and should make use of such devices as permeable surface treatments, wet or dry detention ponds, constructed wetlands or other devices as deemed suitable and consistent with best management practices. Stormwater runoff from storage areas shall be controlled to prevent contamination of watercourses.

6.10 Temporary Use Permits

Background:

Section 921 of the *Local Government Act* provides that temporary uses may be permitted in areas designated in the Official Community Plan. Upon application by a property owner the Local

Trust Committee can issue a Temporary Use Permit through resolution. The permit can allow a use not permitted by the land use bylaw, the conditions of use and the time period. Temporary Use Permits can be issued for a term up to three years and may be renewed one time only.

Objectives:

The objectives of this subsection are:

(1) to consider allowing a temporary event as per policy 6.5.1.10;

(2) to allow for a period of evaluation of new commercial ventures that do not involve significant new development prior to an application for rezoning as per policy 6.5.1.10;

(3) to allow particular uses for a period of time to enable impacts to be assessed before any further permitting of the use as per policy 6.5.1.10;

(4) to consider allowing transport of ground water off a lot where the water is extracted as per policy 5.1.4;

(5) to consider allowing temporary seasonal or emergency accommodations as per policies 6.3.5.18 and 6.3.5.19;

(6) to consider allowing a temporary secondary suite or detached housing for a relative or caregiver of occupants of the residence as per policy 6.3.5.14 in association with a housing agreement or by such other means as are available to encourage occupancy by a relative or caregiver;

(7) to consider allowing temporary nonagricultural uses on land within the Agricultural Land Reserve or on land used for agriculture where there is minimal negative impact upon the agricultural land values and where applicable approval has been received from the Agricultural Land Commission as per policy 6.4.2.5;

(8) to allow light industrial home occupations that require a more rigorous permitting process than provided for under land use regulations for extended home occupations as per policy 6.5.5.9; and

(9) to allow vacation home rental use that does not comply with limitations imposed by land use regulation pursuant to OCP policy 6.5.3.4.

Guidelines:

6.10.1 Upon application, Temporary Use Permits may be considered for all parcels of land within the Hornby Island Local Trust Area, with the following exclusions:

a) properties less than one quarter of a hectare (0.63 acre), except when the application is for vacation home rental use,

b) land designated as Park, , as shown on Schedule B, and

c) a parcel identified as containing an environmentally sensitive area, as shown on Schedule D1 or D2, unless information is provided by the owner that establishes that the proposed land use does not negatively impact the environmentally sensitive features or is located outside of the sensitive area on the parcel.

6.10.2 Applications for Temporary Use Permits may be referred to the Advisory Planning Commission which may be requested to provide an opportunity for public input to be received and considered in preparing its recommendations.

6.10.3 Temporary Use Permits for parcels within the Agricultural Land Reserve should only be issued for uses that do not conflict with Agricultural Land Commission policies and regulations.

6.10.4 A professional assessment of hydrological impacts may be required when the proposed use is within an identified groundwater recharge area or an aquifer classified as heavily developed as shown on Schedule B or D2 and if the proposed use involves more than minimal potential impacts upon the groundwater resource.

6.10.5 Where approvals are required from other agencies, these should be obtained prior to the issuing of a Temporary Use Permit.

6.10.6 The general conditions for issuing a Temporary Use Permit are as follows:

a) adequate off-road parking should be provided;

b) there should be adequate provision for approved waste disposal before consideration is given by the Local Trust Committee;

c) commercial uses (other than very short term uses or vacation home rentals) should be screened from adjacent residential uses;

d) industrial uses should be screened from adjacent properties and roads;

e) there should be adequate setbacks of the use to minimize impacts upon adjacent properties;

f) noise generation should be addressed to prevent disturbance of the neighbourhood and to ensure compliance with regional district regulations;

g) the use should be conducted so as to not risk contamination of the land, surface water or groundwater, including by making adequate provision for the safe storage of toxic materials;

h) water supply should be addressed so as to not create negative impacts upon existing common water sources;

i) other potential impacts upon the neighbourhood should be mitigated, including by limitations upon the hours of operation where appropriate;

j) the owner of the property may be required to provide a security to guarantee the performance of the terms of the permit and should be required to provide an undertaking to demolish or remove any building or structure and to restore the land to a condition specified in the permit, especially in circumstances where temporary housing is provided and such housing is no longer used for the temporary purposes; and

k) lands with good agricultural potential should not be compromised by any use permitted by a Temporary Use Permit.

6.10.6 Applicants for Temporary Use Permits should address the issues identified in these policies in their applications and are strongly encouraged to consult with neighbours about the proposed use prior to making application.

6.10.7 Light Industrial activities require specific consideration of impacts with respect to environmental protection, water use, waste generation, noise, odour, parking, or neighbourhood character, but may be allowed upon application for a Temporary Use Permit that contains specific conditions to address these impacts.

6.10.8 The Local Trust Committee should consider the climate change impacts of any proposed temporary use when reviewing temporary use permit applications.

6.10.9 In consideration of applications for vacation home rentals the Local Trust Committee may consider the following:

a) The cumulative effects, both positive and negative, on the neighbourhood and island of all temporary use permits issued for vacation home rentals;

b) Limitations on any signage that may be placed on the property;

c) A requirement for information to be posted that will inform guests regarding the location of property lines by way of a map, any applicable noise bylaws, measures to address water conservation, fire safety, storage and management of garbage, septic system care and control of pets (if pets are permitted) in accordance with standards applicable by bylaw, as stated in the permit or as determined by the owner or manager to effectively manage the site;

d) The proposed maximum number of occupants;

e) The proposed time periods that the dwelling will be available for rental or months of the year when the rental will occur; and.

f) Other requirements that the Local Trust Committee may consider appropriate.

SECTION VII—ADMINISTRATION

7.1 Interpretation

The final interpretation as to the location of boundaries on any map schedule shall be defined by:

a) Where boundaries coincide with lot lines, the boundaries are the lot lines.
b) Where a boundary is shown as following any highway, right-of-way or stream, the centre line of such highway, right-of-way, or stream the centerline of that feature is the boundary.
c) Where land based and water based boundaries coincide, the common boundary shall be the natural boundary of the sea.
d) Where a boundary does not follow a legally defined line and no dimensions are shown by which the boundary could otherwise be located, the location of the boundary must be determined by scaling from the map schedule and in that case the boundary is the midpoint of the line delineating the boundary on the schedule.

7.2 Implementation

7.2.1 Section 884 of the *Local Government Act* specifies that:

"An official community plan does not commit or authorize a municipality, regional district (includes a Local Trust Committee pursuant to Section 27 of the *Islands Trust Act*) or improvement district to proceed with any project that is specified in the plan."

and

"All bylaws enacted or works undertaken by a council, board or greater board (includes a Local Trust Committee pursuant to Section 27 of the *Islands Trust Act*), or by the trustees of an improvement district, after the adoption of an official community plan must be consistent with the relevant plan."

7.2.2 The Hornby Island Local Trust Committee may use available regulatory tools as defined in the *Local Government Act* to implement this Plan.

7.2.3 The following instruments may be used to implement this plan: Development Permits, the Land Use Bylaw, Siting and Use Permits, Temporary Use Permits and covenants.

7.2.4 The Local Trust Committee may formally communicate with the Comox Valley Regional District, Ministries of the Provincial government, departments of the Federal government and any other agencies mentioned in this Plan to advocate the policies of this Plan.

7.2.5 The Local Trust Committee may use every opportunity to work co-operatively with other governments and non-government organizations, or through the Islands Trust Council, to support policies of this Plan.

7.2.6 The Local Trust Committee may actively promote the policies of this Plan to residents, businesses, community organizations, non-resident property owners and visitors.

7.2.7 To promote compliance with the instruments used to implement this Plan, the Local Trust Committee may, among other things:

a) make information available on policies, regulations and permit requirements to property owners and residents;
b) encourage real estate agents to inform prospective buyers about policies, regulations and permit requirements;
c) encourage building contractors to ensure that appropriate permits are in place before undertaking work on a property;
d) encourage voluntary compliance with regulations and support neighbourhood resolution of problems;
e) make property owners and residents aware of the bylaw investigation and enforcement process, including procedures for initiating investigation; and
f) consider adopting bylaw enforcement policies to establish priorities for enforcement resources.

7.3 Development Approval Information

7.3.1 The Hornby Island Local Trust Area is designated as an area under which development approval information may be required for the following purposes:

(a) Development Permits as specified in s. 6.9 of this plan in relation to the areas and objectives, and subject to the conditions, stated in that section;

(b) Temporary Use Permits as specified in s.6.10 of this plan in relation to the area and objectives, and subject to the conditions, stated in that section;

(c) The development of renewable energy sources (s. 4.4.2) that allow for the sale of power to the Hydro grid, to ensure that there are not environmental impacts or increased safety risks

(d) Rezoning applications for the purpose of obtaining consistent and comprehensive information on the impacts of changes to permitted siting, structures, use or density, to ensure achievement of the objectives stated in this plan as they apply to the parcel proposed to be rezoned and the surrounding areas, vegetation, environment and infrastructure, including, without limitation, for the purposes of the policies stated in s. 6.5.2.3 of this Plan.

(e) Commercial land-based aquaculture operations should be regulated by zoning. Before any application for a rezoning to allow upland aquaculture (using freshwater or saltwater ponds or tanks) are considered, a site specific analysis of the potential impacts of water consumption, waste disposal, drainage or potential spills on the surrounding land and upon surface water and groundwater may be required.

(f) Upon application, properties 4 hectares or greater may be considered for a “land co-operative” or “community housing” rezoning supported by submission of an impact assessment plan that addresses projected densities, provision for water supply and waste treatment, impacts on the neighbourhood, retention of vegetation and a limited footprint on the land resulting from restricted size of dwellings and shared facilities where possible.

7.3.2 Trust Council may consider adoption of a development approval information bylaw pursuant to s. 920.1 of the Local Government Act.

7.4 Amendment Procedure

This Bylaw may be amended by the Hornby Island Trust Committee at its initiative or in response to an application. Individuals seeking amendment shall submit applications in the form provided for in the bylaws of the Trust Committee.

Where an application for amendment of this bylaw has been refused, no application for the same amendment should be considered within twelve months of the date of refusal, unless the Hornby Island Trust Committee waives this requirement.

7.5 Update and Revision

The Local Trustees, in consultation with the Advisory Planning Commission and the community, may initiate review of the Community Plan at any time. The bylaw should be updated on a periodic basis and changes in legislation or other issues arise and should be reviewed in its entirety at least every ten years from the adoption date.

All amendments of the Community Plan shall comply with the mandate and policies of the Islands Trust, as well as with procedures specified in the *Local Government Act*, and be accompanied by public review and discussion.

Whenever the Policy Statement is amended by Islands Trust Council, the relevant sections of the community plan shall be reviewed and if necessary amended to ensure compliance.

7.6 Public Facilities

Any designation or policy for proposed public facilities on private lands including but not restricted to roads, parks, trails, parking facilities, and public and community facilities that are not available for acquisition through dedication, grants, or as an amenity through a zoning regulation and that are not subject to committed funds either through a capital expenditure plan or other budgeting process of the public agency responsible for the proposed facility, shall be deemed to be a community goal of this Bylaw.

Schedule G

List of Community References

1. *Amending Agreement to the Letter of Agreement between the Ministry of Transportation and Highways and the Islands Trust. Subject: Road Standards, Classification and the Consultative Process in the Islands Trust Area Dec, 1996.*
2. *An Ecosystem Approach to Groundwater Management in the Gulf Island—Henderson, 1997* stated that "there is a need for management of the groundwater resources to ensure a sustainable supply for the present and future on the islands."
3. *Bedrock Aquifers on Hornby Island—Ministry of Water, Land and Air Protection, 2001* provides a classification of the aquifers on Hornby Island using a provincial classification system. The four aquifers on Hornby Island are all classified as having "high vulnerability" (the highest of three categories). The aquifer in the Whaling Station Bay peninsula east of Tribune Bay is classified as "highly developed" (the highest of three categories) while aquifers in the central and western part of the island are classified as "moderately developed". The aquifer in the southern part of the island (south of the Mount Geoffrey escarpment) is classified as "lightly developed" (the lowest category).
4. *Coastal Douglas Fir Ecosystems, Flynn—BC Ministry of Environment, Lands and Parks, 1999* notes that only one half of one percent of the original Coastal Douglas Fir forest remains in a relatively undisturbed state. It suggests that "even if efforts to protect all remaining old growth stands are successful, additional areas of older second-growth forest will have to be protected and allowed to recover to an old-growth state in order to ensure adequate representation of these forest types in future."
5. *Develop with Care: Environmental Guidelines for Urban and Rural Development in British Columbia, March 2006.* Ministry of Environment.
6. *"Ecological Inventory of Proposed Woodlot #0032" (1998)* – Environmental Consultants.
7. *Garry Oak Ecosystems, Erickson—BC Ministry of Environment, Lands and Parks,1993* states that Garry oak ecosystems "have been identified as a hot spot of biological diversity" and reports that Garry oak vegetation types are being rated provincially as "endangered" or "threatened".
8. *Groundwater Conditions on Hornby Island, B.C. (Chwojka), 1989* reported that groundwater demands in three areas of the Island were approaching 71 to 83 per cent of the annual replenishment.
9. *The Heart of Hornby Island—A Forest, a Watershed (2000)* Hornby Island Residents and Ratepayers Association.
10. *Hornby Island Community Profile*, March 2010.
11. *Hornby Island Domestic Well Monitoring Study, September 2010 Ministry of Environment, Water Stewardship Division, Vancouver Island Regional Operations Branch.*
12. *The Hornby Island Groundwater Pilot Project—Final Report, 1994* noted that heavily developed neighbourhoods on the Island "experience limited availability of groundwater" and that there are "significant water quality concerns". It recommended that management of groundwater must "ensure that the rate and

use of the groundwater resource does not exceed the rate of replenishment" and "ensure that human activity does not degrade the quality of the groundwater resource".

13. *Hornby Island Vacant Crown Land Profile*, July, 2004.

14. *Hornby Island Water Stewardship Project Report, 1996-1999* reported that 20% of sampled wells tested positive for fecal coliform at a level that does not meet the standard for safe drinking water.

15. *Housing Needs on Hornby and Denman Island* prepared by Eberle Planning and Research, 2008.

16. *Letter of Agreement between the Ministry of Transportation and Highways (Moth) and the Islands Trust (It). Subject: Road Standards, Classification and Moth/It Consultative Process In The Islands Trust Area Dec 1992.*

17. *Nature Conservancy of Canada Inventory of the Trust Area, November 1975 designed "to select area priorities for an anticipated program of preservation and protection by the Islands Trust who administered the Inventory and by the Nature Conservancy of Canada who funded the Inventory".*

18. *A Preliminary Groundwater Assessment of a Crown Parcel on Hornby Island—BC Environment, 1994* concluded that "the upland recharge area including the subject Crown land is likely vulnerable to groundwater contamination" and provided examples of land use activities that should be restricted to sustain groundwater quantity and quality".

19. *A Preliminary Review of Groundwater Conditions on Hornby Island, B.C. (Chwojka), 1984* stressed the importance of preventing contaminants from entering the groundwater by exercising care in placing septic fields and regulating land use in upland recharge areas and recommended that "serious consideration be given to limiting any future groundwater development" in areas with poor water quality and high density of wells.

20. *Protected Areas on Vancouver Island: An Analysis of Gaps in Representation for Conservation Purposes, Eng—BC Ministry of Forests and Range, 1992* reports that the Coastal Douglas Fir zone—within which Hornby Island is located—has received the greatest amount of impact per unit area than any other biogeoclimatic subzone in the Province.

21. *Results of the Groundwater Geochemistry Study on Hornby Island, B.C.—Allen and Matsuo, SFU, 2001* recommended that "water conservation, proper waste disposal and placement of human development should be a priority in land use planning. This should be done so as to protect sensitive groundwater recharge areas in upland locations." This study delineated two recharge areas on the Island— one large one in the main part of the Island and a smaller one in the Whaling Station Bay peninsula east of Tribune Bay. The recharge areas are generally above the 20 metre contour (the 40 metre contour in the western part of the Island).

22. *The Sensitive Ecosystem Inventory of Vancouver Island and Gulf Islands 1993-1997* has documented the rare and fragile ecosystems of this area and notes that "loss of natural ecosystems in the Georgia Basin is of national concern". The inventory records examples of the following sensitive ecosystems on Hornby Island: older forest, woodland (Garry oak), terrestrial herbaceous, wetland, coastal bluff and sparsely vegetated; there are also areas of older second growth

forest. (The ecosystem types are briefly described in Section 1.2 The Natural Setting.)

23. *The Pilot Voluntary Groundwater Protection Project on Hornby Island* (initiated by the Islands Trust and the Ministry of Water, Land and Air Protection), a community-based "Groundwater Protection Strategy" is being developed.

24. *Water Stewardship and Wastewater Management on Hornby Island—Third Eye Consultants, RRU, 2000* recommended "protection of the groundwater recharge area and wells".

Print Date: Mar-04-2014

Islands Trust

Top Priorities

Hornby Island

No.	Description	Activity	Received/Initiated	Responsibility	Target Date	Status
1	Official Community Plan and Land Use Bylaw Review.	Targeted review and update of the OCP and LUB. At the November 22, 2013 LTC meeting the following resolution was passed: **HO-044-2013** that the Hornby Island Local Trust Committee refer the draft Land Use Bylaw and associated schedules to the Advisory Planning Commission for their review and comment and refer the draft Official Community Plan and associated schedules for any comments arising from changes made from the previous draft.	Feb-03-2012	Rob Milne		On Going
2	APC Bylaw review and update	Review language of current bylaw and consider amendment to current language which prevents appointments after March. Bylaw 146 adopted at November 22, 2013 Local Trust meeting.	Jun-07-2013	Rob Milne		Done
3	Riparian Areas Regulation mapping and implementation.	Additional data collection and mapping is planned to be completed in the fall of 2013. Contract issued to Madrone Environmental Services Inc. November 8, 2013. Mapping to take	Feb-03-2012	Rob Milne	Dec-31-2012	On Going

	place the week of November 25th.
	Presentation of RAR mapping to be presented at March 14th HOLTC meeting.

Islands Trust

Projects

Hornby Island

No.	Description	Activity	Received/Initiated	Status
1	Review of home occupation regulations to allow the rental of accessory building space to a non-resident of the property for commercial use.			On Going
1	Review of Siting and Use Permit Bylaw No. 52 regarding applicability to the construction of secondary suites within a dwelling and research requirements for proof of adequate water and septic capability.		Feb-01-2013	On Going
1	Review and update 'Building on Hornby Island' brochure and include HPO information.		Feb-01-2013	On Going
1	Develop and implement a Development Approval Information Bylaw.		Mar-15-2013	On Going
1	Review of environmentally sensitive areas OCP map schedule (D2) as a stand alone mapping project or addition to the community profile.		Apr-26-2013	On Going
1	Review development permit for water conservation for new development, including water catchment requirements.		Apr-26-2013	On Going
1	Establish a community process to review residential density to address community housing needs following the completion of the official community plan and land use bylaw reviews.		Jun-07-2013	On Going
1	Inventory and assessment of beach access and other unopened road allowances		Jul-12-2013	On Going
1	Development Procedures Bylaw	*Consider options prepared by staff for amending the development procedures bylaw to include requirements for posting of signs on property with respect to significant applications.*	Feb-03-2012	On Going

1	Information and education with respect to eelgrass, possibly in conjunction with Conservancy Hornby Island		Feb-07-2014	On Going
2	Continue relationship building with K'omoks First Nations.		Feb-03-2012	On Going
3	GHG Emissions Reduction	Facilitate *community communications regarding greenhouse gas emissions in collaboration with community organizations.*	Feb-03-2012	On Going
3	Review of vacation home rental regulations by 2017		Sep-13-2013	On Going
3	Review of approaches to groundwter porotection on Hornby Island.		Sep-13-2013	On Going
4	Communications strategy for revised OCP and LUB		Feb-03-2012	On Going
5	Review community profile by adding further information on environmentally sensitive areas and important habitat and including information in Schedule D2 of OCP.		Nov-23-2012	On Going

Print Date: Mar-04-2014

Applications w/ Status - Hornby Island Status: Open

Applications

Development Variance Permit

File Number	Applicant Name	Date Received	Purpose
HO-DVP-2013.2	Zaharko Land Surveying Inc. **Planner:** Marnie Eggen	Sep-17-2013	to vary Lot 5 front lot line

Planning Status

Status Date: Nov-19-2013

Applicant revising subdivision plan; DVP put on hold

Status Date: Nov-05-2013

Mailout sent Nov 5, 2013 / Hand Delivery Nov 8 - Statutory Notice Period Nov 8 - 21, 2013

Subdivision

File Number	Applicant Name	Date Received	Purpose
HO-SUB-2012.3	Peter Mason	Apr-26-2012	1410 Carmichael Road (Gustein & Burrows) 2 lot subdivision under Section 946 Local Government Act

Planner: Linda Prowse

Planning Status

Status Date: Dec-05-2013

Continuing to await RAR report and DVP application from applicant

Status Date: Dec-20-2012

Still awaiting RAR report and DVP application from applicant

Status Date: May-18-2012

Referral response sent to the Ministry of Transportation and Infrastructure

File Number	Applicant Name	Date Received	Purpose

HO-SUB-2013.1	Zaharko Land Surveying Inc. **Planner:** Marnie Eggen	Jun-13-2013	4115 Roburn Road, Hornby Island 2 lot subdivision, Section 946 Local Government Act

Planning Status

Status Date: Jul-29-2013

Referral report emailed to MOTI; requires variance and 946 covenant

Status Date: Jun-25-2013

Planner reviewing

Siting and use Permit

File Number	Applicant Name	Date Received	Purpose
HO-SUP-2011.11	Hornby Island Resorts Ltd. (The Thatch) **Planner:** Marnie Eggen	Sep-22-2011	Commercial Building, Triplex and Duplexes, Pump House and Water Cistern

Planning Status

Status Date: Jul-02-2013

no change

Status Date: Dec-07-2012

Awaiting further info from applicant

Status Date: Nov-26-2012

DP and DVP approved

Islands Trust

LTC EXP SUMMARY REPORT F2014

Invoices posted to Month ending February 2014

635 Hornby	Invoices posted to Month ending February 2014	Budget	Spent	Balance
65000-635	LTC "Trustee Expenses"	1,300.00	431.05	868.95
LTC Local				
65200-635	LTC - Local Exp - LTC Meeting Expenses	3,000.00	1,938.93	1,061.07
65210-635	LTC - Local Exp - APC Meeting Expenses	1,000.00	774.22	225.78
65220-635	LTC - Local Exp - Communications	500.00	608.86	-108.86
65230-635	LTC - Local Exp - Special Projects	2,000.00	1,500.00	500.00
65240-635	LTC - Local Exp - Miscellaneous	250.00	0.00	250.00
TOTAL LTC Local Expense		6,750.00	4,822.01	1,927.99
Projects				
73001-635-2004	Hornby OCP/LUB	0.00	4,292.23	-4,292.23
73001-635-3009	Hornby RAR	12,000.00	13,480.37	-1,480.37
TOTAL Project Expenses		12,000.00	17,772.60	-5,772.60

Hornby Island Local Trust Committee

POLICIES AND STANDING RESOLUTIONS

No	Meeting Date	Resolution No.	Issue	Policy
1.	November 22, 2013	HO-O43-2013.	Enforcement Actions related to rentals of Accessory buildings by non-residents	**It was MOVED and SECONDED,** 1. that whereas the Land Use Bylaw and Official Community Plan for the Hornby Island Local Trust area are currently undergoing a community review process which amongst other items includes a review of home occupation AND THAT whereas neither document addresses the rental of accessory buildings for non-commercial use it is resolved that enforcement actions related to the rental of accessory buildings shall be considered to be a low priority; 2. that nothing in this enforcement policy should be interpreted as giving permission to any party to violate the Land Use Bylaw and the Hornby Island Trust Committee may change this policy at any time and may give direction to commence enforcement activities without notice; and 3. that unless the Hornby Island Local Trust Committee extends the effective period on this enforcement policy it expires on September 30, 2014 or when the Land Use Bylaw and Official Community Plan review is complete, whichever is the sooner.

Islands Trust

ISLANDS TRUST FUND

Memorandum

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Date: February 13, 2014

To: Hornby Island Local Trust Committee

From: Kate Emmings, Ecosystem Protection Specialist, Islands Trust Fund

Re: Islands Trust/Islands Trust Fund Eelgrass Mapping

Eelgrass Mapping in the Hornby Island Local Trust Area

Eelgrass Mapping for the Hornby Island Local Trust Area was completed in December, 2013 by SeaChange Marine Conservation Society under contract with the Islands Trust (see attached report). Findings for the Hornby Island Local Trust Area indicate that approximately 31.7% of the shoreline of Hornby Island has eelgrass presence – this is one of the highest shoreline coverages in the Islands Trust Area, second only to Denman Island which has 33.24% coverage. The eelgrass mapping report also identified 3 potential eelgrass restoration sites and recommended one area for clean-up of underwater debris.

About Eelgrass

Eelgrass is a critical nearshore habitat for birds, mammals, invertebrates and commercial and non commercial fish. Eelgrass beds are also an important carbon sink. Contaminants, shading from docks and overwater structures, increased sedimentation, marine traffic and development pressures from shoreline land use threaten eelgrass ecosystems and the species they support.

Report Recommendations

Most of Hornby's shoreline remains naturalized although one anchorage was noted as a potential eelgrass restoration site if mooring pressures could be reduced. The 2012-2013 Nearshore Eelgrass Inventory Report contains several recommendations. Some of the relevant recommendations for local trust committees are:

- Create setbacks from the shoreline in regulatory bylaws.
- Prevent construction of docks in eelgrass beds. Where dock construction cannot be avoided, ensure that docks are built to allow light to pass through to eelgrass beds below and that they are constructed from materials that have a minimum impact on water quality.
- Require removal of illegal shoreline modifications and habitat restoration where appropriate.
- Support education of the boating community and shoreline landowners regarding the importance of eelgrass beds and natural shorelines.
- Encourage the boating community not to locate mooring buoys in eelgrass beds and not to anchor in eelgrass beds. Where mooring buoys are located in eelgrass beds, encourage the use of line floats to keep chains and lines off of the sea floor where they can drag and scour the bottom, removing eelgrass habitat and killing species.
- Encourage dock owners to replace dock materials with light penetrable materials.

Next Steps

The Islands Trust Fund has placed the eelgrass mapping and the associated report on its website at www.islandstrustfund.bc.ca and eelgrass mapping has been added to the MapIT public mapping site at http://mapit.islandstrust.bc.ca (links on Islands Trust and Islands Trust Fund websites). Local trust committees are encouraged to provide links to the mapping on their websites and consider actions within their local trust areas to include eelgrass protection in their official community plans and regulatory bylaws as per the Islands Trust Policy Statement, section 3.4.4 (see background below).

Attachment Report: 2012-2013 Nearshore Eelgrass Inventory
Map 6. Eelgrass Presence, Hornby Island Local Trust Area

Background

The Islands Trust Policy Statement, section 3.4.4, states:

Local trust committees and island municipalities shall, in their official community plans and regulatory bylaws, address the protection of sensitive coastal areas.

The 2013 Audit of Biodiversity in B.C. (Office of the Auditor General of B.C., www.bcauditor.com/pubs/2013/report10/audit-biodiversity-bc-assessing-effectiveness-key-tools) highlighted the importance of collecting sufficient and reliable information on species distribution in order to make well-informed decisions about conserving biodiversity. With sensitive ecosystem mapping completed in the Islands Trust Area (2008-2010), the Bowen Island Municipality (BIM) and local trust committees have access to ecosystem data for terrestrial species. The Islands Trust and Islands Trust Fund are now working to acquire mapping of sensitive coastal areas to help island governments meet the requirements of the Islands Trust Policy Statement.

In 2012, the Islands Trust and Islands Trust Fund launched a project to map eelgrass as a partnership with the Seagrass Conservation Working Group and SeaChange Marine Conservation Society. The arrangement between the partners results in shared funding of the program between the Islands Trust, the Trust Fund Board and the Seagrass Conservation Working Group (through its member group, SeaChange Marine Conservation Society).

Eelgrass mapping is intended to assist BIM, local trust committees and the Trust Fund Board in making science-based decisions about land use and conservation to preserve coastal ecosystems in the Islands Trust Area. Eelgrass mapping will serve as a baseline inventory to monitor the effects of conservation activities, such as Marine Protected Areas, as well as human impacts, such as potential increased tanker traffic, marine industrial activities (e.g. log dumping and booms) and foreshore use (e.g. wharves and docks). It will also enable marine conservation groups to identify areas ideal for eelgrass restoration.

In 2012, the Islands Trust Fund and Seagrass Conservation Working Group, with financial assistance from some local trust committees and outside funders, mapped eelgrass in the following areas:

- Gambier;
- Lasqueti;
- Mayne;
- North and South Pender; and
- Thetis and associated islands (except Valdes).

In 2013, the partnership mapped eelgrass in the following areas, with funding from the Islands Trust, Islands Trust Fund, Metro Vancouver, Comox Valley Regional District, Capital Regional District, Victoria Foundation, Greater Victoria Savings and Credit Union Legacy Foundation and the Pacific Salmon Foundation:

- Ballenas – Winchelsea (Executive Islands) Local Trust Area

- Bowen Island Municipality;
- Denman Island;
- Gabriola and associated islands;
- Galiano and associated islands;
- Gambier associated islands;
- Hornby Island; and
- Valdes Island.

Resources for local trust committees

The following are some resources for local trust committees. Please see references in the attached report for a more complete list.

Hutton, K. E. and S. C. Samis. 2000. Guidelines to protect fish and fish habitat from treated wood used in aquatic environments in the Pacific Region. Can. Tech. Rep. Fish. Aquat. Sci. 2314: vi + 34 p. Available at http://www.dfo-mpo.gc.ca/Library/245973.pdf .

Fisheries and Oceans Canada. Projects Near Water. Available at http://www.dfo-mpo.gc.ca/pnw-ppe/index-eng.html .

Province of BC. 2011 (amended August 2013). Land Use Operational Policy: Private Moorage. Available at http://www.for.gov.bc.ca/Land_Tenures/documents/policies/private_moorage.pdf .

EnviroVision, Herrera Environmental, and Aquatic Habitat Guidelines Program. October 2007 (revised June 2010). Protecting Nearshore Habitats and Functions in Puget Sound. Available at http://wdfw.wa.gov/publications/00047/.

2012 - 2013

Final Report
Nearshore Eelgrass Inventory

Prepared for the Islands Trust and Islands Trust Fund by:

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SeaChange Marine Conservation Society

Leanna Boyer, BSc. MA
Mayne Island Conservancy Society

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Galiano Conservancy Association

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SeaChange Marine Conservation Society acknowledges the Mayne Island Conservancy Society for the use of its software and computer for data management. Seachange would also like to acknowledge funding from the following sources, which has made this project possible: Islands Trust, Islands Trust Fund, the Capital Regional District, the Comox Valley Regional District, Metro Vancouver, the Greater Victoria Savings and Credit Union Legacy Foundation, Vancouver City Savings (Vancity), the Public Conservation Assistance Fund, Moonstone Enterprise, the Pacific Salmon Foundation and the Victoria Foundation.

Thank you.

1.0 Introduction

Land use developments within watersheds have led to a loss of natural estuarine and nearshore marine habitats in British Columbia - the receiving waters of land based activities. Agriculture, forestry, and dredging for commercial and residential development have all contributed to the loss (Durance, 2002). The pressure to modify natural marine features and habitat for the development of commercial facilities and residential units within coastal areas is intensifying. To prepare for the increase in populations on the BC coast and concurrent shoreline developments, it is necessary to identify and quantify nearshore habitats to protect and maintain these valuable nearshore environments.

This final report of the 2012 - 2013 nearshore inventory of native eelgrass, *Zostera marina* in selected islands is a summary of the rationale, methodology and findings conducted for the Islands Trust and Islands Trust Fund. The areas mapped during the summer and fall months of 2012 for eelgrass habitats were the Thetis Island Local Trust Area (excluding Valdes and the Cufra Inlet), Lasqueti Island, Gambier Island, North and South Pender Islands and Mayne Island.

The islands mapped in 2013 include the Bowen Island Municipality, Valdes Island and Cufra Inlet within the Thetis Island Local Trust Area, the Gambier Island Local Trust Area Associated Islands (excluding the islands off of the Sunshine Coast) and the local trust areas of: Denman, Hornby, Ballenas – Winchelsea (Executive Islands), Gabriola and Galiano.

The report serves also as background information for future eelgrass inventories and adds value to the Islands Trust Shoreline Mapping Project. The goal is to support sound decisions that will affect the natural ecological health of the marine nearshores within the Islands Trust Area. The Islands Trust and Islands Trust Fund have limited jurisdiction over marine areas; however, they can have an impact on long term development and protection of the shoreline. This report and the mapping information that forms its basis are designed to assist Islands Trust and Islands Trust Fund planners to make science-based decisions when planning for nearshore areas.

ShoreZone maps of coastal habitats within the Islands Trust Area were created over the past decade. ShoreZone is a mapping and classification system that produces an inventory of geomorphic and biological features of the intertidal and nearshore zones from low altitude aerial images of the coastal environment (Harper 2011). These maps provided the groundwork for identifying suitable physical components for eelgrass on the islands mapped during 2012-2013. The presence/absence of *Zostera marina* was determined according to the methodology of Cynthia Durance, R.P. Bio., Precision Identification (Appendix A). A more detailed description of the methods used can be found in Section 6.

2.0 Importance of Eelgrass

Seagrasses are rooted aquatic plants that grow in estuaries and along low wave energy shorelines throughout the world. They have important influences on biogeochemical cycling, sediment stability, and food web support (McGlathery et al. 2007; Orth et al., 2006). Seagrasses can form extensive meadows supporting high biodiversity. The global species diversity of seagrasses is low (~60 species). Across the globe, however, seagrass meadows cover about 177,000 square kilometers of coastal waters – larger than the combined area of the Maritime Provinces (Short et al, 2007). British Columbia has about 400 km² of saltmarsh and eelgrass habitats (Campbell 2010).

2.1 Biodiversity

The complex and intricate food webs of an eelgrass (*Zostera marina*) meadow provide food and shelter for numerous fish and invertebrates. Meadows also serve as a nursery habitat and as a refuge from predation for juvenile fishes (Orth et al., 1984; Bostrom and Bonsdorff 2000; Duarte 2000).The productivity of native seagrasses rivals the world's richest farmlands and tropical rainforests. From an unstructured muddy/sandy bottom grows a myriad pattern of leaves that supply nutrients to salmonids and other fish, shellfish, waterfowl and about 124 species of faunal invertebrates. The plants offer surface area for over 350 species of macroalgae and 91 species of epiphytic microalgae – the basis of the food web for juvenile salmon in marine waters (Phillips 1994). Often referred to as "salmon highways", nearshore marine environments containing eelgrass beds (*Zostera marina*) are home to over 80% of commercially important fish and shellfish species, including all species of salmon, at some point in their life histories (Durance 2002).

2.2 Blue Carbon

Like terrestrial forests, eelgrass habitats capture and store large amounts of carbon but at much more efficient rates - up to ninety times the uptake provided by equivalent areas of forest. This "Blue Carbon" is stored in sediments where it is stable for thousands of years. In B.C., roughly 400 km² of salt marsh and seagrass meadows sequester as much carbon as B.C.'s portion of the boreal forest, and the equivalent of the emissions of some 200,000 passenger cars (Campbell 2010).

When eelgrass beds are restored, the rate of carbon sequestration appears to be rapid over the first few years and up to 40 years following restoration. The natural transport of eelgrass by currents and wave action to deeper waters in estuaries and the coastal ocean may further sequester more carbon (Thom 2011).

As ocean waters warm as a result of climate change (up to 5 C° during the spring), greater flowering as well as faster growth of eelgrass shoots has been observed. Both of these changes result in greater biomass. Like marshes, much of the eelgrass biomass is under the substrate, indicating that a warming environment may result in greater carbon accumulation rates (Thom 2011).

2.3 Ecosystem Services

Ecosystem services are the benefits provided by the land, air, water and subsurface materials of the earth (Molnar et al 2012). Eelgrass habitats within the lower reaches of the Salish Sea provide carbon sequestration and storage, habitat refugia and nursery and nutrient cycling benefits to an approximated natural capital cost of $80,929 per hectare per year (Molnar et al., 2012). Within the Islands Trust Area, eelgrass habitats also provide revenue for commercial fisheries, recreational fishery, and revenue from tourism.

Protecting and conserving, and in some instances restoring these critical habitats is a recommendation of the Islands Trust Fund's Regional Conservation Plan. Mapping eelgrass is identified as a priority to meet the goal of conserving marine ecosystems and habitats. As well, accounting for these benefits in economic dollars and cents and factoring them into decision making policies would emphasize the economic, cultural and ecological values of nearshore habitats.

3.0 Eelgrass Habitat Characteristics

Eelgrass meadows are found in most of the world's coastal temperate regions except at extremely high latitudes. Physical and chemical factors affecting *Zostera marina* include temperature, light attenuation, elevation, substratum, wave action, salinity and pH. Worldwide, the plants survive under a wide range of water temperatures, from 0° to greater than 30°C. The optimum temperature for growth lies between 10° - 20° C in most areas (Phillips 1984). Eelgrass grows best within the Salish Sea in salinity ranges of 20 ppt - 32 ppt. Eelgrass can tolerate periods of freshwater inundation on a seasonal or daily basis (Durance 2002).

Of all the above factors, light availability and elevation may be the most crucial. Light availability seems to be the primary factor limiting depth distribution, density, and productivity of eelgrass meadows within their salinity and temperature ranges. When the Coal Port was expanded in 1982-1983 in Roberts Bank, both species of eelgrass (*Z. japonica and Z. marina*) expanded. The construction of causeways across a broad intertidal zone directed the turbid Fraser River water offshore, improving the light regime and initiating higher productivity in the eelgrass beds (Harrison and Dunn 1999).

3.1 Wildlife Corridors

Seagrasses are in decline throughout much of the world, with rates of loss accelerating from a median of 0.9% per year before 1940 to 7% per year since 1990 (Waycott et al., 2009). It has been estimated that 18% of coastal marine and nearshore wildlife habitat in the Salish Sea has been destroyed (British Columbia/Washington Marine Science Panel 1994). A large percentage of this decline is attributed to human impacts, including filling of shallow waters, dredging, and eutrophication (Short and Wyllie-Echeverria 1996).

Often referred to as “salmon highways”, nearshore marine environments containing *Z. marina* beds are home to more than 80% of commercially important fish and shellfish species, including all species of salmon, at some point in their life histories (Durance 2002). *Zostera marina* beds are highways for Chinook, Coho, Pink, Chum, and Sockeye salmonid stocks (Thompson 1994). Great Blue Herons have been observed to feed in eelgrass beds within 3 km of their nesting colonies. Other important bird species using these habitats include Brant geese, Rhinoceros Auklets, cormorants and Western Grebes.

E.O. Wilson proposed the importance of habitat corridors in the 1960s (MacArthur and Wilson 1967). Habitat reduction and fragmentation at a variety of spatial scales has been widely acknowledged as a primary cause of the decline of many species worldwide (Thompson 1994). Habitat fragmentation generally leads to smaller and more isolated animal populations. Smaller populations are more vulnerable to local extinction. To reduce the isolation of habitat fragments, many conservation biologists have recommended maintaining landscape "connectivity" - preserving habitat for movement of species between remaining fragments (BC/Washington Marine Science Panel 1994).

Many nearshore environments on the islands inventoried in 2012 and 2013 indicated continuous fringing eelgrass beds. These beds are the connectivity for salmon and other marine wildlife for shelter, food and refugia. Although they may be less biomass than continuous flat beds of eelgrass plants, they serve an important function and should be protected.

4.0 Impacts from Human Activities

The majority of the earth’s population now lives within 10% of land defined as “coastal”. One of the results of this increased pressure on coastal shorelines has been the destruction of approximately 215,000,000 acres of estuarine habitat worldwide (BC/Washington Marine Science Panel 1994). Seagrasses are in decline throughout much of the world, with rates of loss accelerating from a median of 0.9% per year before 1940 to 7% per year since 1990 (Waycott et al., 2009).

It has been estimated that 18% of coastal marine and nearshore wildlife habitat in the Salish Sea has been destroyed (British Columbia/Washington Marine Science Panel 1994). A large percentage of this decline is attributed to human impacts, including filling of shallow waters, dredging, and eutrophication (Short and Wyllie-Echeverria 1996). With the population of the Georgia Basin/Puget Sound forecasted to exceed nine million people by 2020, nearshore critical habitat loss is likely to increase.

The following is a description of some of the major impacts human coastal settlements have on eelgrass habitats and their functions.

4.1 Removal and Burial

Dredging and filling associated with the construction of harbors and ports have been the major cause of the decline in eelgrass beds (Levings and Thom 1994). The plants themselves are removed and then the physical, chemical and biological composition of the system is altered. Sediments raised by dredging can also bury plants growing nearby and alter eelgrass density by affecting water clarity. The reduction in plant density can further increase silt load because it reduces the capacity of eelgrass beds to trap sediments. It can also increase the erosion of bottom sediments because of the reduced root mass available to hold sediments together. The ultimate result is the reversal of the entire nutrient-flow mechanics of the ecosystem. Dredging activities include hydraulic clam harvesting, bay scallop raking, oyster harvesting and maintenance dredging of harbors. Filling in shallow wetland areas with the debris from wood processing (e.g. log dumps and log booms), sediment runoff from agricultural land and logging severely impact eelgrass habitats as well (Phillips 1984).

4.2 Pollution and Changes to Freshwater Input

Since estuaries are extremely vulnerable to changes in salinity and temperature, human activities affecting freshwater flows from streams heavily affect eelgrass meadows. Pristine watersheds surrounding estuaries provide steady supplies of fresh water and clean sediments to seagrass communities in the estuary. The opposite holds true as well: unhealthy watersheds increase the problems for seagrass distribution and productivity. Activities that cause increased nutrient loads in streams and rivers can result in overgrowth of algae that then die and deplete the oxygen from the bottom of poorly flushed bays. Chemical contaminants, such as fertilizers, pesticides and household hazardous wastes, runoff from streets and roads and runoff from industrial activities also add to the toxic composition of muddy bottoms of eelgrass meadows (BC /Washington Science Panel 1994).

Quiescent waters are more susceptible to chronic contamination than areas with high energy water flows (Harrison and Dunn 1999). In the Salish Sea, more than 540 sq. kilometers of intertidal gravel, sand and mud habitat are closed for shellfish harvesting because of bacterial

contamination. More than 730 sq. kilometers of shallow water habitat are unusable for crab and shrimp because of dioxin contamination from pulp mills. More than 32% of classified commercial shellfish growing areas in Puget Sound and Juan de Fuca Strait are either restricted or prohibited for harvesting due to water quality issues (Levings and Thom 1994). The same activities that impact shellfish, crab and shrimp harvesting also impact the health of eelgrass meadows.

Most toxic chemicals that accumulate in sediments in an inland sea such as the Salish Sea reside there for long periods of time unless they are physically removed. There is evidence that the roots of eelgrass take up a significant amount of heavy metals for long periods of time (e.g. lead, cadmium, zinc and chromium), thereby making up a large pool of heavy metals in coastal systems (Lyngby and Brix 1989). The consequences of toxic chemicals may have long term effects on eelgrass consumers, especially waterfowl and marine invertebrates.

4.3 Forestry Activities

Logging may cause scouring of stream channels and thereby increase sedimentation in estuaries, limiting the light available for photosynthesis. Bark chips from log booms smother eelgrass beds and form a blanket on the substrate, which leads to anaerobic sediment devoid of life (BC/Washington Marine Science Panel 1994).

4.4 Oil Spills

Oil spills pose serious threats to eelgrass communities growing in sheltered bays that are poorly flushed. These areas will tend to retain oil for long periods of time, becoming chronically contaminated. If spills happen in late summer or winter when leaf sloughing is at its peak, mats of drift blades will tend to catch and retain oil for later decomposition in the intertidal zone. Seed production and viability could be affected if a spill occurs in the spring (Beak Consultants 1975).

4.5 Shading by Overwater Structures

The apparent increase in demand for overwater structures in the Howe Sound Islands can have deleterious and cumulative impacts on the nearshore system. Shading, disruption of nearshore marine water movement, damage to the shore and subtidal habitat and operational pollution from boats can be some of the impacts (Van der Slagt et al., 2003).

4.6 Effects of Boating

Boat propeller cuts disturb eelgrass beds in shallow waters, both when boats are travelling through shallow areas and when they are approaching the shore to debark passengers, moor or anchor. The impacts from boating activities in eelgrass beds may be affecting waterfowl such as Black Brant, direct grazers on eelgrass. The Brant have been steadily decreasing in the Pacific Northwest since the 1940's (Phillips 1994).

Conserving eelgrass habitats enhances the amount of high quality rearing habitat as well as increases the ecological services for human communities, including erosion control, sediment settling and food production (shellfish and fish). With the population of the Georgia Basin/Puget Sound forecasted to exceed nine million people by 2020, nearshore critical habitat loss is likely to increase.

5.0 Eelgrass and Rising Sea Levels

Sea level rise and increased frequency and intensity of extreme weather are two expected and observed effects of climate change (IPCC, 2007, IPCC 2012). The Intergovernmental Panel on Climate Change warns that on small islands in particular, sea level rise is expected to exacerbate coastal hazards such as storm surges, floods and erosion (IPCC 2007).

Impacts of rising sea level on the coastline of the Salish Sea will be more complicated than the inundation of low-lying areas. The effects will differ significantly between different shoreline features. Inland movement of sea water (Titus and Strange 2008), as well as erosion and re-deposition of sediment will reshape the coastal landscape where there is room for the shoreline to shift and sufficient sediment is available (Mumford 2007). Increasing sea levels are expected to shift the zone in which sunlight is available to eelgrass beds. As a result, eelgrass beds are expected to shift inland unless barriers impede this shift (Titus and Strange 2008).

Eelgrass beds play a role in shoreline stability. Established eelgrass beds reduce currents, leading to increased sediment and organic detritus deposition (Durance 2002). Continuous dense eelgrass beds provide a buffer for incoming wave energy. The more the bed is fragmented by physical structures (e.g. boats, wharves, docks and overwater play structures), the less eelgrass beds function as an erosion buffer. Where shorelines are constrained by development or structures to prevent erosion (e.g. rip rap, sea walls), natural coastal features will be squeezed out and maintaining shoreline infrastructure and development will require increasingly expensive engineering measures (Mumford 2007). Pre-emptive planning for these changing conditions is necessary to protect settlement areas and shore features recognized for their natural and ecosystem services. This planning includes protection of natural buffers such as eelgrass beds. Preemptive planning for these changing conditions is necessary to protect settlement areas and shore features recognized for their natural and ecosystem services.

6.0 Mapping Methodology

Identifying and monitoring the distribution of native eelgrass habitats supplies much needed information for regional planning for conservation purposes. Maps and associated outreach activities also may lead to improvements in land use practices from increased knowledge and awareness about the habitat. Locating areas suitable for eelgrass restoration will lead to rehabilitation of eelgrass meadows as funding opportunities become available.

The eelgrass inventory for this project entailed determining the presence or absence of *Zostera marina* with an underwater towed camera and a boat, except in the Cufra Inlet (Thetis Island) where mapping was done by kayak without a towed camera due to shallow tides. GPS hand held units were used to record waypoints at approximately 10 m intervals in 2012. Accuracy of the GPS readings was on average +/- 2.4 metres. In 2013, a Trimble Pathfinder ProXR GPS was used, except in the Cufra Inlet where a handheld GPS unit was used. A detailed description of the methods used to map eelgrass habitats can be found in Appendix A.

The terms used to map eelgrass habitats are described below:

6.1 Distribution

The distribution of eelgrass within the bed is described for this inventory as either patchy or continuous. Patchy beds are those that contain isolated groups or patches of plants. Beds which are not patchy are classified as continuous; a bed that contains bare patches surrounded by eelgrass is classified as continuous. The boundary of a bed is determined by a shoot density of less than 1 shoot per square meter (Durance, 2002).

6.2 Form

There are two basic forms of eelgrass beds in the Pacific Northwest: fringing beds that occur as relatively narrow bands usually on gentle slopes, and more expansive beds that cover large areas such as tidal flats known as “flat” beds (Durance, 2002). Inter-annual variation within a bed is not well known, but appears to be less than ten percent (Dowty et al, 2005). Fringing beds are generally linear. Flat beds are areas of large eelgrass beds in embayments that extend deeper than fringing and more linear beds found along shorelines (Dowty et al. 2005). Distribution is often, but not solely, determined by aspect to dominant winds. Eelgrass distribution across a bathymetric gradient is limited at the upper boundary by the degree of exposure at low tide (desiccation) and by light limitations at the lower boundary.

6.3 Sediment Types

When possible, field observers rated the primary, secondary and tertiary occurrence of substrate types: sand, mud, pebble and cobble. A subtidal environment dominated by cobble might indicate a habitat more suitable for large kelps, which would shade any eelgrass shoots growing between the cobble during the summer months. A predominately sandy muddy bottom would support continuous eelgrass meadows in most cases, unless other factors are present, such as exposure to strong waves or the interruption of habitat by boat mooring buoys. In some cases substrate characteristics change with increasing depth (e.g. cobble to sandy or mud to cobble).

6.4 Percent of Cover

Percent cover was estimated in broad categories to increase accuracy of observation (<25%, 26-75%, >75%). The coverage of an eelgrass meadow reflects both the substrate and the flow of water through it. A calm environment with a sandy mud substrate generally supports a dense, continuous eelgrass bed with virtually 100% cover. The cover of eelgrass in areas subjected to strong currents is typically patchy. Areas with heterogeneous substrate (mixture of fine and coarse) also tend to be patchy (Durance 2002). The percent of cover data collected from this inventory is based on subjective approximations as observed through the lens of an underwater camera. The approximate percent of cover does give important information on the density and productivity of a bed.

6.5 Tidal Fluctuations

It was important to note whether the tide was running or slack at the time of the inventory. Eelgrass shoots will tend to bend towards the substrate during running tides; the accuracy of percent of cover is then very approximate.

6.6 Presence of Other Vegetation

Other types of algae were documented as broad or tuft. Broad algae, such as kelps, sea lettuce and *Sargassum muticum* can blanket the ocean floor and make it difficult to characterize substrate. They can also shade eelgrass in mixed substrates as they anchor to hard surfaces. Tuft algae, such as brown and red algae do not shade eelgrass but indicate presence of hard surfaces for attachment. The presence of kelps, predominately large brown kelps, was noted, as was the presence of other types of smaller algae and *Sargassum muticum*. *Sargassum* is an exotic species of algae that can overshadow eelgrass if the substrate is a mix of sand and cobble. The presence of *Sargassum* was noted especially off the shores of Thetis and North and South Pender Islands.

6.7 Visibility

Visibility was a subjective observation and was rated low, medium and high. The amount of visibility could impact in some instances the accuracy of the observations, namely characterization of substrate. For example, Gambier Island often had low visibility. This can be caused by winds, sediment flows from the lower reaches of watersheds, inputs from nearby streams and tidal/current movements. Low tide periods make for the best visibility.

7.0 Survey Limitations

The range of accuracy for all the islands surveyed in 2012 was within +/- 2.4 metres. Visibility at times was poor, due to tidal influences, sedimentation in the water column from stream outflows, summer plankton blooms and wind. During the last day of mapping Gambier Island in August,

2012 the wind was too high to continue the inventory. The survey team returned to complete the inventory in September 2012. During the 2013 survey of islands within Howe Sound, the winds were often a factor in scheduling the inventories. The average horizontal precision for the GPS unit used for the 2013 eelgrass inventory was 0.814 m.

Percent of cover of eelgrass shoots is difficult to assess accurately with an underwater camera but was deemed important to characterize. Areas of particular interest (e.g., impact of shoreline modifications, restoration potential) should be surveyed by SCUBA divers. Overall, this inventory is an indication of the presence or absence of eelgrass habitat and does not represent maps of the outer or shoreward edges of each bed, with the exception of Bowen, Passage and Bowyer Islands. Polygons were mapped for these islands where possible in 2013.

8.0 2012 Inventory Findings

Eelgrass inventories were conducted using ShoreZone inventory maps which include presence of eelgrass where available and the ShoreZone shoreline classification types (available for all islands) as a reference.

The Islands Trust eelgrass inventory is important, particularly on islands such as Gambier and Lasqueti, as the ShoreZone data was based on Orthophoto images alone. Valdes, Cufra Inlet (Thetis Island), Passage and Bowyer Islands were mapped in 2013, but are included here under the 2012 inventory, as they are within the Thetis Island and Gambier Island local trust areas which were surveyed in 2012.

8.1 Gambier Island Local Trust Area

Gambier Island was surveyed on August 21st-23rd and September 11th, 2012. This island has rugged shorelines, with steep slopes leading to the subtidal zone. Eelgrass habitat comprises approximately 8.3% of the island's linear subtidal shoreline. The majority of the eelgrass beds are fringing, the significance of which has been described earlier in this report as important to wildlife corridors.

Gambier Island has been highly impacted by historical log storage practices. Eight sites were identified as possible restoration areas starting with small eelgrass test plots (approximately 800 to 1000 shoots). Larger eelgrass restoration might occur if these test plots increase in shoot density and coverage and as funding opportunities arise. In some of these sites, backshore lands have been placed on the real estate market, which may impact future restoration efforts if docks and wharves are permitted as additions to upland development.

Boat mooring buoys and recreational equipment on the water over eelgrass beds as well as derelict log booming cables and booms were observed. There were numerous docks and wharves within eelgrass habitats. Several large shoreline modifications were also noted. These changes to

the shore can have long term impacts on nearshore environments, including wave scouring, shading and interruptions to sediment transport. With the presence of active and retired log leases, the island would greatly benefit from an eelgrass restoration strategy plan to increase value for both biological diversity and ecological services.

Bowyer Island was surveyed on October 11-12th, 2013 using the polygon mapping methodology. The west, north and east coasts of Bowyer Island are largely steep and rocky. The south shore is characterized by several coves, varying in substrate. Eelgrass was estimated to extend along 11.35% of the Bowyer Island shoreline, observed only in particular coves along the southern portion of the island. The area of polygons containing eelgrass was observed to total 3690 m^2 and the length of mapped line features was observed to total 70 m. In addition to continuous beds, 4 individual patches of eelgrass were recorded, noted on the map as points. Eelgrass around Bowyer Island was similar in appearance and percent cover to that surrounding Bowen Island, i.e. patchy and sparse. Percent cover within the polygons was less than 25%.

Docks were located in eelgrass depth in the bay on the central southern shore of Bowyer Island, within zone W2/W1a. Eelgrass beds in that bay were observed to extend as far as the docks. Several chains were located on the ocean floor in zone W2 on the southeast shore of the island, and a large dock is within or adjacent to the eelgrass bed.

Large schools of small fish were frequently observed while circumnavigating Bowyer Island, particularly on the west, north and east coasts. Also observed were large numbers of pile perch (*Rhacochilus vacca*) and rockfish. Harbour seals were observed in several locations.

Passage Island was surveyed on October 5th, 2103 using the polygon methodology. One of the most exposed islands of Howe Sound, this island is a good example of how people and eelgrass tend to occur within similar, sheltered environments. Most of the island is characterized by rocky cliffs, with a few beaches. Eelgrass was observed in sections of the east coast of the island, along 15.67% of the total shoreline of the island. The area of polygons containing eelgrass was observed to total 3718 m^2 and the length of mapped line features was observed to total 40 m. Percent cover within the polygons was less than 25%. Ropes were observed on the sea floor in eelgrass depth in an area of the southeast coast of the island in the presence of patchy eelgrass. In this area was also located a floating dock within eelgrass depth and approximately 12 moorings in the eastern part of the area, where the eelgrass was very sparse and patchy. A floating dock and mooring was located at the south end of the more northerly eelgrass polygon on the east coast of the island.

The islands west of Bowen Island were inventoried between August 4th - 6th, 2013. The linear shoreline extent of eelgrass habitat surrounding the associated islands within the Gambier Island Local Trust Area totals approximately 13.27%.

Most of **Keats Island** contains flat or fringing beds of continuous eelgrass habitat on sandy/mud substrates, especially on the north and west facing shores. Patchy eelgrass beds were observed on the southeast shores, most likely due to exposure to predominant winds.

A high preponderance of single eelgrass patches lie on the southern tip of Keats Island, which may be caused by exposure to southerly winds, but also to the multiple locations of docks, especially on the southwestern shore.

There is potential for eelgrass restoration on the northern end of the island at the eastern point of a log booming area if the log lease is retired in the future. This area has a rocky/cobble foreshore, forested backshore and water park with overwater floats. There are also many docks on the southwestern portion of the island, which may cause fragmentation of eelgrass beds. Where there were low rock/cobble substrates, no eelgrass was present.

Anthropogenic Impacts include the construction of docks, presence of moored boats in eelgrass beds, removal of native backshore vegetation and recreational use of the nearshore (water park overwater play structures).

Continuous flat eelgrass habitat was observed in the southeast and western shores of **Shelter Island** directly west of Keats Island. No eelgrass was found near **Home Island** south west of Keats Island. **Preston Island** south of Keats Island contains a small continuous eelgrass bed on the southeast shore. The backshore is forested. **Ragged Islets** contain mostly patchy eelgrass beds throughout most of the subtidal areas, except for the west facing side of the islets. Mooring buoys and docks were observed on the eastern shore and a float on the northern side of the islets. Most of the islets are forested and contain rocky substrate. The small islet to the northeast contains a fringing continuous eelgrass bed.

The majority of eelgrass surrounding **Pasley Island** south of Ragged Islets is flat and continuous in sandy/shell hash substrate. Vegetation along the foreshore has been cleared near many residences. Retaining walls, docks and mooring buoy chains interrupt eelgrass continuity along the south and southeastern facing shores. There is potential for eelgrass restoration on the southeastern facing shore almost at the midpoint of the island where there is a gap in an otherwise flat continuous eelgrass bed. On the northeastern shore of Pasley there is a dense eelgrass bed that could serve as a possible harvesting site for restoration of lost or damaged eelgrass habitat.

No eelgrass was noted off of **Worlcombe Island** southeast of Pasley Island.

Mickey Island northeast of Pasley Island is surrounded on its western, southern and northern shores by mostly fringing patchy beds of eelgrass in sandy/shell substrate. Eelgrass is mostly likely limited on the eastern shores by low rock/boulder substrates. The rocky shores are surrounded by natural forests. Minimal anthropogenic impacts were observed.

To the west lies **Hermit Island.** The majority of eelgrass habitat is flat and continuous in sandy/shell hash substrates. Most of the habitat is located on the east facing shoreline, though the foreshore is cobble or low rock. The majority of the backshore is forested. In some areas, dock construction interrupts eelgrass beds. Harlequin ducks were observed within an eelgrass area on the southwestern side of the island.

Little Popham Island south of Hermit Island has mostly continuous flat beds of eelgrass to the southwest and northeast next to rocky shores and forested backshores. It is very likely eelgrass is limited by the subtidal low rock/boulder substrate surrounding the remaining areas of the island. Most of the eelgrass around **Popham Island** lives on the northeastern portion of the island in sandy/shell substrate and consists mostly of continuous and flat beds along steep rocky shores.

Grace Island southwest of Gambier Island contains mostly fringing continuous eelgrass habitats in shell/sand substrates next to steep rocky foreshores and forested backshores. A large school of fish was observed. **Woolridge Island** to the northwest of Gambier Island contains mostly flat continuous beds of eelgrass on its north facing shores. The beds are very robust, with a possible harvesting site on the east shore if restoration is undertaken in this area. There is woody debris noted near a breakwater on the north western facing shore of the island.

The majority of eelgrass habitat surrounding **Anvil Island** northeast of Gambier Island lives on the southeastern shores and is characterized as fringing. Most of the island is classified as cliff or low rock/boulder which is limiting for eelgrass growth. The presence of numerous mooring buoys and retaining walls impact the habitat. One potential restoration site was identified on the eastern shore.

The islands near the Sunshine Coast within the Gambier Island Local Trust Area were not mapped in 2013 due to poor mapping conditions and scheduling limitations. There are plans to inventory them in 2014, subject to funding and capacity.

8.2 Lasqueti Island

Lasqueti was surveyed from July 17th to July 19th 2012. This island's shoreline is composed of substrate formed from shallow stony deposits over bedrock. Shallow sandy/muddy benches extend into the subtidal zones. Eelgrass comprises approximately 13.8% of the island's linear intertidal and subtidal shoreline. The majority of the eelgrass habitat is flat, dense and continuous. Most of the backshore lands were naturalized with little development.
Possible impacts that could be occurring would be from boat mooring buoys anchored within eelgrass habitats, grazing by Canada geese, historical damage from log booming practices, hardened shoreline modifications and site locations of some aquaculture enterprises. False Bay could benefit from more detailed eelgrass mapping, as the multiple mooring buoys might be impacting eelgrass habitats.

8.3 North Pender Island

North Pender was inventoried on July 3rd, 4th and 6th 2012. Eelgrass comprises approximately 11.6% of the island's linear intertidal and subtidal shoreline. The majority of the eelgrass beds are flat and continuous. The protected nature of North Pender results in a relatively high proportion of soft substrate in shallower areas.

Impacts include housing developments with accompanying tree and shrub clearings, rip rap and rock wall modifications, some of which were constructed below the high water line, direct raw sewage outfall at Port Washington which would directly affect the water quality for eelgrass productivity, the presence of Canada geese, direct grazers on eelgrass shoots during low tides, and mooring buoys within eelgrass beds. Port Browning might be an appropriate site for eelgrass restoration as the substrate is suitable and there is a small bed on the northeast side.

8.4 South Pender Island

South Pender was surveyed on July 6th 2012. Eelgrass comprises approximately 8.5% of the island's linear intertidal and subtidal shoreline. South Pender has more exposed shoreline therefore less eelgrass is to be expected. Roughly the same proportion of flat and fringing beds are present with slightly more than half of them being continuous.

8.5 Mayne Island

Mayne Island was surveyed from 2009-2012 using two methodologies on a variety of platforms including: 1) delineation and creation of polygons (with towed underwater camera, on foot, by kayak, by free diver), 2) linear presence/absence (by kayak). Data was converted to presence/absence line format for incorporation into the 2012 Islands Trust Eelgrass Inventory.

Mayne Island is mostly protected except on the Northeast side which is exposed to winds from the Strait of Georgia. Eelgrass comprises approximately 22% of the island's linear intertidal and subtidal shoreline. The Mayne Island associated islands, **Georgeson Island** and **Curlew Island**, contain 15.7% and 24.8% respectively.

Evidence from the Mayne Island Conservancy's eelgrass monitoring program and historical anecdotal evidence has shown loss in intertidal eelgrass in **Miners Bay** and two Southeast facing bays on the Southeast side of Mayne. Reasons for loss are unknown, but ongoing monitoring will indicate natural variability in these eelgrass beds. Potential impacts include grazing from Canada geese, anchoring, mooring buoys, trampling by kayakers and damage from boats and propellers. Winter heavy rain events could be introducing increased sediment loads into eelgrass beds, but this would need to be studied.

Gallagher Bay (on Navy Channel) and **Conconi Reef Park** are potential eelgrass restoration sites. They both have large bare areas adjacent to continuous eelgrass beds and have suitable substrate.

8.6 Thetis Island Local Trust Area

Thetis and its associated islands were surveyed July 31st through August 3rd, 2012, except for the inside of Cufra Inlet which was inaccessible because of low tides, and Valdes Island. The Cufra Inlet survey was completed in the summer of 2013. Valdes Island was surveyed July 29th, and 30th, 2013.

Approximately 26.6% of the linear subtidal shoreline on Thetis Island is composed of eelgrass habitat, 72% of which is continuous. Fringing continuous eelgrass beds were observed off the western shore of Thetis where the ShoreZone map indicates a preponderance of low rock and boulder (not a typical shoreline type for eelgrass). **North Cove** is also rich with an abundance of eelgrass, except where it is shaded by overwater structures.

Cufra Inlet contains dense (26-75% cover) flat continuous eelgrass beds. The inside of the inlet was surveyed during the summer of 2013 by local residents using kayaks and hand held GPS units but without the use of an underwater camera, as the water was shallow enough for eelgrass to be observed from the kayaks. Low tides in 2012 prevented an aluminum boat from approaching close to shore during the low tides occurring during the survey. The continuous bed begins on the western shore of Cufra Inlet as a narrow 1 m wide swath on the shoreward side and then widens out. An abundance of drifting sea lettuce (*Ulva* spp.) was observed within this area. Eelgrass became denser seaward in the muddy/shell hatch substrate. The substrate became sandier as the mappers traveled towards the mouth of the channel. Patches of sand dollars were noted as the inlet widens and the eelgrass extends towards the eastern shore. Diatoms were noted growing on the eelgrass blades. At the western edge of the mouth of the inlet eelgrass is patchy and sparse despite its ShoreZone classification of 'cliff'.

Clam Bay eelgrass was dense and continuous.

Telegraph Harbour on Thetis Island had a preponderance of algae (*Ulva* spp.), *Sargassum muticum* and filamentous algae growth. Visibility was poor. Upland and shoreline development (rip rap, retaining walls and cement ramps) with accompanying vegetation clearing most probably has led to higher sedimentation in the nearshore waters.

Understory kelps were observed at most sites, although no fish or crab species were present at the time of the survey in the majority of the survey area. Possible impacts from boat moorings within eelgrass beds (e.g. **Ruxton Island** had > 15 boats moored off shore in one small area), recreational overwater play structures, shoreline modifications and nutrient run-off could be impacting nearshore habitats. Where there was suitable substrate for eelgrass as indicated by the ShoreZone data, eelgrass was present, with the exception of the narrow channel between Thetis and Penelakut Islands. However a long-time resident remembers eelgrass presence there approximately 40-50 years ago. Islets and small islands are important refugia for wildlife and often are less impacted than the surrounding larger islands.

A short description of the smaller islands and islets associated with Thetis Island are described below.

Percentages of eelgrass for each associated islet are:

Island	Eelgrass % Cover
Ruxton	11.6%
Pylades	0%
Bute	50.3%
Dunsmuir Islands (2)	34.7%
Hudson	30.9%
Reid	3.9%
Dayman & Scott Islands	39.6%
Valdes	12.7%

Hudson Island west of Thetis is rich with continuous fringing beds of eelgrass (26-75% cover) on both its eastern and western subtidal areas. **Dayman Island** has just under approximately 25% coverage of patchy eelgrass habitat mostly on its eastern facing side. **Reid Island** to the east has dense patches of fringing eelgrass on its northeast facing shore.

Ruxton Island to the north of Thetis has flat, continuous (less than 25% cover) eelgrass beds within sheltered sites on the western facing area; an abundance of nudibranchs was observed on eelgrass blades. The eastern shore, with the exceptions of some sites with fringing patchy beds, is too deep for eelgrass growth.

Whaleboat Island to the east of Thetis had too steep a drop off to be suitable for shallow eelgrass habitats. **Tree Island** contained 100% cover of understory kelps, which is an indication of a dominance of cobble/pebble substrate. As well, the subtidal area is too deep for eelgrass production.

Bute Island off of Ladysmith Harbour contained dense continuous beds because it is surrounded by a shallow bay with sandy substrate. There is a potential eelgrass restoration site on the northeast side of **Dunsmuir Island**, as it is composed of clean sandy substrate in a protected site. The narrow channel between Dunsmuir Island and Ladysmith Harbour contains continuous dense flat eelgrass beds.

Valdes Island was surveyed between July 29th and 30th, 2013. Eelgrass coves 12.69 % of its linear subtidal shores. The majority of the habitat is flat and continuous, with most of the locations cited on the northeastern and southwestern shorelines. Although the majority of the shorelines

on the western portion of Valdes are ShoreZone classified as low rock/boulder or cliff, the presence of flat continuous beds with bare patches was noted on the north and south western shores. Three potential restoration sites were identified; one on the central western side of the island, the second site on the northern tip of the island containing a small degraded eelgrass bed adjacent to the BC Parks dock, and the third is located on the southwestern shore which might have been historically impacted by log storage. The substrate at this site is suitable for a transplant; however *Ulva* spp. is present, which might be an indication of a high level of nutrient inputs.

The location of mooring buoys in eelgrass habitats with fifty-one buoys observed within beds and the interruption of eelgrass continuity by the construction of docks are the major anthropogenic impacts affecting eelgrass habitats on Valdes. The majority of the shoreline is naturally vegetated.

9.0 2013 Inventory Findings

The islands mapped in 2013 for eelgrass (*Zostera marina*) within the Islands Trust Area Islands include:

- Denman Island Local Trust Area,
- Hornby Island Local Trust Area,
- Ballenas – Winchelsea (Executive Islands) Local Trust Area,
- Gabriola Island Local Trust Area,
- Galiano Island Local Trust Area,
- Valdes Island and Cufra Inlet in the Thetis Island Local Trust Area
- Bowen Island Municipality
- Gambier Island Local Trust Area Associated Islands in the Howe Sound (i.e. excluding the islands off of the Sunshine Coast)

The characteristics and locations of eelgrass habitats for each island are described below in order of the beginning dates eelgrass inventories occurred. Note that Valdes and Cufra Inlet are described in Section 8 above as they are in the Thetis Island Local Trust Area. Similarly the Gambier Island Local Trust Area Associated islands are also described in Section 8 as they are in the Gambier Local Trust Area. Both Thetis and Gambier Islands were mapped in 2012.

9.1 Galiano Island Local Trust Area

Galiano and its associated islands were inventoried over seven days between June 26th and November 25th, 2013. Approximately 16.66 % of the linear subtidal shoreline of Galiano Island is eelgrass habitat.

ShoreZone maps indicate that most of the southwestern and northeastern shorelines of Galiano Island are not suitable substrates (coastal bluffs and low rock/boulder respectively), except where there are sheltered embayments. However there are notable exceptions over the north, south west, south and eastern areas of the entire island.

The eelgrass distribution on Galiano is 88% continuous; 12% patchy. The placement of mooring buoys (at least 14 were noted within eelgrass beds, especially on the southwestern shores of the island), private docks (at least 12) and log storage have damaging effects on the habitat's continuity and function as a wildlife corridor. The construction of retaining walls (rip rap, rock and wooden) and the removal of backshore vegetation (at least 10 sites were observed) are obstacles for eelgrass to flourish in certain sites.

Most of the backshore on Galiano Island remains naturalized, with notable exceptions where trees and understory vegetation surrounding residences are removed and where shores are modified with retaining walls. Exotic invasive plants include English ivy, St John's Wort and gorse. Heavy epiphytic algae growth on eelgrass blades were noted within **Montague Harbour**, a possible indication of a high level of non-point source pollution. Another site for pollution is the public dock in **Whaler Bay** where boats are worked upon. Best management practices are recommended for boat sewage disposal and using tarps for collection of boat paint chips at each location.

There is the potential for eelgrass restoration within Whaler Bay, as the channel in front of the public dock contains a narrow band of eelgrass that could be expanded shoreward if log leases were retired in the future. In November, bufflehead and Barrow's Goldeneye as well as schooling forage fish were observed. Patchy eelgrass beds were noted off the eastern shores of Galiano Island. This area is ShoreZone classified as low rock/boulder. Four mooring buoys were located with these beds.

The eelgrass habitats covering the associated islands of Galiano comprise approximately 19.98% of the islands' linear shorelines. **Parker Island** has extensive eelgrass on its northeastern shores (96% continuous). The construction of docks and the placement of mooring buoys within eelgrass beds, however, may be impacting the habitat. Most of the eelgrass surrounding **Gossip Island** lives on the island's east facing shores is continuous (95%); however docks (7 were noted within the eelgrass beds) interrupt their form and function. Mooring buoys (3 observed) are situated within the existing beds on the south-western facing shores also disrupt the connectivity of eelgrass habitats.

No eelgrass was observed on **Ballingall** and **Lion Islets**, **Wise, Charles**, **Sphinx** or **Julia Islands**.

9.2 Gabriola Island Local Trust Area

Gabriola Island and associated islands were surveyed between July 8th and 21st, 2013. Gabriola Island's linear shores are comprised of 24.8 % eelgrass, with 89% continuous distribution. Two potential eelgrass restoration sites were identified on this island. The first is on the southwestern shore facing **Mudge Island** near an active log booming site. When the log lease is retired at this site, a small eelgrass transplant (100-500 shoots) could indicate whether the area is suitable for a larger transplant. The second site is on the northeast tip of Gabriola Island where a small existing bed could be expanded.

Wildlife in some areas abound, including Canada geese, an abundance of fish species, Great Blue Herons (22 at the southern channel entrance between Gabriola and Mudge Islands), sand dollars and Bald Eagles. Beaches that have suitable substrate for sand lance and surf smelt spawning were also noted. Healthy eelgrass beds near the **Malaspina Galleries** in Gabriola Sands Provincial Park are not surrounded by mooring buoys and docks and are thriving in in 4-5 metres water depth, although the area also contains rocky substrates.

Possibly the biggest impacts to marine wildlife habitats on Gabriola and its associated islands are the locations of floats and mooring buoys (in one embayment on the northwestern shore of Gabriola, over 12 floats – moorings and/or crab traps – and 14 buoys were observed in a continuous eelgrass bed); construction of retaining walls (nine riprap or rock walls identified); and, the removal of native backshore vegetation (13 sites). Numerous moorings are located in an otherwise robust eelgrass bed in **Degnen Bay**.

The eelgrass coverage for the Gabriola associated islands' linear shorelines totals 19.98%. Near the eastern shore of **DeCourcey Island** south of a marine park there are many docks and boats. Poor water quality was noted, and there are no washroom facilities at this location. No marine life was observed growing on the seafloor. North of the marine park there is a potential restoration site facing a steep rock ramp foreshore and a steep grassy conifer backshore near a former log booming site.

Snake Island has the potential for eelgrass restoration on its southern tip where there is a protected area with suitable subtidal sandy mud substrate, although this location may be too close to active boating. Seal pups and oyster catchers were cited near a large mussel bed.

There was no eelgrass habitat observed on **Hudson Rocks**. Marine life there included seal pups hauled out, bird habitats, cormorants and oyster catchers. The shell hash substrate off of **Five Finger Island** was noted to be situated too deep for eelgrass growth.

Mudge Island also has a potential eelgrass restoration site on its southeastern shore. Kelps are mixed with sandy/muddy/shell substrate. Most of the backshores are naturally vegetated, with exceptions near residential developments where mooring buoys are situated within eelgrass

beds (4 observed). The eelgrass habitat observed on Mudge was a mix of patchy/ continuous and flat / fringing beds on the eastern shores of the island. One bed in particular, located mid- island on the eastern side extended 100 metres shoreward beyond the waypoint, but the water depth was too shallow to delineate the bed.

Eelgrass on **Link Island** is characterized as flat continuous beds on its eastern shores. On the south shore of Link Island there are multiple docks (4) and mooring buoys (6).

Continuous fringing beds lie next to the northwest shores of **Breakwater Island**. Near **Saturnina Island** there are fringing continuous beds of eelgrass habitat on the western and northern shores.

Bath Island has a wide rock ramp in front of a windblown forest with a patchy bed with two larger patches surrounded by kelp and *Sargassum muticum* on its northwestern shore, while on its western shore there was a flat continuous bed.

Eelgrass habitat on **Tugboat Island** is characterized as narrow beds tucked between shore and wharf floats on the eastern side of the island and between the Tugboat Island and **Sear Island** to the south, which has flat continuous beds on its western shores. Continuous flat beds lie at the entrance to a marina on **Vance Island**. A rock/boulder shoreline with a, private dwelling with floating dock and several moorings are near flat continuous eelgrass habitat on **Acorn Island**.

9.3 Denman Island Local Trust Area

Denman Island and its associated islands were inventoried on several boat expeditions between August 20th and September 15th, 2013. In the Denman Island Local Trust Area 33.24% of the linear shore contains eelgrass. In some areas, especially in eastern subtidal areas, patchy eelgrass was observed amongst broad leaf kelps and *Sargassum muticum*, where the substrate is classified as low rock/boulder. A potential restoration site is located on the southwest area of the island near **Metcalf Bay** and is close to a site that could be used for harvesting transplants. The substrate south of this site gradually changes to cobble and gravel. Most of the beds surrounding the island are fringing, most likely due to coarser substrate changes at depth.

Eelgrass habitat is situated on the north eastern shores, classified by ShoreZone as sand/cobble and where numerous overwater structures are located and associated with industrial aquaculture activities. The eelgrass here was predominately patchy; most likely there are more patchy beds both shoreward and seaward of the mapped area. This area is the second most patchy eelgrass habitat observed, second only to areas in Howe Sound.

The majority of the backshore is not heavily impacted by development; most of the residences had either forested or grassy areas between them, with a minimum of landscaping. Abundant species of birds including black legged kittiwakes, surf scoters, marbled murrelets, grebes, harlequin ducks, surf scoters, herring gulls, and other marine wildlife species such as hooded nudibranchs, sand dollars, sand lance juveniles and abundant schooling fish were observed.

Sandy Island north of Denman Island contains continuous (99%) eelgrass habitats although the southern shores are ShoreZone classified as sand/cobble and the northern areas are classified as altered. Sand dollars were observed on both eastern and western sides of the island. **Seal Islets** were surrounded by fringing continuous (81%) eelgrass habitats. Associated with these beds were observed marbled murrelets and rafts of harlequin ducks and surf scoters, kittiwakes, gulls and seals. The backshore consisted of flat shrub, herbaceous and grassy slopes. . No eelgrass habitat was observed near **Chrome Island** due to unsuitable rocky substrates.

9.4 Hornby Island Local Trust Area

Eelgrass beds on Hornby Island were mapped over several days between August 21st and September 12th, 2013. The linear shoreline of the Hornby Island Local Trust Area is composed 31.70 % of eelgrass habitat. Large areas on both the western and northeastern shores of Hornby have continuous (90%) flat beds, although the classification by ShoreZone of these shorelines is low rock/boulder. The small areas of eelgrass found in these otherwise rocky cobble areas are valuable as critical habitat and corridors for marine life.

Most of the backshore is naturalized, even where residential houses are situated. Suitable substrate for spawning sites for forage fish was identified on the north eastern shores. Three potential restoration sites were also noted; one near this area for potential forage fish spawning, the second within a sandy embayment on the eastern shore (if boat anchoring pressures were decreased), and the third near the Hornby Island ferry terminal on the western side of the island (eelgrass was noted just north of the terminal growing in pebbles). There is also an opportunity for a community clean-up of underwater debris near a breakwater and marina on the southern end of the island. On **Toby Island** dozens of seals were hauled out.

9.5 Ballenas – Winchelsea (Executive Islands) Local Trust Area

The islands within the Ballenas – Winchelsea Local Trust Area were surveyed for eelgrass habitat between November 21st and 23rd, 2013. The total linear shoreline coverage of the Local Trust Area is 1.4%.

Mistaken Island west of Parksville has two eelgrass sites, one fringing patchy bed and the second within a cove with a dock, both on the southwestern shore. A flat continuous bed lies between the channel separating the **Ballenas Islands**. A continuous bed also lives on the north shore of the south island, punctuated with rock substrate. A school of forage fish, possibly sand lance was observed at the time of the survey in the shallow subtidal zone.

A small flat continuous bed on the west facing shores of the **Ada Islands** also may serve as suitable habitat for forage fish, prey for ancient murrelets, of which one was cited by field staff (unconfirmed). A second eelgrass bed is situated on the western shore of the west Ada Islands. The substrate at this location is primarily sandy with a secondary substrate of bedrock with associated intermixing rockweed and detritus. A seal haul out with 61 seals was noted near this site.

A small flat continuous eelgrass bed is located on the northeastern side of **Southey Island**. No eelgrass habitats were observed on **Gerald, Yeo, Amelia, Ruth** or **Winchelsea Islands.**

9.6 Bowen Island Municipality

Bowen Island was surveyed between Aug 6th -11th and Oct 4th, 5th and 12th, 2013 using the polygon mapping methodology. The island is characterized by a mix of sandy bays and steep shorelines. Large homes are common, with docks constructed both in the bays and on the steep cliffs. Bays, which are areas in which eelgrass is expected to grow, were also the location of waterfront homes and associated docks (both land-based and floating), moorings and anchored boats.

Eelgrass was estimated to extend along 11.6% of the shoreline of Bowen Island. The area of mapped eelgrass polygons was observed to total 41,917 m^2 and the length of mapped line features was observed to total 958 meters. Percent cover was low, however, and in addition to continuous beds, 84 individual patches of eelgrass were recorded and noted on the map as points. Eelgrass was observed within bays and straight sections of coastline on the southwest, northwest, northeast tip, east (Mannion Bay and north) and southeast coasts.

Around much of the island eelgrass was characterized by frequent individual patches, with each patch often consisting of very few shoots. Patches on the west coast were observed in areas that, from the shoreline or ShoreZone analyses, would not have been predicted, as the plants occurred seemingly opportunistically in patches of soft substrate located amid boulders and other coarser substrate. Percent cover even in continuous beds was consistently far less than 25% and noticeably sparser than other islands within the Islands Trust areas also surveyed during the 2013 mapping season.

Docks in areas such as in **Tunstall Bay** were located in depths suitable for eelgrass growth. Distances between some points on the polygon mapped in Tunstall Bay are longer than 20 meters as the eelgrass field surveyors needed to navigate around swimmers, docks and moored boats. Large clusters of sunflower stars (*Pycnopodia helianthoides*) were observed in the bay on sandy bottoms that did not contain eelgrass. Docks and moorings were also located in eelgrass depth elsewhere on the west coast of Bowen Island (e.g. the relatively straight shoreline north of Bowen Bay, King Edward Bay, the shoreline north of King Edward Bay and Galbraith Bay).

In some sites such as **Galbraith Bay** and **Columbine Bay**, eelgrass was only observed on one side of the bay despite suitable sandy substrate on the other side. For example, the substrate on the north side of Galbraith Bay was bare sand. There were several moorings in that bay. Eelgrass in Columbine Bay was sparse and appeared unhealthy; individual clumps were surrounded by bare sand. One hypothesis for this is that eelgrass may be impacted by boat wakes in the area. Boats were moored throughout eelgrass depth in **Cates Bay**.

Multiple beds of continuous eelgrass were identified throughout **Mannion Bay** between zero and more than 5 meter depth relative to chart datum. These beds, however, were not as dense as would be predicted given the soft substrate and sheltered environment. In the northeast side of the bay bare sandy fringing beds are interrupted by the construction of docks.

Mannion Bay is heavily used for boat anchoring, mooring and docking within depths suitable for eelgrass growth. The construction of docks and floats and their associated chains are impediments for eelgrass productivity in this area. Multiple adjacent docks have been constructed within eelgrass depth Ropes and chains from docks, moorings or anchors had dragged on the sea floor, apparent due to the patterns they had created in the sand. The motion of the chains due to waves and currents can damage or uproot eelgrass.

Eelgrass otherwise appeared healthy in Mannion Bay and there are opportunities to restore lost eelgrass habitat if boat anchoring were restricted to a defined area outside of the depth range for eelgrass growth, i.e. if they were limited to 6 m depth or deeper. Schools of fish were observed within the existing sparse eelgrass; therefore, restoring the eelgrass in the area would serve to enhance fish habitat. Although it was not included in the project deliverables, the research team had been requested to look for evidence of litter on the sea floor in this bay; however, only a few cans and the possible remnants of a shopping cart were observed. Some of the moorings and anchored boats appeared derelict. Many crabs were observed on the south side of the bay, but were not identified to species.

No eelgrass was observed in **Snug Cove** including the head of the cove, near Crippen Park beach. Possible reasons include dredging, ferry wakes, eutrophication and boat traffic associated with the marina, and pollution of the substrate due to chipped wood debris. No flora was observed on the sea floor except for encrusting algae. There are restoration opportunities for the nearshore environment by Crippen Park beach if the historical and present impacts from the marina and former log booming site are addressed.

The inner portion of the eastern cove of **Konishi Bay** on the south coast of the island appeared suitable for eelgrass due to the sandy substrate and sheltered cove with a sandy beach. The substrate was bare sand, however. Eelgrass was observed in deeper locations of that bay. Removal of native plants and retaining wall constructions were noted around residences. In another eelgrass location in the southern portion of Seymour Bay/Seymour Landing where an adjacent coastal lot was for sale, coastal vegetation had been cleared and there is already evidence of slope failure both at the top and foot of the slope, despite installation of riprap. Water flow had also been channeled in the area, which could intensify water and sediment flow into the nearshore environment. Slope failure is a possible threat to eelgrass through smothering by eroding sediments. Shoreline hardening also increases wave energy and wave deflection, which can scour shorelines (Lamont 2013).

The area around **Cape Roger Curtis** has been of concern to local residents due to the construction of large docks and potential for damage to submerged habitats. Eelgrass was not observed around the exposed cape, as the observed substrate was steep and rocky. Kelp was observed in the area, however. Chains from the new construction were observed on the ocean floor. Kelp beds are a major feature along the rocky parts of the Bowen Island shoreline. Several schools of small or juvenile fish were also observed around the island.

10.0 Threats to Eelgrass Habitats

The impacts from human activities have been described previously (Section 4.0). Other field observations are described below.

There seems to be an increase in the abundance and distribution range of the invasive seaweed, *Sargassum muticum* within the Islands Trust Area, although there is at present no research to substantiate this. Although the plant settles and grows on cobble, surrounding eelgrass in sandy/muddy sediment can be shaded out by its overarching canopy. The presence of *Zostera japonica* was noted on Lasqueti and Thetis Islands and other areas within the Islands Trust. This non-native species of eelgrass is not known to compete with *Z. marina*, though it can be found mixed with the native eelgrass in the lower reaches of the intertidal zone.

Though there is some disagreement about the causes of epiphytic algae growth on eelgrass blades, it was noted within Telegraph Harbour on Thetis Island and Montague Harbour on Galiano Island. This could be an indication of excessive nutrients, causing an abundance of algae growth on the blades and blocking light, nutrients and gas exchange (Mumford 2007).

Canada geese are infamous for their grazing on eelgrass shoots. They were noted in large numbers on Lasqueti, Gabriola, and North Pender and South Pender Islands. Overgrazing of shallow eelgrass beds might be a growing concern as the birds are increasing in range and numbers.

As winter storms intensify, there might be an increase in burial of eelgrass shoots by sand over wash. Monitoring eelgrass habitats over time in selected locations vulnerable to storm events might shed light on the effects of climate changes upon the nearshore environment.
Eelgrass Restoration

11.0 Opportunities for Eelgrass Restoration

Thirteen areas in 2012 and nineteen in 2013 were identified as potential sites for eelgrass restoration as indicated in the legends on the maps produced by this project. When funding is available, these sites can be further investigated. The history of eelgrass transplants and their success in British Columbia to date is described below.

11.1 History of Eelgrass Restoration

In the Pacific Northwest, the history of success for *Zostera marina* transplanting projects was dismal prior to 1985. Initially transplant techniques were developed and successful on the Atlantic coast. However, these techniques were not well suited to the Pacific north coast environment and eelgrass. Many of the early transplants were conducted without a thorough understanding of eelgrass physiology and ecology; the donor stock was not always well suited to the area where they were transplanted, and the biophysical conditions of the transplant site were not always appropriate for the species (Durance 2001).

Since 1985, knowledge and experience from adaptive management practices have resulted in a higher success rate for focused mitigation and enhancement projects along the Pacific coast (Thom, Borde, Williams, Southard, Blanto and Woodruff 2001). Factors that led to a higher success rate include the correct selection of physical attributes for the restoration area, including elevation, substrate composition and light and current regime. The selection of the most suitable ecotype or genotype increased the likelihood for success and rate of production. The criteria for success included shoot density and area re-vegetated (Durance 2001).

11.2 Criteria for Successful Restoration

In British Columbia, the criterion for transplant success is based upon the mean shoot density being equal or greater than the area of adjacent natural beds and the area coverage. Projects are thus considered successful if the habitat that was created provided habitat equal in eelgrass productivity (shoot density) to that which it was designed to replace (Durance 2001).

Site selection with the appropriate biophysical characteristics (salinity, sediment type, current velocity, light/depth, temperature, and pH), using suitable plant donor stock (ecotype), using an appropriate transplanting technique and handling the donor plants with care are necessary for successful transplants. Several restoration transplants have occurred in Squamish, the Sunshine Coast, Campbell River, Cowichan Bay and Saanich Inlet. Most of the locations have been impacted by historical log storage practices. The majority of these transplants are considered successful based on monitoring of shoot densities and area coverage post-transplant. They were completed under the supervision of a scientific advisor with community volunteer support and a Workers Compensation Board (WCB) certified team, with funds collected by environmental conservation groups.

12.0 Recommendations

Globally, eelgrass has been used as an indicator of water quality (Neckles 1994). Often, a bed will decrease or increase in width and length dependent on light availability. The lower depth distribution of eelgrass is related to overall water clarity. Water quality, including water clarity, is affected by land practices and water uses. If, for example, a large scale development occurs on shore near an eelgrass bed, the bed may decrease in size because the water quality in the nearshore is consistently compromised by the increased pollution load, known as non-point source pollution, frequently delivered by the storm water system. When the amount of light reaching the

plants is limited by shading from increased sediment or plankton blooms associated with increased nutrients from land, eelgrass meadows adapt to the poor light availability through dieback, decreases in density or width and migration to shallower depths.

The Islands Trust Area is home to more than 25,000 people and is located between the highly populated centres of Vancouver, Victoria and Nanaimo. However, only approximately 12.5 % of the marine environment has some type of protection. Most of this protection is in Rockfish Conservation Areas, with Provincial and Federal Marine Protected Areas accounting for only 1.53% (Islands Trust Fund Regional Conservation Plan 2011-2015). Sound decisions by local trustees and an educated public are necessary to protect the functions of the nearshore for all who benefit from their healthy ecology.

A set of recommendations is listed below to contribute to the conservation work of the Islands Trust and Islands Trust Fund.

12.1 Education

1. Educate boaters and coastal residents about the presence and importance of eelgrass beds.

2. Encourage shoreline landowners to replace light-impenetrable docks with materials that allow light penetration.

3. Encourage signage at boat ramps reminding boaters to avoid eelgrass beds in shallow water.

4. Build public awareness about the importance of reducing nutrient inputs in marine riparian areas; encourage protection and restoration of wetlands and the construction of retention ponds to filter land based pollutants; and encourage reduction in the use of fertilizers, pesticides and herbicides.

5. Develop a long term public outreach nearshore marine education strategy that includes new shoreline property owners.

12.2 Regulatory and Enforcement

1. Limit dock development, particularly in established and potential eelgrass areas (i.e. areas where substrate is suitable for eelgrass growth).

2. Encourage creation of “No anchoring/mooring” zones in suitable eelgrass areas (based on substrate, depth and observed presence of eelgrass); encourage movement of moorings to areas that are too deep for eelgrass.
3. Limit shoreline development; maintain a coastal riparian zone that will enable inland shift of eelgrass beds as sea levels rise.

4. Create and implement appropriate setbacks for built structures from the nearshore.

5. Limit or reduce overwater structures; increase shared community docks and wharves when possible.

6. Require removal of illegal shoreline modifications; require restoration or removal of aged derelict structures where possible.

12.3 Opportunities for collaboration with other agencies

1. Encourage and undertake as resources allow regularly scheduled monitoring of sensitive or vulnerable shorelines; make monitoring results readily accessible to all.

2. Where boat traffic must go through an eelgrass bed, encourage establishment of marked boat channels so that the least damage is done to the habitat.

3. Create protected marine zones and encourage planned siting for mooring buoys for recreational boats around eelgrass beds.

4. Promote management strategies to mitigate conflicting uses in eelgrass habitat, such as oyster and clam harvesting, boating and anchoring in meadows and near-shore development requiring dredging.

5. Promote restoration of natural hydrology when opportunities arise.

6. Promote restoration of eelgrass habitats where possible.

13.0 Conclusion

Changes from increased human population, more frequent and intense storms and changes in sea levels and pH of the oceans emphasize the need to monitor eelgrass habitat and protect it with sound science- based policies and regulations.

Eelgrass meadows function as natural marine sanctuaries, as indicators of nearshore ecological health, and as sequesters of atmospheric carbon. As well, these valuable habitats are important sources of nutrients for local and off-shore marine and nearshore systems. The conservation, protection, monitoring and restoration of native eelgrasses within the Islands Trust Area is and will continue to be a long term smart investment in the social, cultural and biological vitality of the islands.

References

Beak Consultants. 1975. Biology oil impact literature review final report 1975. Baseline Study Program, North Puget Sound, Dept. of Ecology, Olympia Washington.

Bostrom C., Bonsdorff E. 2000. Zoobenthic community establishment and habitat complexity – the importance of seagrass shoot density, morphology and physical disturbance for faunal recruitment. Marine Ecology Progress Series 205:123-138.

British Columbia/Washington Marine Science Panel. 1994. The shared marine waters of British Columbia and Washington: A scientific assessment of current status and future trends in resource abundance and environmental quality in the Strait of Juan de Fuca, Strait of Georgia and Puget Sound of BC State of Washington. p 71.

Campbell, Colin (2010). Blue Carbon Report. Sierra Club BC.p.1.

Dowty, P.B. Reeves, H. Berry, S. Wyllie-Echeverria, T. Mumford, A. Sewell, P. and Wright R. 2005. Puget Sound submerged vegetation monitoring project: 2003-2004 monitoring report. Nearshore Habitat Program, Aquatic Resources Division, Washington State Department of Natural Resources, Olympia, Washington.

Duarte, C.M. 2000. Marine biodiversity and ecosystem services; an elusive link. Journal of Experimental Marine Biology and Ecology. 250:117-131.

Durance, C. 2001. A review and assessment of eelgrass transplant projects in British Columbia. Document prepared for Fisheries and Oceans, South Coast Area. 37.

Durance, C. 2002. Methods for mapping and monitoring eelgrass habitats in British Columbia. Funded by the Canadian Wildlife Service, Environment Canada.

Harper, J. 2011. Coastal habitat mapping program fact sheet. Coastal & Ocean Resources Inc.

Harrison, P.G. and Dunn, M. 1999. The Fraser delta sea grass ecosystems: importance to migratory birds and changes in distribution. In: unpublished manuscript. p. 3-4.

IPCC. 2007. Climate change 2007: synthesis report. An assessment of the Intergovernmental Panel on Climate Change. Adopted at IPCC Plenary XXVII, Valencia, Spain, 12-17 November 2007, 52pp.

IPCC. 2012. Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation. A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change [Field, C.B., V. Barros, T.F. Stocker, D. Qin, D.J. Dokken, K.L. Ebi, M.D. Mastrandrea, K.J. Mach, G.-K. Plattner, S.K. Allen, M. Tignor, and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, UK, and New York, NY, USA, 582 pp.

Islands Trust Fund Regional Conservation Plan (2011-2015). Prepared for the Islands Trust Fund Board, November, 2010 and endorsed by Islands Trust Council December 8, 2010.

Lamont, G. SNC Lavalin. 2013. Presentation to Conference on Science and Stewardship – Addressing Rising Sea Level Impacts on Coastal Communities, Brackendale, BC, 30 November 2013.

Levings, Colin; Jamieson, Glen. 1995. Marine and estuarine riparian habitats and their role in coastal ecosystems. Pacific Region. Canadian Science Advisory Secretariat.).

Levings, C.D. and Thom, R.M. 1994. Habitat changes in Georgia basin: implications for resource management and restoration in: Proceedings of the BC/Washington Symposium on the Marine Environment. January 13th -14th, 1994. R.C.H. Wilson, R.J. Beamish, F. Aitkens, j. Bell, eds. Can. Tech. Pep. Fish. Aqua. Sci. 1948: 330-349.

Lyngby, J.E. & Brix, H. 1989. Heavy metals in eelgrass (*Zostera marina*) during growth and decomposition. In: Hydrobiologist 176/177:189-196. Belgium.

MacArthur, R.H. and E.O. Wilson. 1967. The theory of island biogeography. Princeton University Press: Princeton, NJ.

McGlathery, K.J., J. Sundback, and I.C. Anderson. 2007. Eutrophication in shallow marine bays and lagoons; the role of plants in the coastal filter. Marine Ecology Progress Series 348:1-18.

Molnar, M., Kocian, M and Batker, D. Nearshore natural capital valuation. 2012. David Suzuki Foundation. p. 12.

Mumford, T.F. Jr. 2007. Kelp and eelgrass in Puget Sound. Prepared in support of the Puget Sound Nearshore Partnership. Washington Department of Natural Resources Aquatic Resources Division. Technical Report 2007-05.

Neckles, H.A. (ed.) 1994. Indicator development. Seagrass monitoring and research in the Gulf of Mexico. U.S.E.P.A.

Orth, R. J., T. J. B. Carruthers, W. C. Dennison, C. M. Duarte, J. W. Fourqurean, K. L.

Heck, A. R. Hughes, G. A. Kendrick, W. J. Kenworthy, S. Olyarnik, F. T. Short, M. 14 Waycott and S. L. Williams. 2006. A global crisis for seagrass ecosystems. *BioScience* 56:987-996.

Orth, R. J, Heck, Jr. K. L, and Monterans J. van. 1984. Faunal communities in sea grass beds: A review of the influence of plant structure and prey characteristics on predator-prey relationships. Estuaries 7:339-350.

Phillips, R.C. 1984. The ecology of eelgrass meadows in the Pacific northwest: A community profile. SCH. Nat. and Mathematical Sciences, Seattle Pacific University. Fish and Wildlife Service, U.S. Dept. of the Interior.

Short, F.T., and Wyllie-Echeverria, S. 1996. Natural and human induced disturbance of seagrasses. Environmental Conservation 23.

Short, F., Carruthers T., Dennison W., Waycott M. 2007. Global seagrass distribution and diversity: A bioregional model CA Department of Natural Resources, University of New Hampshire, Jackson Estuarine Laboratory, Durham, NH 03824, USA

Thom, R., Borde, A.B., Williams, G.D., Southard, J.A., Blanto, S.L. & Woodruff, D.L. 2001. Effects of multiple stressors on eelgrass restoration projects: Proceedings of Puget Sound/Georgia Strait Conference. p.5.

Thom, R., Diefenderfer, M., Vavrinec, J., Borde, A. 2011. Restoring resiliency: Case studies for Pacific Northwest estuarine eelgrass (*Zostera marina L.*) ecosystems.

Thompson, R.E. 1994. Physical oceanography of the Strait of Georgia-Puget Sound-Juan de Fuca system. Symposium on the Marine Environment, Institute of Ocean Sciences, Sidney, B.C. p.36.

Titus, J.G. and E.M. Strange. (eds.), 2008. Background Documents Supporting Climate Change Science Program Synthesis and Assessment. Product 4.1: Coastal Elevations and Sensitivity to Sea Level Rise, EPA 430R07004. U.S. EPA, Washington, DC.

Van der Slagt, G., Harlow, G., and Verge, M. (Coordinators) 2003. Coastal shore stewardship: A guide for planners, builders and developers on Canada's pacific coast. The Stewardship Series. Stewardship Centre for BC. www.stewardshipcentre.bc.ca

Waycott, M., C. M. Duarte, T. J. B. Carruthers, R. J. Orth, W. C. Dennison, S. Olyarnik, A. Calladine, J. W. Fourqurean, K. L. Heck, A. R. Hughes, G. A. Kendrick, W. J. Kenworthy, F. T. Short, and S. L. Williams. 2009. Accelerating loss of seagrasses across the globe threatens coastal ecosystems. Proceedings of the National Academy of Science 106:19761- 19764.

Waycott and S. L. Williams. 2006. A global crisis for seagrass ecosystems. *BioScience* 56:987-996.

Wilson, E.O., and E.O. Willis. 1975. Applied biogeography in M.L. Cody and J.M. Diamond, editors. Ecology and evolution of communities. Harvard University Press, Cambridge, Massachusetts.

Appendix A

Mapping Methodology

2012 - 2013

2012 Methodology for *Zostera marina* Presence and Absence Mapping With a Towed Underwater Camera

The following methodology for eelgrass mapping (*Zostera marina*) was used to determine the location (presence/absence) of eelgrass habitats for Thetis, North and South Pender, Mayne, Lasqueti and Gambier Islands in 2012 under contract with the Islands Trust Fund.

The methodology reported here is an addendum to "Methods for Mapping and Monitoring Eelgrass Habitat in British Columbia" ("Methods") authored by Precision Identification Biological Consultants and peer reviewed by experts in the field. This addendum was created by the Seagrass Conservation Working Group with input and review by Precision Identification.

The purpose of presence and absence mapping methodology is to determine the linear extent of eelgrass along the coastline. This is achieved by deploying an underwater camera that is towed by a boat and recording the geographic location of eelgrass beds using a hand held GPS. The resulting representation of eelgrass beds are lines.

General habitat characteristics outlined in Methods are also recorded: Form (flat/fringing), Distribution (continuous/patchy), Percent Cover (<25%, 26-75%, >75%), and Substrate type (sand/mud/pebble/cobble/boulder). The state of the tide was recorded as "slack" or "running" in order to indicate the level of confidence in the percent cover estimate. A slack tide yields a higher level of confidence than a running tide, which causes the eelgrass lay across the ocean floor.

Eelgrass ShoreZone bioband mapping and marine charts were used to determine potential locations of eelgrass beds The majority of the eelgrass beds in the Southern Salish Sea include habitat between 1 and 3 m chart datum. This depth contour was followed and eelgrass presence within this depth range was recorded. If eelgrass ass not found in this depth range where bathymetry and substrate characteristics were suitable for eelgrass growth, a perpendicular transect was followed ranging from +1m to -6m which is the typical range of eelgrass in the Salish Sea.

GPS waypoints and the following parameters were recorded at roughly 10m intervals: depth, eelgrass presence, form, distribution, substrate, percent cover, tide state, presence of broad or tuft algae, visibility.

Where marine charts indicated suitable conditions (a shallow bathymetric relief) for eelgrass but eelgrass was not present, waypoints and substrate type were recorded at 20m intervals. Where marine charts indicated unsuitable conditions for eelgrass (steep bathymetric relief), only waypoints were recorded to indicate mapping coverage.

2013 Methodology for *Zostera marina* Presence Mapping with a Towed Underwater Camera

For the 2013 contract, the following methodology for eelgrass mapping (*Zostera marina*) was used to determine the location (presence) of eelgrass habitats for the Gabriola Island Local Trust Area, the Galiano Island Local Trust Area, Valdes Island, Ballenas – Winchelsea (Executive Islands) Local Trust Area, Cufra Inlet (Thetis Island) and the Gambier Associated Islands found within Howe Sound (excluding the Thormanbies and other islands off of the Sunshine Coast).

The methodology reported here is an addendum to "Methods for Mapping and Monitoring Eelgrass Habitat in British Columbia" ("Methods") authored by Precision Identification Biological Consultants and peer reviewed by experts in the field. This addendum was created by the Seagrass Conservation Working Group with input and review by Precision Identification. For 2013 mapping Islands Trust Global Positioning System Specifications (Schedule G to the Islands Trust contract) were adopted except for Cufra Inlet on Thetis Island where a hand held GPS was used to be consistent with 2012 mapping. Average accuracy was 0.814m and was the combined result of the built-in accuracy of the GPS unit, lag time between sighting eelgrass and the unit gathering enough satellite data to create a waypoint, in combination with boat drift.

Linear Mapping

With the exception of the islands in Metro Vancouver, the Islands Trust eelgrass mapping was done using a linear method to determine presence of eelgrass along the shoreline. This linear eelgrass mapping is achieved by towing an underwater camera using a boat, except for the mapping done in Cufra Inlet in 2013, where the water was shallow enough to observe eelgrass from kayaks, and by concurrently recording the geographic location of eelgrass beds using a GPS. The resulting representations of eelgrass beds are lines and points (where the eelgrass patch was less than 3m in length).

Polygon Mapping

With financial assistance from Metro Vancouver, eelgrass beds on Bowen, Bowyer and Passage Islands were mapped using polygons to show their full extent. In addition to the linear mapping described above, underwater camera transects were conducted perpendicular to shore to map shoreward and seaward edges. In some areas, fringing eelgrass and eelgrass patches were too small to map as polygons. In these locations lines and points were used respectively to show eelgrass presence. Fringing eelgrass bands $\leq$ 5m wide were mapped as lines and patches less than 10m^2 were mapped as points. Mapping of polygons according to standard methodology was limited due to safe boat operation in wind, current and tidal movements, as well as navigation around boats and swimmers.

For all the islands, general habitat characteristics outlined in Methods are also recorded: Form (flat/fringing), Distribution (continuous/patchy), Percent Cover (<25%, 26-75%, >75%), and Substrate type (sand/mud/pebble/cobble). The state of the tide was recorded as "slack" or "running" in order to indicate the level of confidence in the percent cover estimate. A slack tide

yields a higher level of confidence than a running tide, which causes the eelgrass to lie across the ocean floor.

ShoreZone eelgrass bioband mapping and marine charts were used to determine potential locations of eelgrass beds. The majority of the eelgrass beds in the Southern Salish Sea are found between 1 and 3m chart datum. This depth contour was followed and eelgrass presence within this depth range was recorded. If eelgrass was not found in this depth range where bathymetry and substrate characteristics were suitable for eelgrass growth, a perpendicular transect was followed ranging from +1m to -6m which is the typical range of eelgrass in the Salish Sea.

GPS waypoints and the following parameters were recorded at roughly 10m intervals with intervals no longer than 20m: depth, eelgrass presence, form, distribution, substrate, percent cover, tide state, presence of broad or tuft algae, visibility.

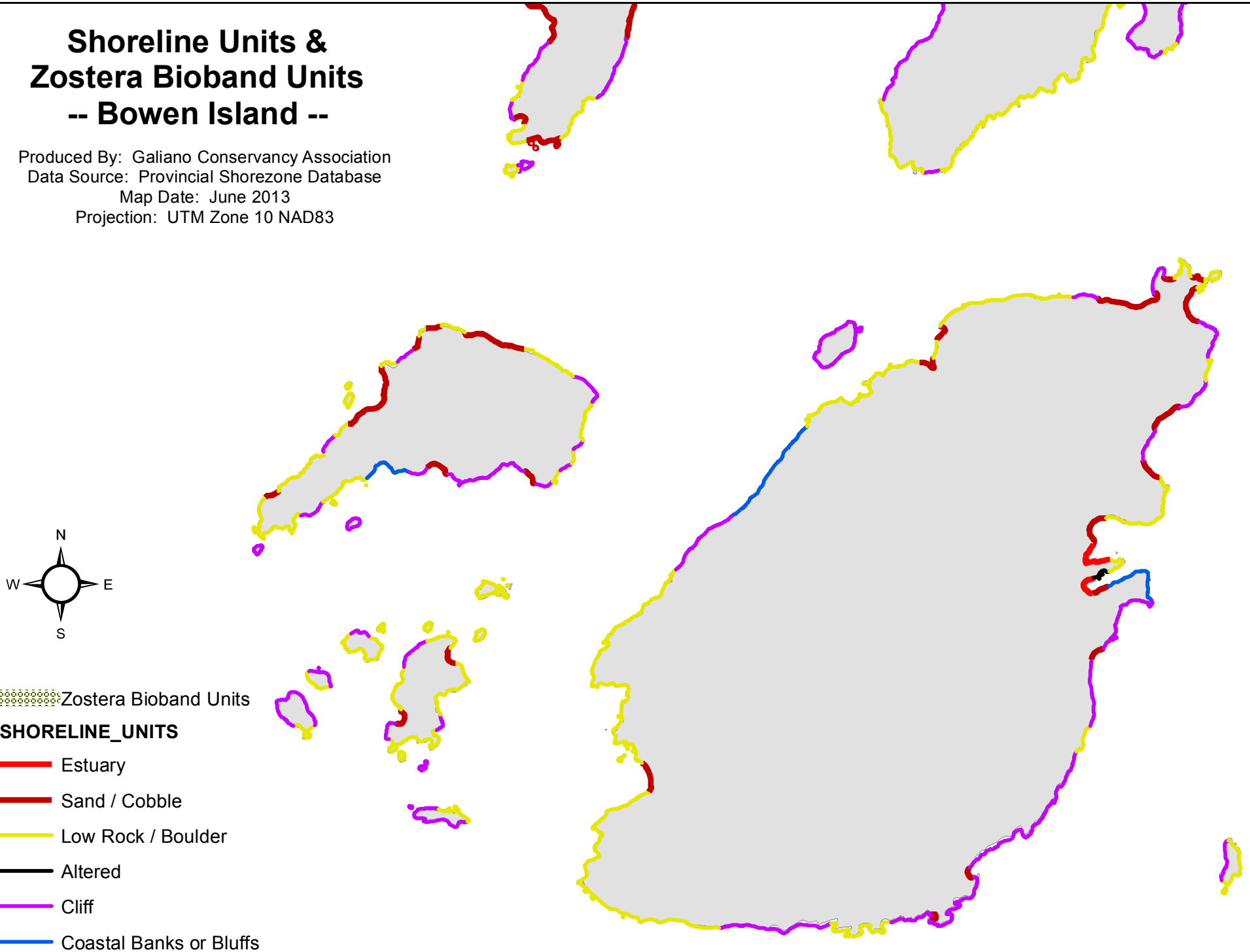
The following section was removed from the methodology for 2013:
Where marine charts indicated suitable conditions (a shallow bathymetric relief) for eelgrass but eelgrass was not present, waypoints and substrate type were recorded at 20 metre intervals. Where marine charts indicated unsuitable conditions for eelgrass (steep bathymetric relief), only waypoints were recorded to indicate mapping coverage.

Appendix B

Maps of Shoreline Units

Shoreline Units & Zostera Bioband Units -- Bowen Island --

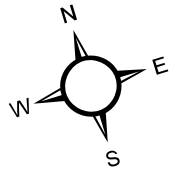
Produced By: Galiano Conservancy Association
Data Source: Provincial Shorezone Database
Map Date: June 2013
Projection: UTM Zone 10 NAD83



1:70,000

Shoreline Units & Zostera Bioband Units -- Denman Island --

Produced By: Galiano Conservancy Association
Data Source: Provincial Shorezone Database
Map Date: June 2013
Projection: UTM Zone 10 NAD83



Zostera Bioband Units

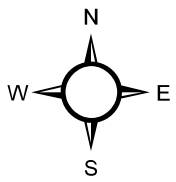
SHORELINE_UNITS

- Estuary
- Sand / Cobble
- Low Rock / Boulder
- Altered
- Cliff
- Coastal Banks or Bluffs

1:70,000

Shoreline Units & Zostera Bioband Units -- Executive Islands --

Produced By: Galiano Conservancy Association
Data Source: Provincial Shorezone Database
Map Date: June 2013
Projection: UTM Zone 10 NAD83



Zostera Bioband Units

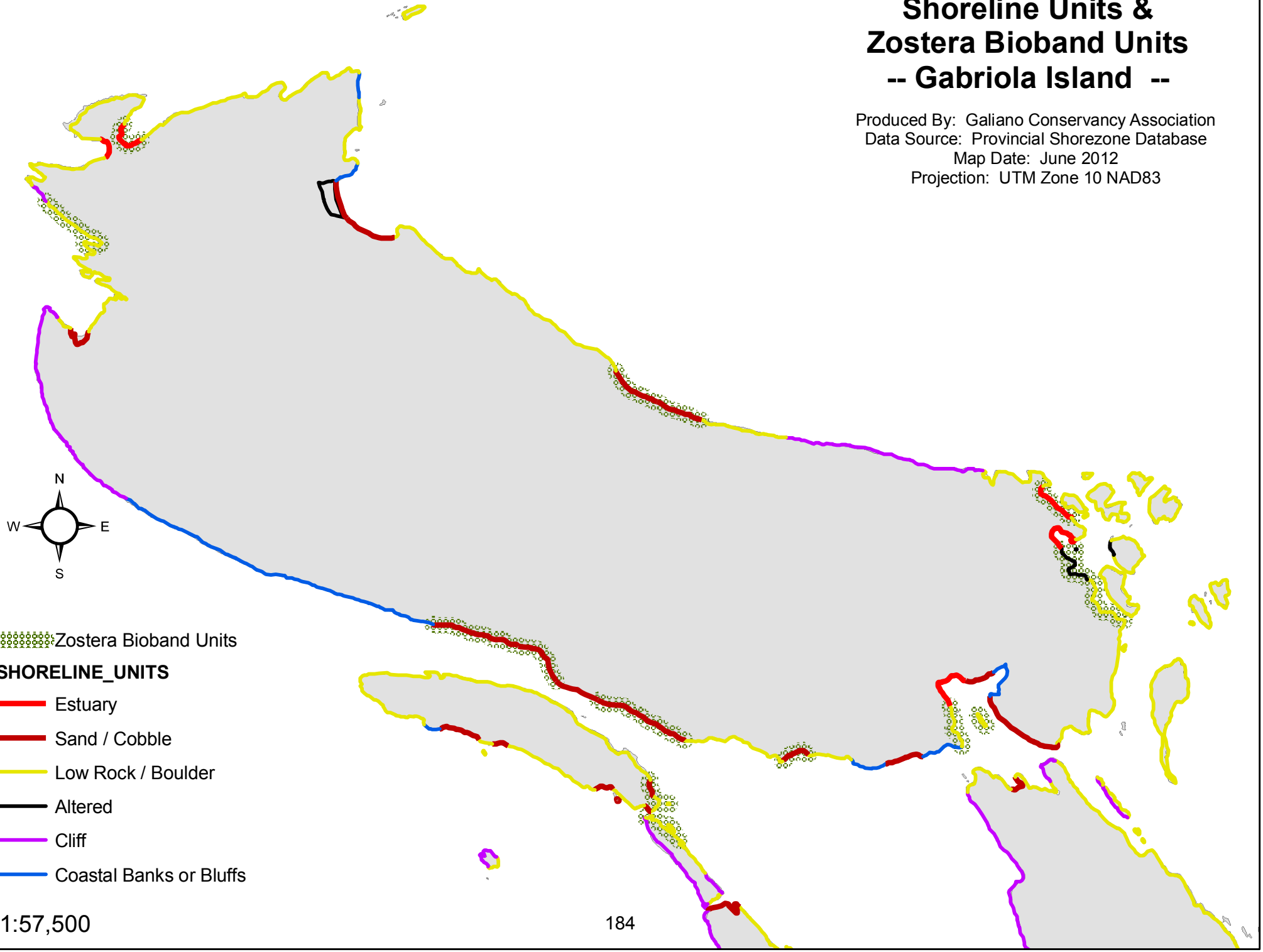
SHORELINE_UNITS

- Estuary
- Sand / Cobble
- Low Rock / Boulder
- Altered
- Cliff
- Coastal Banks or Bluffs

1:46,362

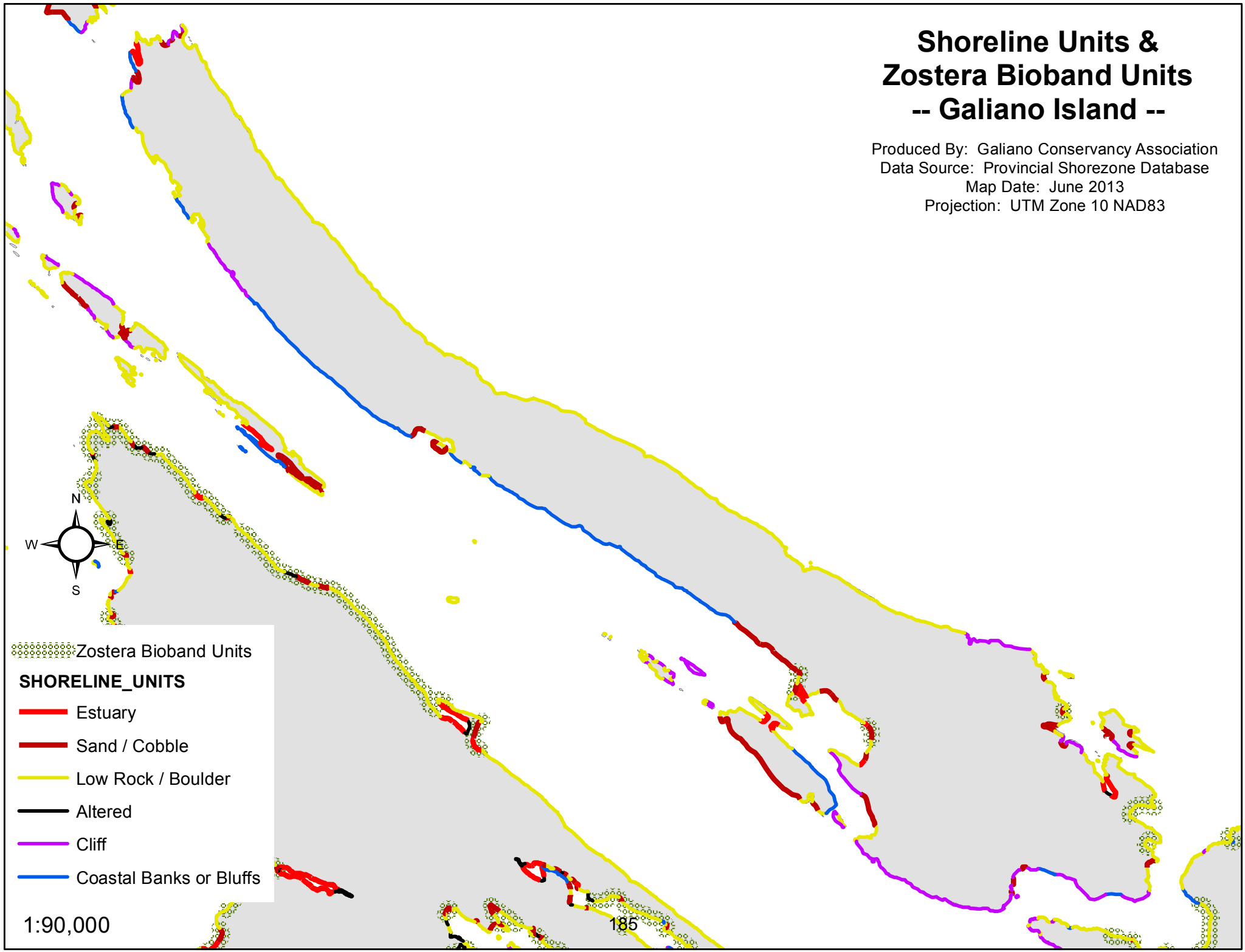
Shoreline Units & Zostera Bioband Units -- Gabriola Island --

Produced By: Galiano Conservancy Association
Data Source: Provincial Shorezone Database
Map Date: June 2012
Projection: UTM Zone 10 NAD83



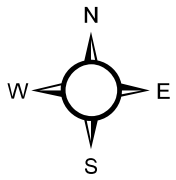
Shoreline Units & Zostera Bioband Units -- Galiano Island --

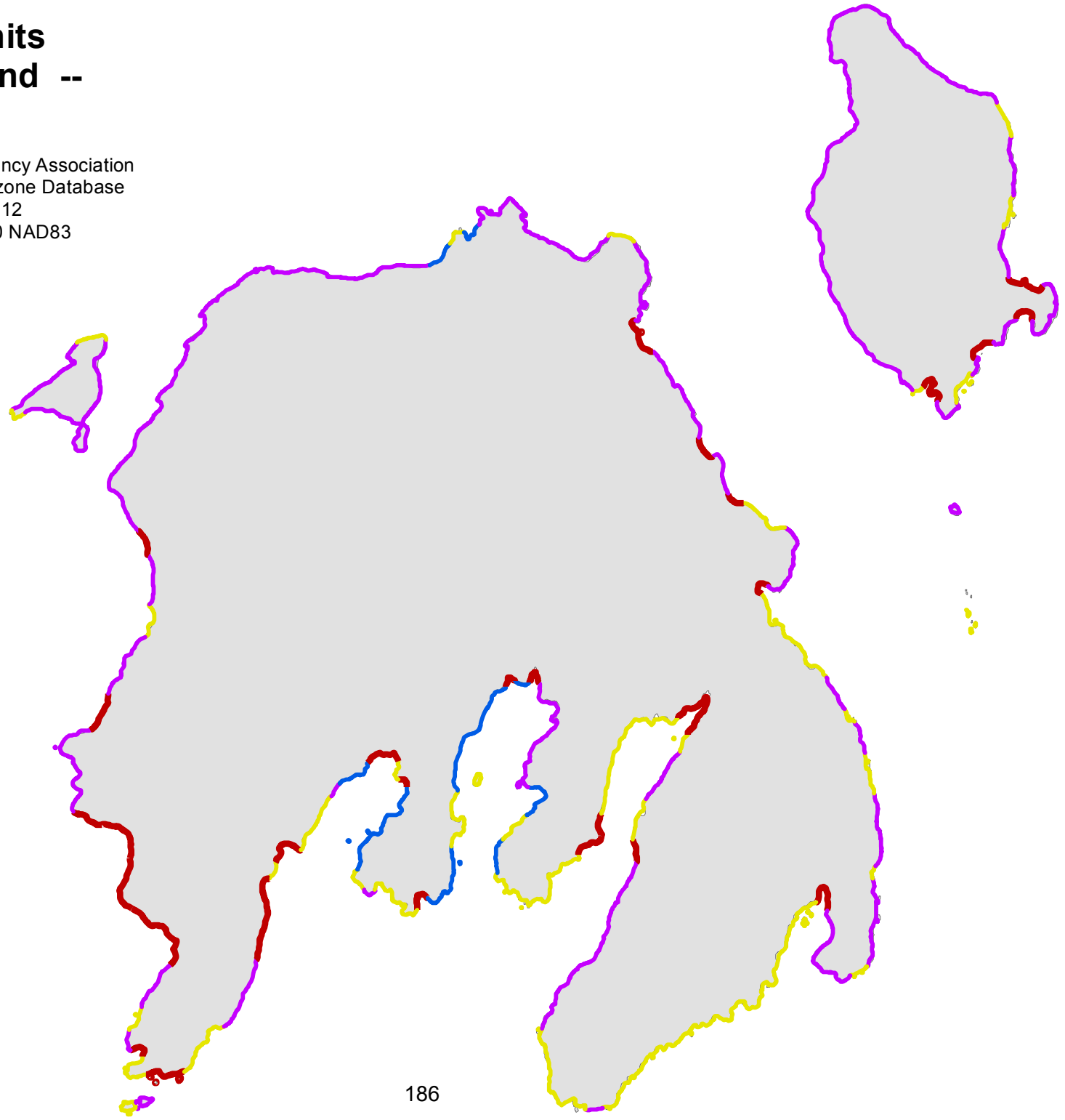
Produced By: Galiano Conservancy Association
Data Source: Provincial Shorezone Database
Map Date: June 2013
Projection: UTM Zone 10 NAD83



Shoreline Units
-- Gambier Island --

Produced By: Galiano Conservancy Association
Data Source: Provincial Shorezone Database
Map Date: June 2012
Projection: UTM Zone 10 NAD83





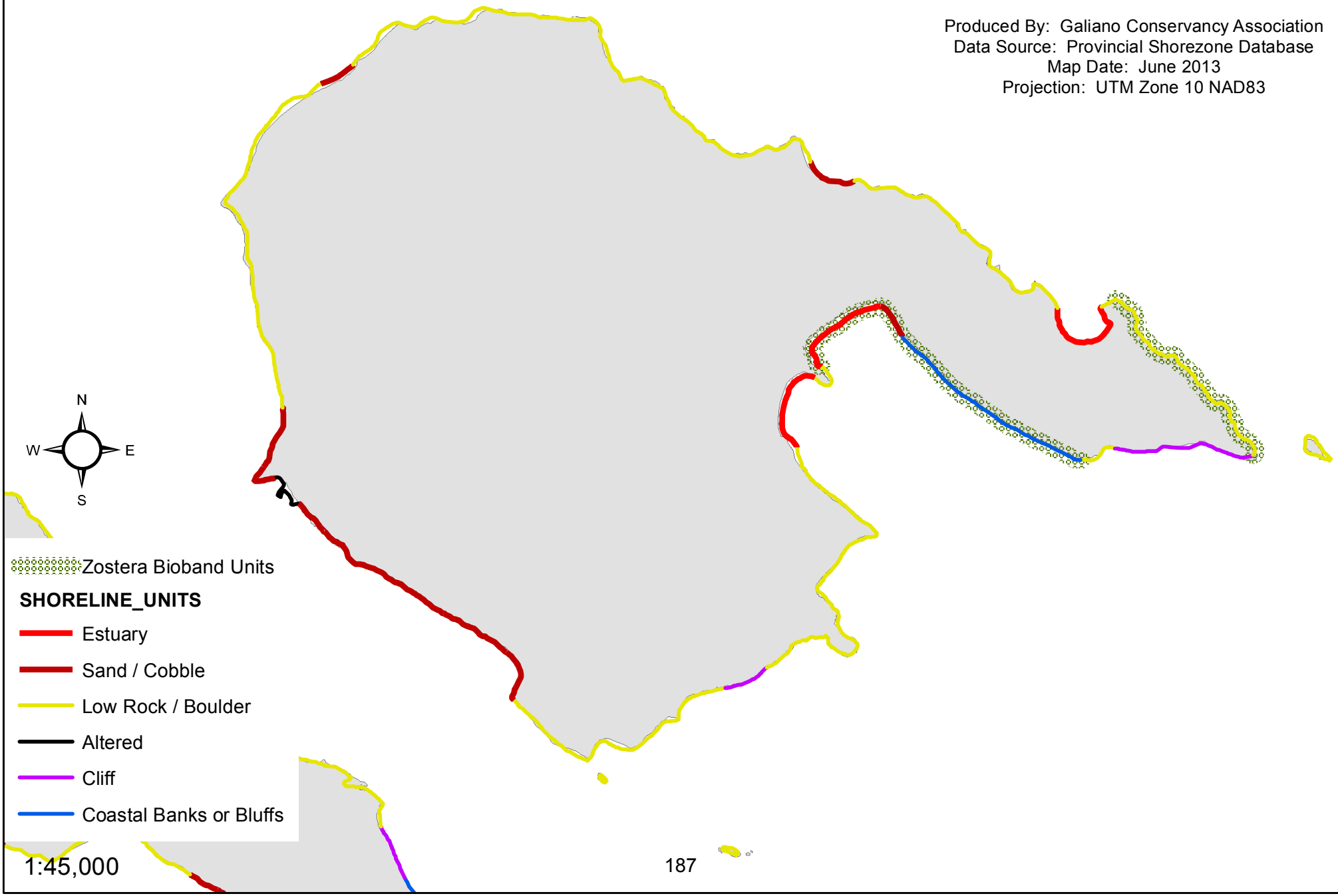
SHORELINE_UNITS

- Estuary
- Sand / Cobble
- Low Rock / Boulder
- Altered
- Cliff
- Coastal Banks or Bluffs

1:70,000

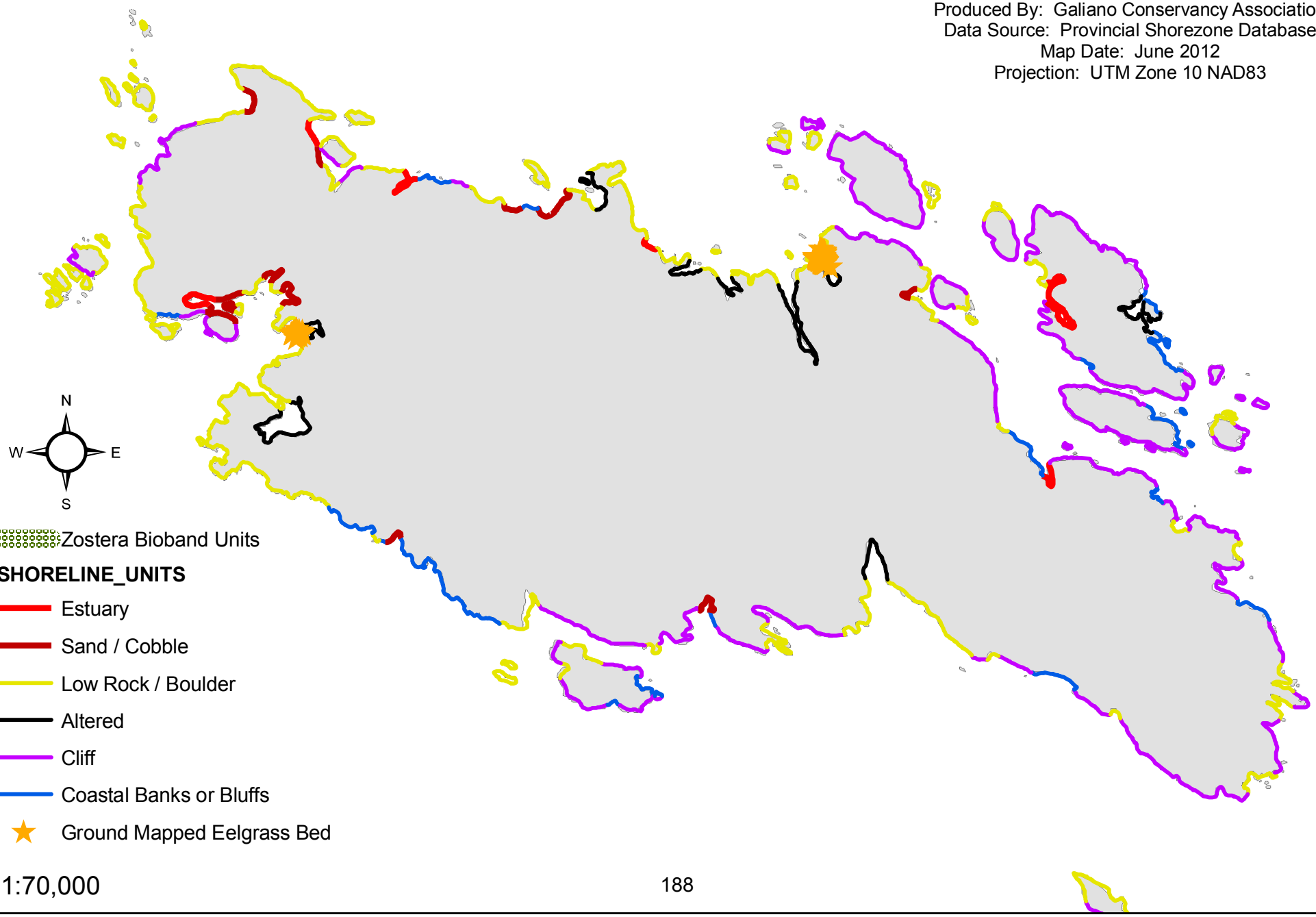
Shoreline Units & Zostera Bioband Units -- Hornby Island --

Produced By: Galiano Conservancy Association
Data Source: Provincial Shorezone Database
Map Date: June 2013
Projection: UTM Zone 10 NAD83



Shoreline Units & Zostera Bioband Units -- Lasqueti Island --

Produced By: Galiano Conservancy Association
Data Source: Provincial Shorezone Database
Map Date: June 2012
Projection: UTM Zone 10 NAD83



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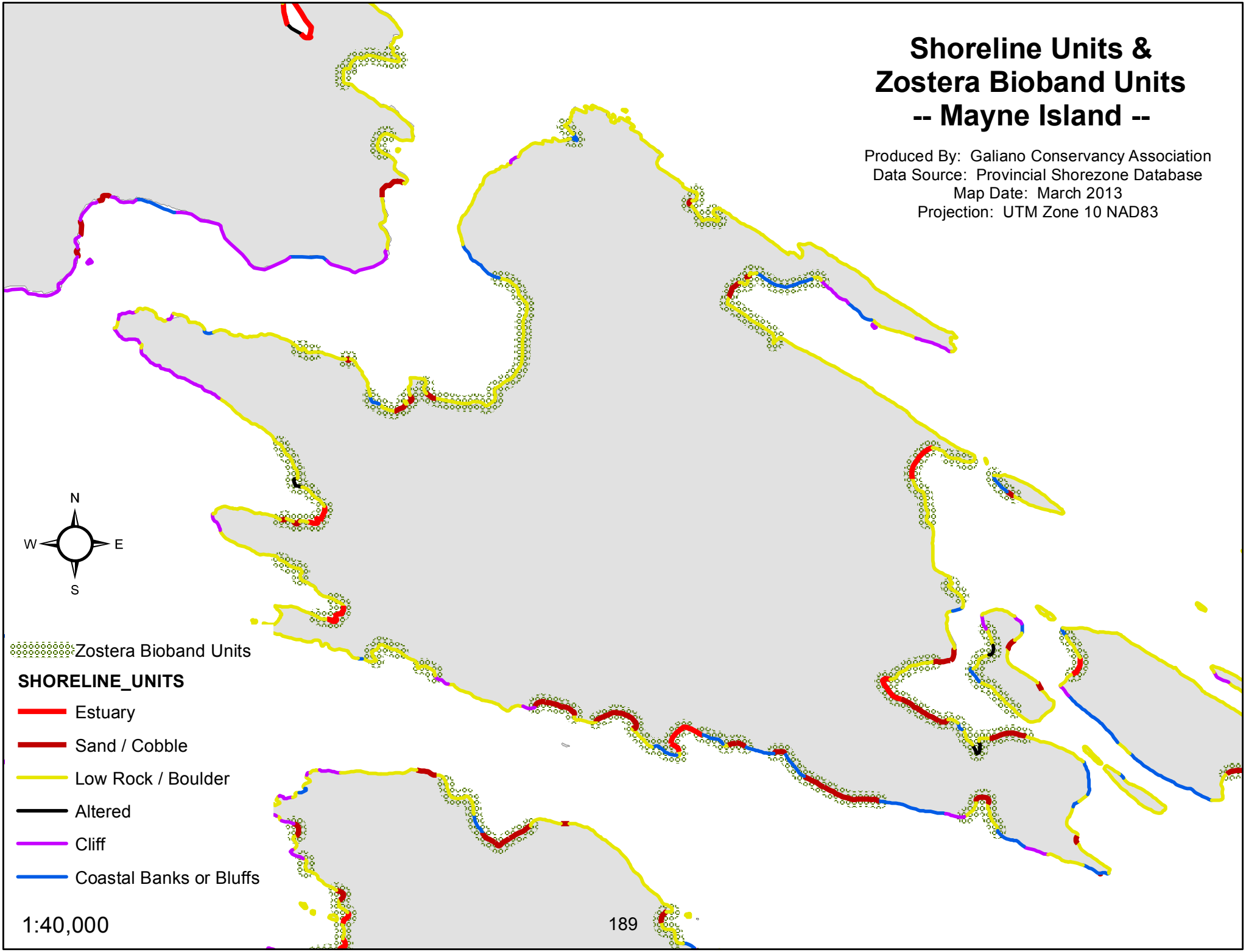
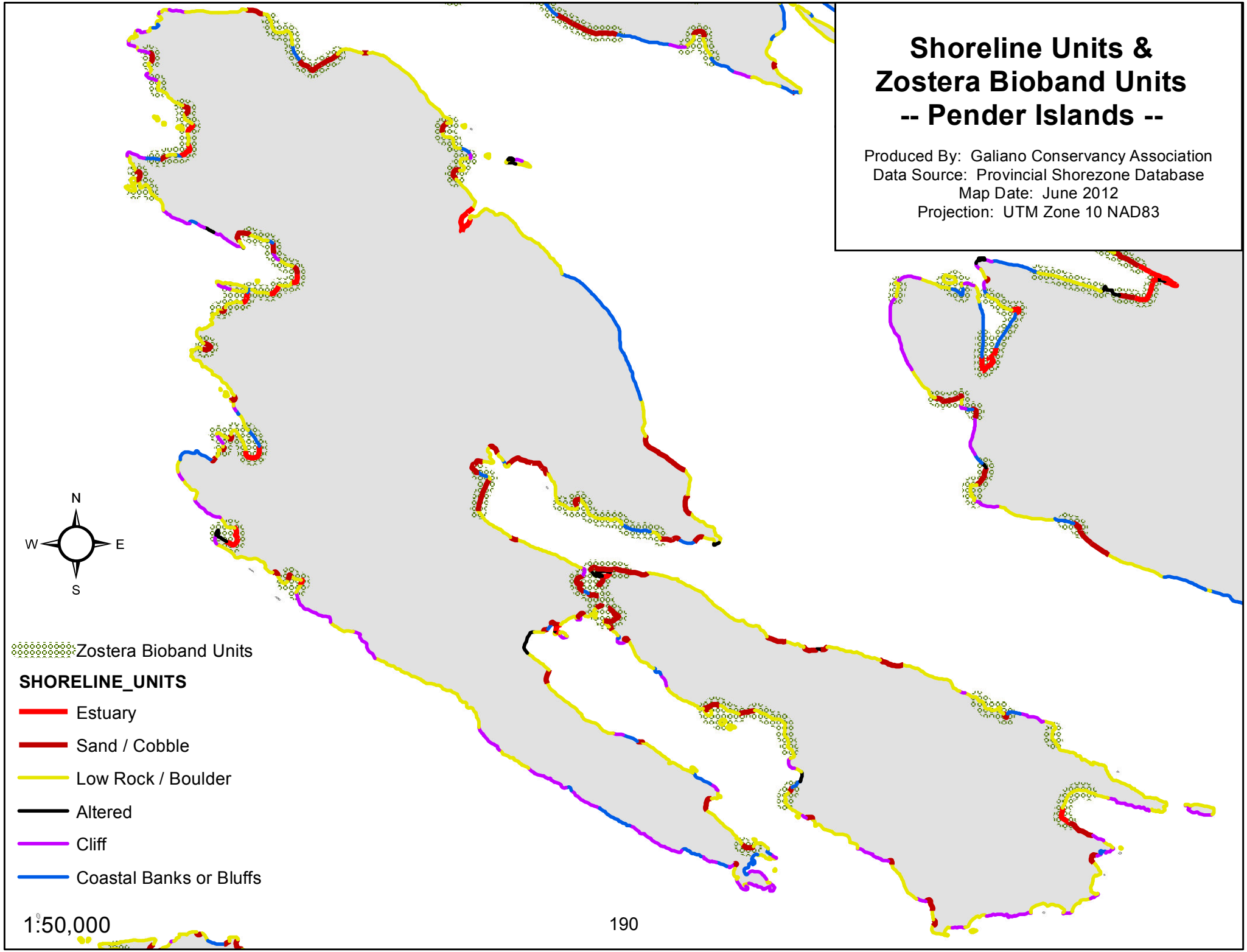
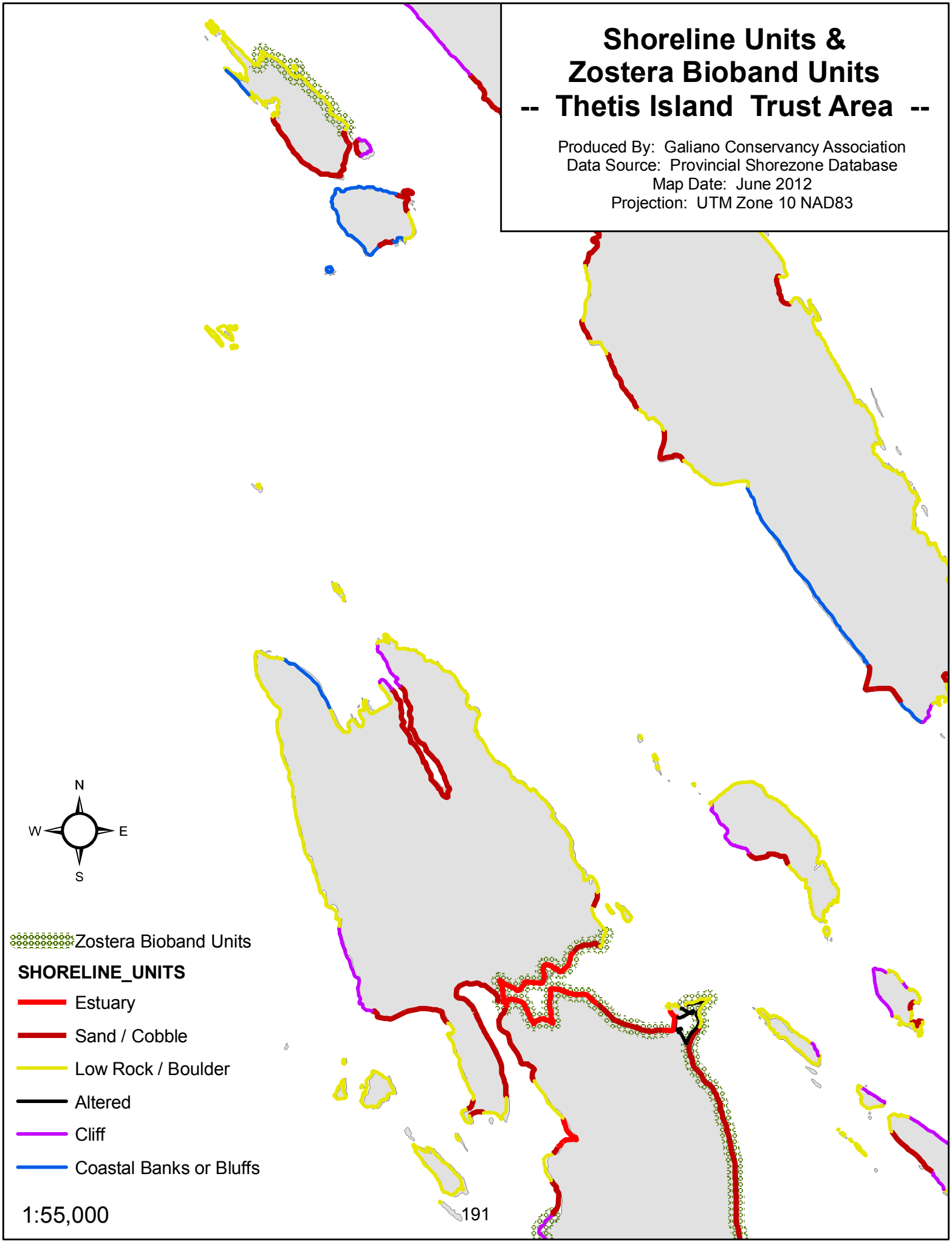
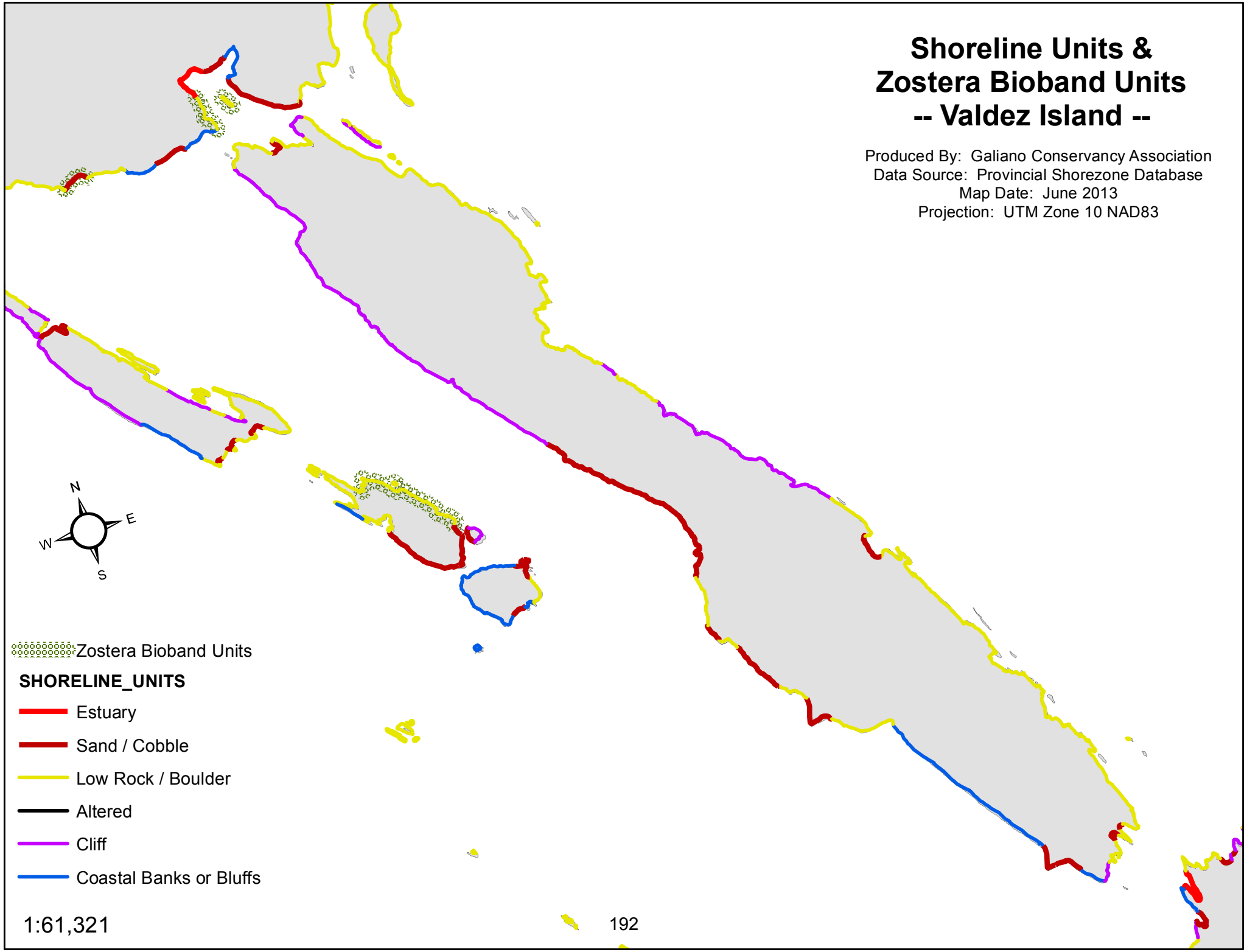

Shoreline Units &
Zostera Bioband Units
-- Mayne Island --
Produced By: Galiano Conservancy Association
Data Source: Provincial Shorezone Database
Map Date: March 2013
Projection: UTM Zone 10 NAD83
N
W
E
S
Zostera Bioband Units
SHORELINE_UNITS
Estuary
Sand / Cobble
Low Rock / Boulder
Altered
Cliff
Coastal Banks or Bluffs
1:40,000
189


Shoreline Units &
Zostera Bioband Units
-- Pender Islands --
Produced By: Galiano Conservancy Association
Data Source: Provincial Shorezone Database
Map Date: June 2012
Projection: UTM Zone 10 NAD83
N
W
E
S
Zostera Bioband Units
SHORELINE_UNITS
Estuary
Sand / Cobble
Low Rock / Boulder
Altered
Cliff
Coastal Banks or Bluffs
1:50,000
190

Shoreline Units & Zostera Bioband Units -- Thetis Island Trust Area --

Produced By: Galiano Conservancy Association
Data Source: Provincial Shorezone Database
Map Date: June 2012
Projection: UTM Zone 10 NAD83




Shoreline Units &
Zostera Bioband Units
-- Valdez Island --
Produced By: Galiano Conservancy Association
Data Source: Provincial Shorezone Database
Map Date: June 2013
Projection: UTM Zone 10 NAD83
N
E
W
S
Zostera Bioband Units
SHORELINE_UNITS
Estuary
Sand / Cobble
Low Rock / Boulder
Altered
Cliff
Coastal Banks or Bluffs
1:61,321
192

Appendix C

Summary of Overwater Structures

The Impacts of Overwater Structures on the Marine Nearshore Environment

The following information was taken from two sources. A Green Shores document summarizes possible effects of docks.[1] A White Paper published in 2001[2] for the Washington State Transportation Commission in Puget Sound is more detailed. The page numbers at the end of paragraphs indicate the page on which the information was found in the original document.

Information collated by Nikki Wright, Executive Director

SeaChange Marine Conservation Society

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[1] Province of British Columbia. *Coastal Shore Stewardship: A Guide for Planners, Builders and Developers on Canada's Pacific Coast.* www.greenshores.ca

[2] Nightingale, B. & Simenstad, C.A. (2001) *Overwater Structures: Marine Issues White Paper Research Project T 1803, Task 35*. Prepared for Washington State Transportation Commission and in cooperation with U.S. Department of Transportation, Federal Highway Administration. 108 pages.

Summary of Possible Effects of Docks

Coastal Shore Stewardship: A Guide for Planners, Builders and Developers on Canada's Pacific Coast Province of British Columbia (Available on the Green Shores Web site: www.greenshores.ca)

What Can Happen (p. 65)

The installation of docks can affect the coastal biophysical environment in a variety of ways:

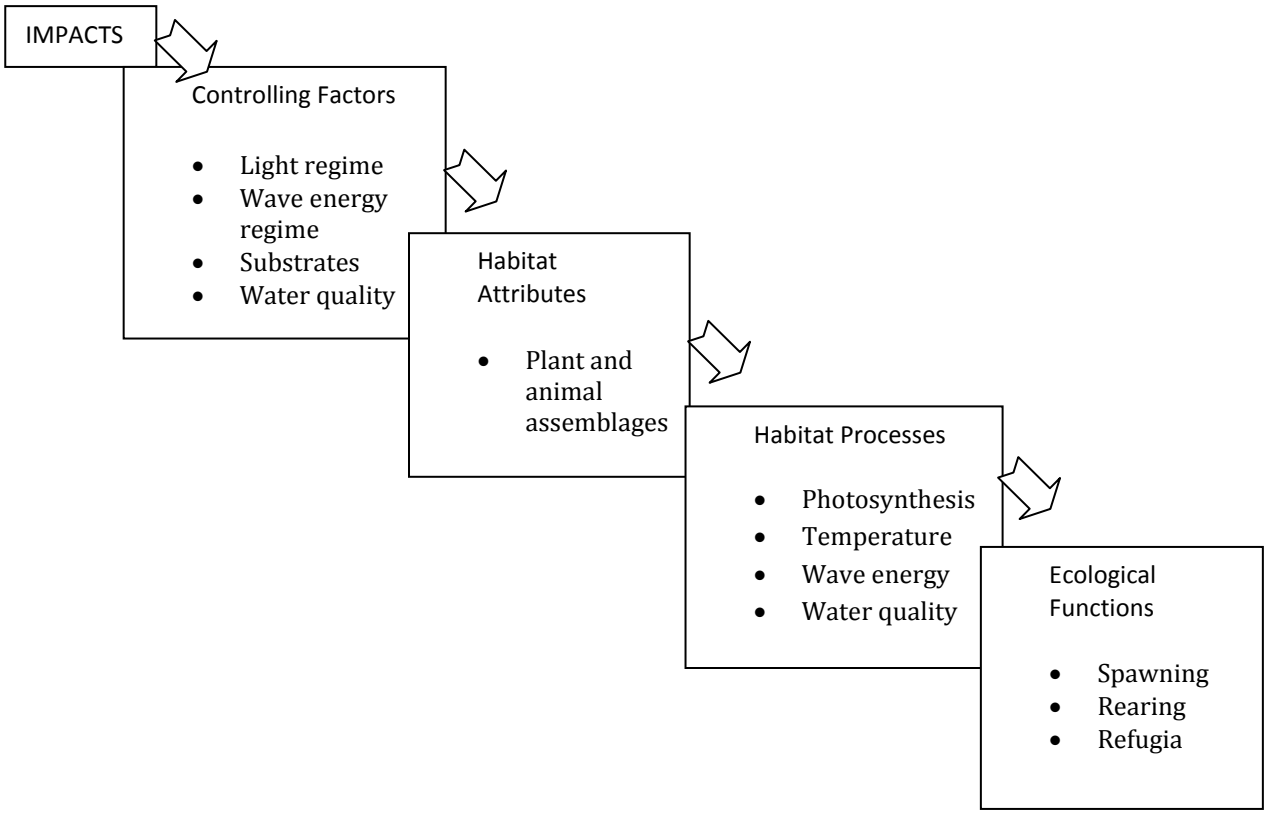
- Shading: Shading caused by the dock can affect the vigor of intertidal and subtidal plant communities, such as marsh plants, eelgrass and kelp beds. These impacts may be chronic (reduced productivity) or acute (wiping out plant communities, leaving the area barren).
- Disruption of shore drift patterns: This can result in updrift beach formation and downdrift shoreline erosion.
- Shore damage: Removal of shore plants and disturbance of soils where docks are attached to land can increase erosion and sedimentation of the intertidal and adjacent subtidal areas.
- Bottom habitat: Installation of footings, pilings and other structures permanently alienates benthic habitat. Dredging to create sufficient depth next to the dock can also disrupt or destroy bottom habitat.
- Operational pollution: poor refueling and dock maintenance practices, bilge releases and accidental spills from boats and docks can release contaminants into the nearby waters. (p. 65)

Overview of Ecological and Habitat Issues

From: Overwater Structures: Marine Issues White Paper Research Project T 1803, Task 35.

Estuarine and shallow marine nearshore habitats provide passage for fish and fish larvae, ocean water and human transportation, as well as areas for settlement of marine shellfish and other marine life. These sites are important sources of prey resource production, refugia, and spawning areas for Pacific salmon, groundfish, and forage fish, such as herring, sand lance and surf smelt. Overwater constructed structures can pose alterations to key factors that control prey production and spawning. Light, wave energy and substrate regimes determine the habitat characteristics that support these critical functions (p. 1).

Overwater structures are typically located in intertidal areas from above the area submerged by the mean higher high tides and out to 15 meters below the area exposed by the mean lower low tide. The primary physical processes controlling habitat attributes (i.e. plant and animal assemblages) and functions are depth (elevation) substrate type, wave energy, and light and water quality. These are the most important factors influencing the development and distribution of nearshore habitats (p. 33).



Conceptual model used by authors to define overwater structure impacts to nearshore habitat (p. 33).

Overwater structures and associated activities can impact the ecological functions of habitat through the alteration of habitat controlling factors (light regime, wave energy regime, and

substrate and water quality). These alterations can, in turn, interfere with habitat processes supporting the key ecological functions of spawning, rearing and refugia. Whether any of these impacts occur and to what degree they occur at any one site depend upon the nature of site-specific habitat controlling factors and the type, characteristic, and use patterns of a given overwater structure located at a specific site (p. 34).

In addition to impacts associated with overwater constructed structures, activities associated with docks can also pose risks to the quality and quantity of habitat through prop scour, groundings, contaminant introduction to the marine environment and structural interferences with shallow nearshore habitats with the placement of ramps and haul-outs in nearshore areas.

Habitat Impact Mechanisms (p. 34)

Habitat Controlling Factors	Overwater Structures & Activities	Habitat Impact Mechanisms	Habitat Impacts
Light Regime	• Docks • Floats • Pilings • Moored vessels	• Reduced light levels	• Limited plant growth & recruitment • Altered animal behavior and assemblages
Wave Energy Regime	• Floats • Breakwaters • Prop wash • Marina	• Altered wave patterns	• Altered plant and animal assemblages • Altered substrate type • Altered sediment transport & distribution
Substrate	• Prop & anchor scour • Pilings, breakwaters & floats	• Altered substrate characteristics	• Altered sediment transport & distribution • Altered substrate type • Altered plant & animal assemblages
Water Quality	• Discharges • Boat & upland run-off	• Increased exotics, toxics, nutrients and bacterial introductions	• Altered plant & animal assemblages • Limited growth & recruitment • Exotic species replacement of natives

Overwater Structure Effects on Light Regime

Effects on Underwater Vegetation

Without proper precautions, docks, piers, and pilings can cast shade upon the underwater water environment thereby limiting light availability for plant photosynthesis. Distributions of invertebrates, fishes, and plants have been found to be severely limited in under-dock environments when compared to adjacent vegetated habitat in the Pacific Northwest not shaded by overwater structures (p. 38).

Each dock defines a shade footprint specific to its structural specifications. Dock height, width, construction materials, and the dock's orientation to the arc of the sun are primary factors in determining the shade footprint that a given dock casts over the submerged substrates. Researchers found underwater light availability and eelgrass bed quality under docks to be primarily dependent upon dock height, followed in importance by dock width and dock orientation to the arc of the sun. Light is the most important variable affecting canopy structure (i.e. shoot density and height) and eelgrass bed quality. To the degree that a shade footprint limits plant photosynthesis, it decreases the extent and quality of habitat that support a wide variety of fish and shellfish populations. Construction of even partially shading types of structures, floating or on pilings, could be expected to largely eliminate existing eelgrass and other macroflora with little chance for replacement plant growth (p. 39).

Effects on Fish

Overwater structures can create sharp underwater light contrasts by casting shade in ambient daylight conditions. They can also produce sharp underwater light contrasts by casting artificial light in ambient nighttime conditions. Changes to ambient underwater light environments pose a risk of altering fish migration behavior and increasing mortality risks. Findings have demonstrated that fish responses to piers are ambiguous with some individuals passing under the dock, some pausing and going around the dock, schools breaking up upon encountering docks, and some pausing and eventually going under the dock (p. 43).

Light is considered to be the primary factor limiting the survival and distribution of eelgrass. Given the strong association of important fish prey resources with eelgrass, limitations in the extent of eelgrass pose a potential risk of reduced prey resources. Prey resource limitations likely impact migration patterns and the survival of many juvenile fish species. For smaller fish less than 50 mm in length, residence times along particular shorelines are thought to be a function of prey abundance. Research in the Hood Canal demonstrated that outmigrating juvenile chum fry (30-45 mm) feed extensively upon small, densely distributed harpacticoid copepods selecting for the largest copepods available. As the fish grew in size, their diet content became composed more of larger epibenthos and pelagic crustaceans. Consistent with other studies, the highest densities of harpacticoid copepods occurred in magnitudes 4-5 times higher in eelgrass stands than in sand

habitat without eelgrass. Similarly, the largest abundance of first post-larval stage crabs of 0+ age are found in eelgrass beds (p. 45).

Impacts on Wave Energy

Wave energy and water transport alterations imposed by docks, bulkheads, breakwaters, ramps and associated activities alter the size, distribution, and abundance of substrate and detrital materials required to maintain the nearshore detrital-based food web. Alteration of sediment transport patterns can present potential barriers to the natural processes that build spits and beaches and provide substrates required for plant propagation, fish and shellfish settlement and rearing, and forage fish spawning. Although the specific characteristics of the factors at play vary with the geology of each region or subsystem, changing the type and distribution of sediment will likely alter key plant and animal assemblages. Wave and current interactions in shallow water (i.e. depths <1.0m) are particularly important to intertidal flora and fauna (p. 48).

Dock pilings have also been found to alter adjacent substrates with increased shell hash deposition from piling communities and changes to substrate bathymetry. Similarly, dock uses and construction activities are known to limit underwater light and redistribute sediments through prop scouring, vessel shading, and pile driving. These changes in substrate type can change the nature of the flora and fauna native to a given site. In the case of pilings, native dominant communities typically associated with sand, gravel, mud, sand, and seagrass substrates are replaced by those communities associated with shell hash substrates (p. 49).

Cumulative Effects

Given the apparent increasing demand for overwater structures, structural design to allow maximum light transmission and to mitigate energy and substrate changes is required to protect the ecosystems marine fishes rely upon. Given what is known concerning overwater structure impacts in marine and estuarine ecosystems, we conclude that multiple placements of overwater structures in marine waters can pose substantive risks of significant changes to the immediate and surrounding marine and estuarine ecosystems. These risks require the assessment of existing cumulative light limitation effects and wave energy and substrate effects to the shoreline environment. These risks require assessment at the drift cell before considering the addition of new structures (p. 91).

MAP 6: Eelgrass Presence Hornby Island Local Trust Area

13.1.3

- Eelgrass Bed: Flat, Continuous
- Eelgrass Bed: Flat, Patchy
- Eelgrass Bed: Fringing, Continuous
- Eelgrass Bed: Fringing, Patchy
- Eelgrass Patch: < 10m2
- Potential Site for Restoration

Each line segment is labeled with its unique ID number. This number corresponds with the ID column in the associated data table.

The eelgrass inventory was completed by SeaChange Marine Conservation Society under contract by Islands Trust Fund and the Islands Trust. The inventory was conducted from July to November, 2013 using a towed underwater camera and Trimble Pathfinder Pro XR GPS.

0 500 1,000 Meters

Produced by: Galiano Conservancy Assoc.
Map Date: December 12th, 2013
Orthophoto Date: 2011 Scale: 1 : 12,000
Map Projection: UTM Zone 10N, NAD83

N
W E
S

MADRONE
environmental services ltd.

HORNBY ISLAND RIPARIAN AREA REGULATION STREAM IDENTIFICATION –

BEULAH CREEK AND THREE UN-NAMED WATERSHEDS

Prepared for:

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Island Planner
Islands Trust Northern Office
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Prepared by:

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1081 Canada Avenue, Duncan, BC, V9L 1V2

January 21, 2014 Dossier 13.0315

TABLE OF CONTENTS

Hornby Island - Riparian Area Regulation
Stream Identification

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1.0 INTRODUCTION AND OBJECTIVES

The Riparian Areas Regulation (RAR) is the basis of streamside protection in British Columbia. The RAR was enacted in 2004 under Section 12 of the Fish Protection Act. The RAR is a joint initiative with Fisheries and Oceans Canada (DFO), the Ministry of Environment (MoE) and local government. The RAR uses a science-based approach to help ensure land development activities do not result in a harmful alteration, disruption or destruction (HADD) of fish habitat.

In BC, the definition of fish habitat includes all aquatic and terrestrial areas that affect fish life processes. Fish habitat, therefore, includes the area directly adjacent to a stream (*i.e.*, the riparian area) because it provides food, nutrients, and other functions vital to fish survival.

It is understood that two watersheds were identified by the MoE on Hornby Island as containing either confirmed fish habitat or potential fish habitat: Beulah Creek and Ford Creek. Of these watersheds, part of the Beulah Creek watershed had been mapped and the Ford Creek watershed had been fully mapped by Mimulus Biological Consultants (2012) prior to the completion of this project. Three potential RAR watersheds were also identified on Hornby Island, which lacked the information required to determine applicability to the RAR.

In order to continue the process of becoming compliant with the provincial RAR, Islands Trust contracted Madrone Environmental Services Ltd. (Madrone) to conduct fieldwork to identify RAR-applicable drainages on Hornby Island.

The target watersheds included the three potential RAR watersheds and part of the Beulah Creek watershed. As Beulah Creek had been subject to previous stream mapping, the scope of Madrone's work was to map the remaining watershed. Islands Trust will use the stream-mapping data to develop a process that recognizes focus areas adjacent to applicable streams (e.g. by incorporating Development Permit Areas or implementing other regulations) to ensure the protection of fish habitat.

The primary objective of the project was to map the centre-line of streams with a high level of accuracy (within 1 m – 5 m), to allow Islands Trust to accurately identify RAR applicable watercourses. As per the RAR, any development within the Riparian Assessment Area (RAA) triggers the requirement for an assessment completed by a Qualified Environmental Professional (QEP). The RAA occurs within 30 m of applicable watercourses, and is measured from the Top of Bank (TOB), or in the case of ravines, from the High Water Mark (HWM) to a point that extends either 10 m or 30 m back from the Top of Ravine Bank (TORB), depending on the width of the ravine. The RAA for wetlands is measured from the HWM. The scope of this project did not include locating the TOB, TORB, or HWM, but the linear extent of ravines were identified during the fieldwork.

Under the Detailed Assessment methodology of the RAR, bankfull widths are used to determine the width of the riparian setback area (referred to under the regulation as Streamside Protection and Enhancement Areas – SPEAs). In order to help determine the extent of riparian setbacks and the dimensions of future management areas, bankfull stream width measurements were taken during fieldwork. The objective of this exercise was to supply Islands Trust with additional data to help with the implementation of planning tools to manage riparian areas. As per the RAR, SPEAs are measured as horizontal distances from the HWM.

2.0 METHODOLOGY

2.1 Background Research

Background research was carried out using the Fisheries Information Summary System (FISS) (http://www.env.gov.bc.ca/fish/fiss/index.html) and Habitat Wizard (http://webmaps.gov.bc.ca/imf5/imf.jsp?site=moe_habwizdatabases) to determine whether any documented stream information existed for the study area. Background stream mapping data contained in the Environmentally Sensitive Area Official Community Plan map (Schedule D1 – Bylaw 104) was also assessed.

Sensitive Ecosystem Inventory (SEI) maps specific to Hornby Island were also assessed to determine the known distribution of wetland and riparian ecosystems on the island. These maps were accessed through the Hornby Island Trust Area Mapping webpage (http://www.islandstrust.bc.ca/maps/trust-area-mapping.aspx). The Denman and Hornby Islands Water Allocation Plan (Pitt and Bryden, 1994) was also included in the background research phase. The report associated with the previous mapping work on Hornby Island (completed by Mimulus Biological Consultants – 2012) was also studied.

2.2 Assessment Area

The scope of the stream mapping work consisted of the three potential RAR watersheds and the Beulah Creek watershed, with boundaries of the four focus watersheds provided by Islands Trust (Figures 1 – 2). The eastern segment of the Beulah Creek watershed had been mapped previously (Mimulus Biological Consultants 2012). The scope of the project did not include field checking this existing mapping, but rather continuing from the end point and completing the stream mapping for the remainder of the watershed. No assessments were carried out on streams flowing through any other watershed beyond the focus watershed boundaries identified in Figures 1 – 2.

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Figure 1: Beulah Creek and Potential RAR Watersheds 2 and 3 - Overview

PROJECT:
Hornby Island Riparian Area
Stream Mapping

CLIENT:
Islands Trust

MAP SCALE:	MAPPING DATE:
1:15,000	December 18, 2013
DOSSIER NO:	DRAWN BY:
13.0315	Anna Riionheimo

LEGEND

- Watershed Boundary
- Streams
- Not field verified due to lack of access permission
- Previous stream mapping data (Mimulus 2012)
- Wetlands from previous stream mapping data

Wetlands Observed in Field

- Pond

Base Symbols

- Roads
- Parks and Protected Areas

N

0 100 200 400 600 m.

Potential RAR Watershed 2

Potential RAR Watershed 3

Harwood Road
Brigantine Crescent
Cannon Crescent
West Carmichael Road
Cowie Road
Gunpowder Trail
Carmichael Road
Savoie Road
Barney-French Road
Lea Smith Road
Fowler Road
Roburn Road
Mary Road
Ostby Road
Sollans Road
Beulah Creek
Chandler Road
St Johns Point Road
Tribune Bay Provincial Pk
Shields Road
Little Tribune Bay Road
Slade Road
Seawright Road
Mount Road

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Figure 2: Potential RAR Watershed 1

PROJECT:
Hornby Island Riparian Area
Stream Mapping

CLIENT:
Islands Trust

MAP SCALE:	MAPPING DATE:
1:10,000	December 18, 2013
DOSSIER NO:	DRAWN BY:
13.0315	Anna Riionheimo

LEGEND

- Watershed Boundary
- Streams

Wetlands Observed in Field

- Wetland

Base Symbols

- Roads
- Parks and Protected Areas

N

0 100 200 400 m.

2.3 Landowner Contact

Using stream data collated as part of the research phase, field maps were produced with imagery and cadastral information provided by Islands Trust. Where known streams intersected with private properties, landowner contact information for the affected properties was recorded in a data base. Prior to fieldwork occurring, landowners with streams on their property were contacted by telephone. Landowners were advised of the objectives of the mapping project and asked for access permission.

Field maps were modified accordingly to reflect those properties where access was permitted and those where access had been denied. Attempts were made to contact all affected property owners, although there were several instances where landowners were absent during the landowner contact phase. Sections of streams that could not be field verified, based on lack of access permission, have been identified in the map products (Figures 3 – 6). Where field verification was not possible, the location of streams was delineated using imagery and/or contour interpretation (where appropriate).

During fieldwork, further efforts were made to make contact with property owners by knocking on doors and explaining the objectives of the mapping work. This approach was not always practical, based on the spatial extent of some of the properties and/or landowners being absent during the field assessment. Each field crew also carried copies of a letter from Islands Trust explaining the purpose of the project, for distribution to the public during fieldwork.

2.4 Definition of a "Stream" under the RAR

In order to identify applicable drainages in the field, the definition of a "stream" as listed under the provincial RAR, was used as a standard. As per Section 1.4.2 of the RAR Assessment Methodology; (http://www.env.gov.bc.ca/habitat/fish_protection_act/riparian/documents/assessment_methods.pdf), a "stream" is defined as follows:

"…any watercourse – natural or human made – that provides fish habitat that contains water on a perennial or seasonal basis, is scoured by water or contains observable deposits of mineral alluvium, or has a continuous channel bed including a watercourse that is obscured by overhanging or bridging vegetation or soil mats. A watercourse may not itself be inhabited by fish, but may provide water, food and nutrients to streams that do support fish."

The RAR further identifies a stream as:

"…any of the following that provides fish habitat:

(a) a watercourse, whether it usually contains water or not;

(b) a pond, lake, river, creek, brook;

(c) a ditch, spring or wetland that is connected by surface flow to something referred to in paragraph (a) or (b).

If a barrier (either definitive or non-permanent) to the migration of fish occurs on a stream, a watercourse is classified as a "stream" above the barrier if there is potential fish habitat downstream of the barrier. A watercourse can also support resident fish above a barrier if suitable perennial habitat exists. Any part of a watercourse that is not inhabited by fish (e.g. above a barrier with no perennial habitat available) that connects by surface flow to fish habitat is considered a stream under the RAR process.

Watercourses that do not support fish or connect by surface flow to fish habitat (e.g. isolated wetlands) are not considered "streams" under the RAR process. No focused mapping of isolated wetlands was carried out as part of this assessment. It should be noted that wetland ecosystem types still provide benefits to a range of species and provide important functions (e.g. stormwater retention).

Where encountered in the field, constructed ditches were identified. The definitions under the RAR Assessment Methodology were used as a basis in determining whether a watercourse qualified as a stream or ditch. This additional classification was carried out in order to provide Islands Trust with information that could affect the planning phase, as ditches are associated with narrower riparian setbacks under the RAR.

2.5 Field Assessment Procedures

2.5.1 Fieldwork Timing

The field assessment was completed using one two person crew over the course of 4 field days on November 25th, 26th, and 29th and December 6th, 2013. Personnel involved in fieldwork included Trystan Willmott, B.Sc., A.Sc.T., Kyle Rezansoff, B.Sc., B.I.T., A.Sc.T., Justin Lange, B.Sc., R.P.Bio., A.Sc.T., and Jennifer Morgen, M.Sc., B.I.T., A.Sc.T. Justin Lange and Jennifer Morgen carried out the fieldwork on November 25th, and 26th and Trystan Willmott and Kyle Rezansoff completed the mapping work on November 29th and December 6th 2013.

All members of the field crew have completed the provincial RAR-implementation training course and are all Qualified Environmental Professionals (QEPs) under the RAR. All crew members have also completed the Resources Information Standards Committee (RISC) field operator GPS training course.

Stream surveys were carried out during the late fall, during a time of year that typically corresponds with high stream flow conditions. The fall of 2013, however, was unseasonably dry, with very little rain falling during October 2013, which was followed by a drier than average November (a weather pattern that continued through December 2013). As a result, streams on Hornby Island appeared to be flowing at a relatively low level for the time of year. In some cases in the Beulah Creek watershed, these conditions made it difficult to determine the location and full extent of streams, especially where low-magnitude tributaries flowed through low gradient forests. Streams were followed to their source, which necessitated the determination of the point where no further evidence of surface flow (including ephemeral flow) could be detected.

2.5.2 Potential RAR Watersheds

The outlet streams of the three potential RAR watersheds on Hornby Island were assessed to determine whether the watersheds contained potential fish habitat. One of the main factors to consider was the potential occurrence of a barrier to upstream fish movement at tidewater. If a definitive barrier occurs at tidewater preventing anadromous fish access, the watershed would not be included as a RAR-applicable watershed unless suitable perennial fish habitat exists upstream of the barrier.

If no barrier occurs at tidewater, there is the potential that the stream could contain anadromous fish. Even if a stream flows on a seasonal basis, there is still the potential for the occurrence of species that do not require a perennial source of water to complete their life cycle, such as chum salmon (*Oncoryhnchus keta*) and pink salmon (*O. gorbuscha*).

2.5.3 Beulah Creek Watershed

Digital stream mapping data for the mapped eastern portion of the Beulah Creek watershed provided by Islands Trust was used to determine the starting point of the mapping exercise. The report accompanying the previous mapping work (Mimulus 2012) was also studied to determine the extent of mapping and to ensure that all areas of the watershed were assessed in the field.

To ensure coverage of the watershed and to check for tributaries, the previously mapped portion of the Beulah Creek main-stem was traversed from the confluence of the last tributary mapped by Mimulus, which enters on the south side of Beulah Creek. As per the Mimulus report, only the lower section of this tributary had been mapped. The inability to access property along the south side of Beulah Creek prevented this tributary from being followed from the confluence. Instead, evidence of this watercourse was determined by traversing the western edge of the inaccessible property and commencing mapping once located. Mapping the upstream extent of the Beulah Creek main-stem and associated tributaries was also completed from the upper limit of the previous mapping carried out by Mimulus (2012).

The Mimulus report identified one main sub-basin flowing close to the southern edge of the watershed. While the Mimulus report did not suggest this sub basin was incomplete, field checks were completed to ensure that the mapped western extent of the tributary represented the full upstream limit and that there were no additional tributaries entering from the extensive watershed area to the north of the main tributary.

Due to the relatively dry conditions, it was difficult to locate watercourses in the low relief area to the immediate west of the inaccessible property in the watershed area south of the Beulah Creek main-stem. The inability to access this property also made it difficult to determine the drainage network.

In addition to following the previously mapped extent of the Beulah Creek main-stem from the last mapped tributary on the south side of the stream, the breadth of the watershed was traversed from north to south between Beulah Creek and the previously mapped tributary to the south to check for tributaries. This strategy of traversing the side slope to the west of the inaccessible property allowed watercourses to be picked up where the gradient was such that allowed for channel incision. Where encountered, streams were mapped to the full upstream extent and the downstream sections were mapped up to the edge of the inaccessible property, or to a point where a stream could no longer be defined.

2.5.4 Tidal Boundary Considerations

The upper limit of tidal influence is relevant in the implementation of the RAR, as the regulation does not apply to marine or estuarine habitats, as per Page 14 of the RAR assessment methods:

> *"The Riparian Areas Regulation does not apply to marine or estuarine shorelines; these waters are still considered fish habitat under the Fisheries Act and DFO should be contacted regarding appropriate setback widths to ensure that development activities do not result in a harmful alteration, disruption or destruction of fish habitat. The boundary between freshwater habitats and estuarine habitats is considered the upstream extent of tidal influence."*

Due to the low magnitude of the outlets of the three potential RAR watersheds, no typical "estuarine" habitat exists. As a result, the stream mapping commenced at the interface between the foreshore riparian vegetation and the intertidal area. Traversing the streams from the upper limit of tidewater allowed for the identification and subsequent mapping of all tributary drainages entering the main-stem.

2.5.5 Collection of Field Data

Concurrently with stream mapping, basic habitat data was also collected along each stream. Data collected included gradient, channel morphology (e.g. riffle-pool/cascade pool or step-pool), extent of riparian vegetation and fish habitat potential. Fish habitat attributes such as cover/security, Large Woody Debris (LWD) and spawning substrate were also noted.

Representative site photographs were taken during each stream traverse (Appendix I). GPS way points were collected to depict the location of features such as barriers to upstream fish movement (e.g. waterfalls). The downstream and upstream boundaries of ravines were also identified with GPS way points.

The edges of wetlands and lakes were not mapped in the field, although their dimensions and attributes were recorded during the assessment. The level of detail shown on the orthophoto coverage, in addition to ground-truthing, allowed for the accurate digitizing of wetland/lake edges on the final maps.

2.5.6 Bankfull Stream Widths and Implementation of the RAR Methodology for Planning Purposes

As part of the field assessment, bankfull widths were taken along each stream traverse in order to provide Islands Trust with more data for planning purposes. As per the RAR methodology (using the "Detailed Assessment"), SPEA dimensions for streams are based on multiplying the average channel width by three. The "Simple Assessment" is another standard used under the RAR, which derives the SPEA from the depth of potential riparian vegetation, stream periodicity and fish

presence/absence. Under the Simple Assessment, the SPEA is measured from the TOB or TORB, and is generally more than 15 m wide, but cannot be greater than 30 m.

Using the Detailed Assessment, the SPEA can never be less than 10 m, with the maximum being 30 m, and is measured as a horizontal distance from the HWM. Bankfull widths taken in the field were used to determine the estimated SPEA dimensions for the streams indicated in the map product, using the Detailed Assessment procedure (Figures 3 – 6). Wetlands (including lakes and ponds) are associated with default 15 m – 30 m SPEAs depending on aspect, under the Detailed Assessment. North facing banks receive a maximum 30 m SPEA, based on the function provided by shade, where-as south, west and east facing banks are associated with 15 m SPEAs.

It should be noted that the SPEAs shown on the maps should only be used as a guide for planning purposes, as the scope of the project did not include the completion of a full detailed RAR assessment on the mapped streams. It should also be noted that the scope of the project did not include the identification of the HWM, TOB, or TORB.

Under the RAR, the 30 m RAA is measured as a horizontal distance from the TOB in the case of a stream, and from the HWM when considering wetlands and lakes. As per the regulation, any developments within the RAA trigger the completion of an assessment using the RAR methodology. When assessing ravines, the RAA extends from the HWM to a point that is either 10 m or 30 m back from the TORB. If a ravine is less than 60 m wide, the RAA is 30 m from the TORB; ravines that are greater than 60 m wide are associated with a RAA that extends 10 m back from the TORB.

While mapping the streams, the downstream and upstream extent of ravines (as defined in the RAR methodology – http://www.env.gov.bc.ca/habitat/fish_protection_act/riparian/documents/assessment_methods.pdf) was identified. The purpose of this exercise was to provide Islands Trust with data for planning purposes, based on the fact that the RAA for ravines extends from the TORB, as discussed in detail above. As stated, the scope of the project did not include the identification of the TORB, or measuring the width of ravines.

2.5.7 GPS Data Collection Parameters

Each field crew collected data using a Trimble GEOXH 6000 GPS unit connected to an external receiving antenna. These units have the capability of receiving position data from GPS and GLONASS satellites, which results in increased accuracy. Data collection thresholds were set on the GPS units to fit within the standards required by Islands Trust, including: a minimum elevation angle to satellites of 15° above the horizon; a maximum Horizontal Dilution of Precision (HDOP) of five; a maximum Position Dilution of Precision (PDOP) of eight; and a minimum number of four satellites for position fixes. As per RISC standards, a minimum of 45 individual fixes were taken for static features such as tributary confluences and barriers. During each stream traverse, position fixes were taken every second. Terra Sync software was used for the collection of field data.

2.6 Assessing for Fish Presence or Potential Fish Presence

While background research using databases is useful in determining the general distribution of fish, it cannot be relied upon as a complete inventory. For example, a lack of data for any given stream or watershed cannot be interpreted as indicating that the stream or watershed does not contain fish. Proving non fish presence generally requires rigorous sampling procedures during optimal seasons. Given the fact that the project was focused on identifying fish bearing or potentially fish bearing watercourses, no detailed sampling procedure was carried out. Fish sampling, therefore, was beyond the scope of this assessment.

As the Beulah Creek watershed had already been associated with extensive stream mapping and had been included as a RAR-applicable watershed by the MoE, it was assumed that potential fish habitat exists in this watershed.

As per Section 2.5.2, the absence of a barrier at tidewater that allows for potential anadromous fish access (even on a seasonal basis), or the occurrence of perennial habitat for resident fish upstream of a tidewater barrier would indicate that a watercourse applies as a "stream" under the RAR. These parameters were used to determine whether the 3 potential watersheds applied to the RAR.

2.7 Field Assessment Limitations

In some instances, the density of vegetation growing in the mapped streams did not make it feasible to follow the drainage with the GPS, as the external antenna would become significantly fouled and/or impeded, leading to poor GPS operating conditions. In these cases, the GPS data collection was paused briefly and resumed

where access to the stream channel was possible. These conditions were generally only a factor along short segments of the upper Beulah Creek main-stem.

Lack of access permission precluded the mapping of the full extent of streams in one of the three potential RAR watersheds and prevented access to part of the central portion of the Beulah Creek watershed assessment area. Unseasonably dry weather, watershed morphology and low stream magnitude also led to challenging conditions when trying to map the location of streams in the field, especially in the Beulah Creek watershed. Where feasible, orthophoto interpretation was used to determine the location of the stream channel for areas that could not be accessed. The portions of streams that could not be field verified due to lack of permission, or where conditions were such that prevented surface connectivity being identified have been depicted in the map products (refer to Figures 3 – 6).

2.8 GPS Data Management and GPS Limitations

After field assessments were completed, the GPS data was downloaded and post-processed using the closest base station relative to the study area (located in Nanoose). The post-processed data was then viewed in Pathfinder Office software, which is used in conjunction with Trimble GPS units and the Terra Sync field collection software. The data was converted to shapefile format and imported into ArcGIS10, which included the creation of a metadata report of all the data collected, including Dilution of Precision (DoP) values, Horizontal Precision and number of satellites used for each position fix.

Using GPS for stream mapping does have obvious limitations, as characteristics in the field play a significant role in the accuracy of data. Traversing obstacles in the creek, or ducking under overhead obstructions (e.g. vegetation) can also lead to temporary loss of locational accuracy, based on the fact that the external antenna is forced out of the optimal position. For example, when climbing over a log, the antenna can either be on a horizontal plane, or pointing towards the ground, leading to poor accuracy. The temporary "zingers" created when the antenna was in a sub optimal position that prevented an accurate location fix was readily identifiable in the data set. Based on the high data logging interval (one locational fix per second), the correct line of the stream could easily be identified in the data by ignoring the "zingers".

It should be noted that the vast majority of data collected met the required accuracy standards. The GPS units performed well, even under tree canopy, and accuracy in open areas (following post-processing) was generally sub-metre.

Having a high data logging interval allowed for an increased number of points to be taken along each stream traverse, leading to increased accuracy. It should be noted, however, that it was generally not possible to follow the exact centre of the stream, unless the stream was completely open, with a uniform depth and no obstructions. During the stream traverses, there would often be the need to move sideways in the creek bed to avoid an obstruction or sections of deep water. The high accuracy of the GPS units allowed for these sideways movements to be depicted in the data, often leading to a "jagged" appearance to the mapped stream line. The creek lines were, therefore, smoothed using the Smooth tool in the Advanced Editing Toolbar in ArcGIS. Smoothing the line features created a more natural stream appearance, while not losing the locational accuracy (sideways movements around obstacles etc. were always within the confines of the channel).

3.0 RESULTS

3.1 Documented Fish Distribution Data

While completing the background research phase, no documented fish distribution data was found for Beulah Creek or the three potential RAR watersheds (using Habitat Wizard and FISS databases). The only documented fish occurrence for Hornby Island was associated with the Ford Creek watershed, which is known to contain coho salmon (*O. kisutch*) and coastal cutthroat trout (*O. clarkii clarkii*). The report associated with the previous mapping work for Beulah Creek (Mimulus Biological Consultants 2012) discussed historical fish (salmon) presence in Beulah Creek, and noted that school groups from the community have undertaken fry release (coho and chum salmon) in the creek.

3.2 Watershed Summaries

Figures 3 – 6 depict the mapped drainage network in each of the target watersheds. All watercourses shown on the maps are considered "streams" under the RAR. The maps also indicate the locations of barriers to upstream fish movement and the extent of ravines. The dimensions of the SPEAs, based on bankfull widths in the field, are also noted on the maps.

The following descriptions summarize the characteristics of each watershed outlet stream and associated tributaries. In all cases, excluding the Beulah Creek watershed, streams are described in an upstream direction, starting from the confluence with the ocean. Representative photographs are included in Appendix 1.

3.2.1 Beulah Creek Watershed – Figure 3

3.2.1.1 Beulah Creek Main-Stem

The upper segment of the Beulah Creek main-stem flows through uninterrupted young forest, with western hemlock (*Tsuga heterophylla*), western redcedar (*Thuja plicata*) and Douglas-fir (*Pseudotsuga menziesii*) dominating. Red alder (*Alnus rubra*) is common in the immediate riparian zone, especially in the moister forest types in the lower section of the mapped area. The riparian vegetation is providing proper biological function in the form of shade, litter fall, insect drop, bank stability and provision of LWD. Throughout the mapped section of the stream, the bankfull width did not exceed 2.9 m.

The stream flows through a well-defined, low gradient (approximately 2%) channel, with a riffle-pool morphology. The substrate consists mainly of small gravel, with sand also occurring in lower energy sections of the channel. Potential fish habitat exists, with stable LWD and undercut banks providing security/cover habitat and sections of suitably-sized substrate to allow for salmonid spawning (especially for resident trout). Fish habitat is likely limited, however, by a lack of water during the summer months. Based on the stream magnitude in the upper reaches, residual water depth in the pool habitat units is likely insufficient to retain an adequate depth of water to provide summer time habitat refugia.

Fish habitat potential in the main-stem decreases in the upper segment of the mapped area, where water flow becomes increasingly restricted to shallow, unconfined flow over soft organic substrates through slough sedge (*Carex obnupta*). The stream was mapped up to a depression at the base of a steep ridge adjacent to the left bank. This depression contains patchy slough sedge, organic substrate and pockets of shallow standing water. Water collects in this depression at the edge of the watershed and represents the source of Beulah Creek.

3.2.1.2 Tributary 1 and Tributary 1-1

While it cannot be confirmed due to a lack of property access permission, it is assumed that Tributary 1 connects with the incompletely mapped tributary included in the Mimulus (2012) report. Tributary 1 was mapped from close to the western

edge of the inaccessible property (allowing for a buffer to ensure no trespassing occurred) and followed to its source.

At the starting point, the stream is poorly defined where it flows through an area exhibiting very low relief. Shallow surface flow through dense sword fern (*Polystichum munitum*) and sections of slough sedge indicate the direction of water flow. Approximately 50 m from the start point, the stream has been ditched immediately downstream of a trail crossing point (wooden foot bridge). As a result of the ditch construction, the watercourse becomes very well defined, although no water was flowing at the time of the assessment.

A secondary ditch flows in a southerly direction from the trail crossing point, which is directed to the east underneath the trail. This watercourse is ditched for approximately 20 m downstream of the trail crossing, at which point no further evidence of water flow could be identified. The ditch was likely constructed to keep water off the trail surface, re-directing the water and allowing it to dissipate over the forest floor on the down-slope side of the trail.

Tributary 1 continues as a wide (up to 1.5 m bankfull) ditched watercourse along the western side of the trail, where it flows from north to south. At the point where the watercourse becomes unrestricted by the ditch along the trail edge, it flows from west to east as a very poorly defined system, with patchy slough sedge and soft organics indicating the direction of water flow. The poorly defined nature of the watercourse continues up to the next trail crossing, where it is directed underneath the trail via a culvert. Upstream of the trail crossing, the gradient increases (up to 15%) and the watercourse becomes relatively well defined. Despite a lack of water during the assessment, the cobble substrate in this area indicates significant water flow during a "normal" late fall period.

The watercourse becomes confined in a ditch adjacent to the edge of a trail, where it displays evidence of high flashy flows and resultant channel instability. The watercourse flows over the Spasm Chasm trail for a distance of approximately 30 m, where seasonal water flow was evidenced during the assessment from scour and deposits of alluvial material. Where the watercourse leaves the trail surface, it becomes confined in a high-sided ditch parallel to the edge of the trail. Sections of the ditch are very unstable, with pronounced down-cutting from flashy flows, which have created high, unstable banks and accumulations of woody debris.

Up slope of the Spasm Chasm trail, the gradient of the watercourse increases again (up to 25%), with an associated increase in channel confinement through confined draws. The watercourse flows over Lox's Bagel trail for approximately 10 m, where it is still well defined, with a cobble substrate. The gradient decreases close to the upper extent of the watercourse, with the source of the stream represented by a shallow depression close to the edge of the watershed. The watercourse splits into two poorly defined watercourses close to the source, which consists of a wide low-relief area at the height of land. At the source, patches of slough sedge occur in depressions surrounded by an otherwise dry young forest ecosystem dominated by Douglas-fir.

Tributary 1-1 represents a poorly defined watercourse. Evidence of scour and minimal deposits of alluvial material indicate the presence of seasonal water flow at the confluence point. Based on a lack of indicators and no apparent channel definition, the stream could not be identified for a distance of approximately 50 m immediately upstream of the confluence. This section has been indicated on Figure 5. Where the gradient increases upslope of this area, the watercourse becomes relatively well defined, although sections are very difficult to identify through lower gradient segments.

The watercourse crosses Northwind Trail, before flowing through a steep draw up to the source. The origin of the watercourse consists of a wide depression close to the height of land, comprising of young Douglas-fir and red alder. The bankfull width of the watercourse does not exceed 1.5 m.

It is assumed that Tributary 1 connects with the partially mapped tributary completed by Mimulus (2012). Based on a lack of fish habitat attributes, it is extremely unlikely that the mapped section of Tributary 1 contains fish, even on a seasonal basis. The confluence of this tributary with the main-stem was observed while the previously mapped section of Beulah Creek was checked for other unmapped tributaries. It should be noted that the confluence does not occur on the property that could not be accessed. At the confluence, the stream is well defined and represents potential fish habitat. Where it flows through the low-relief young forest close to the mapping start point, it is reasonable to assume that fish do not occur due to a complete lack of habitat attributes. In addition, there are no sections of the stream that would support resident fish, based on a lack of perennially-available habitat.

The upstream extent of available fish habitat from the Beulah Creek confluence upstream could not be assessed, as the remainder of the previously mapped portion of

the stream flows through the property that could not be accessed. At the very least, the stream represents a significant tributary to the Beulah Creek system. Apart from the minimal areas where walking trails parallel the watercourse, riparian vegetation consists of continuous forests adjacent to both banks. The stream will, therefore, contribute water and nutrients to the Beulah Creek system.

3.2.1.3 Tributaries 2, 3, 4, and 5

Tributaries 2, 3, and 4 represent very poorly defined watercourses. Shallow surface flow over an organic substrate characterizes the morphology of the streams. The watercourses were followed up to a point where no further evidence of scour or hydrophytic vegetation could be detected. These watercourses will contribute water and nutrients to the Beulah Creek main-stem, but it is very unlikely that fish are present (even on a seasonal basis), due to a lack of habitat attributes.

Tributary 5 joins Beulah Creek close to the upper edge of the watershed. It is similar to Tributaries 2, 3, and 4 in morphology. The watercourse flows over an organic substrate through slough sedge and originates in a moist depression consisting of red alder, slough sedge and dense sword fern. The lower segments of the stream have the potential of supporting fish, at least on a seasonal basis. The bankfull widths of Tributaries 1 – 5 do not exceed 1.5 m.

3.2.1.4 Unconnected Watercourse

This watercourse was located while traversing the watershed to check for streams that could have been missed in the low-gradient area to the west of the inaccessible property. The watercourse is defined at the Coltsfoot trail crossing, where it flows parallel to the trail as a wide (approximately 1 m) ditch. Immediately downslope of the trail, the ditch is no longer defined. The watercourse was dry during the assessment, but it appears that any water in the system dissipates over the forest floor in the low-gradient area to the east of the trail. Despite searching for a defined channel, or any evidence of scour downslope of the trail, no watercourse could be identified.

Despite the fact that no connectivity with either Beulah Creek or any other tributary could be detected, the watercourse was mapped upstream from the point where evidence of surface flow could be identified. At the very least, the watercourse will provide water on a seasonal basis to the Beulah Creek main-stem, albeit via a sub-surface route or via convoluted surface flow over the forest floor.

The watercourse flows parallel to the Coltsfoot trail prior to flowing over the trail surface, where evidence of scour and alluvial deposits occur. Further upslope, the watercourse becomes more defined adjacent to Slick Rock trail, at which point it contained surface-flowing water (very minimal) during the field assessment. Up slope of the trail, the watercourse steepens over bedrock, where it is confined through narrow draws. The watercourse crosses Northwind trail via a plastic culvert, where it is well defined. The source of the watercourse consists of a wide, flat area close to the height of land, with young red alder, western redcedar and Douglas-fir occurring.

3.2.1.5 Southern Sub-basin Tributary Extension

While checking the southern portion of the study area for watercourses connecting to the previously mapped tributary along the southern edge of the watershed, it was discovered that the tributary extends further than the upper extent indicated on the pre-existing mapping layer. The mapped addition to the watercourse consists of a well-defined channel in places, with evidence of scour and alluvial deposits indicating the presence of surface-flowing water. Where the gradient increases, the channel becomes confined, with an associated increase in channel definition. These steeper segments consist of large gravel and cobble, indicating high energy seasonal flows. The watercourse was followed up to a point where no further evidence of seasonally-flowing water could be identified. The bankfull width of the watercourse did not exceed 1.5 m throughout the mapped segment.

Based on the gradient (in excess of 20% in places), a lack of habitat attributes and absence of perennially-available habitat, it is very unlikely that the mapped segment of the stream will support fish, even on a seasonal basis. As indicated by the previous mapping completed by Mimulus (2012), this tributary connects with Beulah Creek and will provide water and nutrients to the main-stem. The Mimulus report (2012) also indicates that this tributary (albeit in the lower reaches close to Beulah Creek) represents “marginal to good” fish habitat.

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Figure 3: Beulah Creek Watershed

PROJECT:
Hornby Island Riparian Area
Stream Mapping

CLIENT:
Islands Trust

MAP SCALE:	MAPPING DATE:
1:10,000	December 18, 2013
DOSSIER NO:	DRAWN BY:
13.0315	Anna Riionheimo

LEGEND

- Watershed Boundary
- Streams (10m SPEA under detailed RAR Assessment based on bankfull width)
- Not field verified due to lack of access permission
- Previous stream mapping data (Mimulus 2012)
- Wetlands from previous stream mapping data

Onstream Ravine Extents
- Upstream
- Downstream

Base Symbols
- Parks and Protected Areas
- Roads
- Properties
- Inaccessible property (no access permission)

0 100 200 400 m.

Beulah Creek
Tributary 5
Tributary 1
Tributary 4
Tributary 2
Tributary 3
Tributary 1-1
Assumed location of surface flow during high flows
Unconnected watercourse
Southern Sub-basin Tributary Extension
Solans Road
Roburn Road
Central Road
Mary Road
Ostby Road
St Johns Point Road
Shields R
Slade Road
Seawi

3.2.2 Potential RAR Watershed 1 – Figure 4

Where the watershed outflow stream enters the ocean, it flows as a narrow, shallow watercourse over a sand beach. At the natural boundary of the marine environment, it was difficult to define a stream channel as water flow was within dense reed canary grass (*Phalaris arundinacea*) beds and an accumulation of drift wood. Mapping of the watercourse was initiated immediately upstream of the freshwater-marine interface where a definitive channel was observed.

The lower portion of the watercourse lacks natural sinuosity where it flows adjacent to Carling Road through a deep (approximately 1 m), incised channel. The morphology of the watercourse is consistent with that of an excavated ditch. Where the watercourse flows adjacent to Carling Road, it possesses an average bankfull width of 1.5 m.

Further upstream, the watercourse flows under Anderson Road and along the boundaries of three residential properties. The morphology of the upper reach remains consistent with that of a deep (up to 1.5 m deep) constructed ditch. The bankfull width of the channel is consistent and does not exceed 2 m. As the watercourse consists of significant headwaters (extensive wetland), it is defined as a "stream" as opposed to a "ditch" under the RAR. The watercourse may represent a natural channel that has been historically modified (*i.e.,* deepened and straightened).

Along the entire length of the drainage, riparian vegetation is composed mainly of grasses and slough sedge; however, several Douglas-fir, western redcedar and red alder were also documented. Substrate throughout the ditch is composed entirely of organic materials (*i.e.,* decomposing leaves and woody debris).

The watercourse was mapped up to the headwaters, which is a wetland complex composed of hydrophytic vegetation and open water habitat. The wetland is approximately 50 m wide and 250 m long. Within the wetland, vegetation is dominated by Red-osier dogwood (*Cornus stolonifera*), willows (*Salix spp.*), and slough sedge. Along the riparian fringe, the tree layer is composed mainly of red alder. Shrubs noted at the time of the assessment included: baldhip rose (*Rosa gymnocarpa*), evergreen blackberry (*Rubus laciniatus*), and willows. Sword fern dominates the herb layer within the riparian fringe.

It is likely that this watercourse only contains water seasonally, based on retention of stormwater by the headwater wetland during the winter months. This system represents low quality fish habitat as there is a lack of spawning areas (*i.e.,* alluvial

substrate) and the flow regime is seasonal. However, due to the fact there is no definitive barrier (*i.e.*, high gradient slope) at tidewater to prevent upstream migration of fish, there remains the potential for anadromous fish species to enter the watercourse.

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Figure 4: Potential RAR Watershed 1

PROJECT:
Hornby Island Riparian Area
Stream Mapping

CLIENT:
Islands Trust

MAP SCALE:	MAPPING DATE:
1:2,500	December 18, 2013
DOSSIER NO:	DRAWN BY:
13.0315	Anna Riionheimo

LEGEND

Watershed Boundary

Streams (10m SPEA under detailed RAR Assessment based on bankfull width)

Wetlands Observed in Field

Wetland

Base Symbols

Parks and Protected Areas

Roads

Properties

N

0 15 30 60 90 120 m.

3.2.3 Potential RAR Watershed 2 – Figure 5

At the tidal boundary, the stream flows over a bedrock ledge (approximately 1 m in height) and onto a cobble beach. During periods of high stream flows and high tides this feature would likely be passable for anadromous fish species. The lower reaches of the creek flow through mature forest, with red alder, western redcedar and Douglas-fir dominating the tree layer. Pacific ninebark (*Physocarpus capitatus*) and salmonberry (*Rubus spectabilis*) compose a dense shrub layer that extends up to the high water mark of the stream. This vegetation on both banks of the creek is intact and providing proper biological function.

Runs and glides dominate the stream morphology, which is characteristic of a riffle-pool system. Throughout the lower reaches, the stream bed is composed of alluvial substrate in the form of small cobbles and gravels. The stream exhibits a low gradient (3%) and is up to 2.3 m wide in the lower reaches downstream of the Harwood Road crossing. At Harwood Road, the stream flows through a closed metal pipe with a diameter of approximately 800 mm.

Upstream of Harwood Road, the stream flows through a residential property and splits near the southeast property corner. The West Fork of the stream has been subjected to anthropogenic influences. The channel has been historically excavated and straightened, with the morphology currently consistent with that of a ditch. Manicured lawn extends up to the high water mark of the creek and functioning riparian vegetation is lacking.

The East Fork of the watercourse is approximately 50 m — 60 m in length, flows in a northerly direction along the eastern boundary of the property and has been ditched adjacent to Harwood Road. Water flows through the roadside ditch for approximately 25 m before re-converging with the West Fork at Harwood Road. The morphology of the East Fork is also typical of a historically straightened/excavated ditch (*i.e.,* straight with a uniform channel depth) and the bankfull width ranges between 1 m and 1.4 m over its length. The watercourse also forms a boundary between two residential properties.

At the time of the assessment the East Fork contained minimal flow, and at the very least will supply the West Fork of the stream with nutrients and water. The East Fork of the watercourse represents marginal fish habitat; however, there is potential for fish to gain access during periods of high flow.

Near Brigantine Crescent, the stream meanders through an intact Douglas-fir/western redcedar forest. Fish habitat potential increases throughout this section of the stream due to the diversity of the habitat. This portion of the stream is dominated by runs and glides, which provide potential for spawning. Also, several large pools with abundant LWD were documented and will provide suitable security habitat for fish. At Brigantine Crescent the stream is directed under the road via a 600 mm closed metal pipe. This culvert does not appear to be a barrier to the upstream movement of fish.

The middle reaches of the stream, between Brigantine Crescent and Gunpowder Trail flow through a series of residential properties. At Gunpowder Trail, the stream flows through a roadside ditch for approximately 30 m. The morphology of the stream and characteristics of the riparian zone change significantly. The quality of habitat and potential for fish to inhabit the middle reaches is low as the stream has been historically subjected to anthropogenic influences. On average, the bankfull width of the channel is 1.2 m and the gradient is between 2% and 4%. Substrate throughout the middle reaches is composed mainly of organic materials; however, pockets of gravel were noted in areas with high velocity flow (*i.e.,* the Gunpowder Trail roadside ditch).

Riparian vegetation is lacking throughout the middle reaches and in most cases manicured lawn extends up to the high water mark of the stream. On the southern-most property, two ponds have been created by excavating the stream channel. Each of the ponds is approximately 5 m wide by 5 m long and 2 m – 3 m deep. Anecdotal evidence suggests that the ponds were created to provide a continuous source of water for livestock.

Upstream of the ponds, the stream exhibits a low gradient (2% – 3%) and flows through a mature mixed forest for approximately 150 m. Dominant tree species include Douglas-fir, western redcedar and red alder. Dull Oregon-grape (*Mahonia nervosa*), salal (*Gaultheria shallon*) and red huckleberry (*Vaccinium parvifolium*) dominate the shrub layer. Herb growth is extensive and composed almost entirely of sword fern.

The upper reaches of the stream represent low quality fish habitat. Channel definition is lacking and portions of the stream flow under tree roots. Organic substrate persists throughout the upper reaches and there were no signs of scour or alluvial deposits.

At the southern extent of the watercourse, the headwaters are represented by an expansive sedge (*Carex* sp.) wetland. The wetland is approximately 25 m wide and 75 m long and confined to the east, south and west by elevated ridges.

Overall, this system represent low quality fish habitat. However, due to the fact there are no definitive barriers (*i.e.,* high gradient slope) at any point along the stream to prevent upstream migration there remains potential for anadromous fish species to enter the drainage. The most suitable fish habitat exists in the lower reaches of the drainage as there is potential spawning areas (*i.e.,* alluvial substrate) and rearing habitat (*i.e.,* pool habitat units).

3.2.3.1 Tributary 1

Tributary 1 joins the main-stem on the left bank, approximately 250 m upstream of Gunpowder Trail. This watercourse flows in a northeasterly direction through a young red alder forest and dense "blankets" of slough sedge. The channel exhibits a low gradient (3% slope) and possesses an average bankfull width of 0.5 m. Over its length, substrate within the drainage is composed entirely of organic materials.

This watercourse was mapped for approximately 150 m, up to a point where access was prohibited by a property owner. It was noted that the drainage continued on an adjacent property to the southwest of the termination point. Anecdotal evidence indicates that the drainage channel was excavated as a measure to deal with storm water run-off. This watercourse represents poor quality fish habitat as it is likely ephemeral and lacks suitable spawning and rearing habitat.

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Figure 5: Potential RAR Watershed 2

PROJECT:
Hornby Island Riparian Area
Stream Mapping

CLIENT:
Islands Trust

MAP SCALE:	MAPPING DATE:
1:2,500	December 18, 2013
DOSSIER NO:	DRAWN BY:
13.0315	Anna Riionheimo

LEGEND

- Watershed Boundary
- Streams (10m SPEA under detailed RAR Assessment based on bankfull width)

Wetlands Observed in Field

- Pond

Base Symbols

- Roads
- Properties

N

0 15 30 60 90 120 m.

3.2.4 Potential RAR Watershed 3 – Figure 6

At the natural boundary of the marine environment, the main watercourse flows over a gravel/cobble beach and into the ocean. Immediately upstream of the confluence with the ocean, the stream flows through a steep sided ravine. The first 20 m – 25 m of the drainage exhibits a low gradient (2% slope) and is up to 3 m wide (bankfull width). In the upper portion of the ravine, the stream channel becomes more confined and is approximately 1.5 m to 2 m wide. The vegetation growing on the ravine walls is contributing biological function by providing bank stability, nutrient input, LWD and shade. Tree growth is composed of both mature and young Douglas-fir, western redcedar and red alder.

The channel morphology throughout the lower reaches of the stream is consistent with a riffle-pool system. The diversity of habitat throughout the lower reaches of the stream provides potential fish habitat, as glides and pools were noted.

Upstream of the ravine, the stream flows through a residential property and has been altered through extensive levels of vegetation removal and channel manipulation (*i.e.*, re-direction). Manicured lawn extends up to the high water mark and in some cases down into the stream bed. Morphology of the stream remains similar to the lower reaches; however, the substrate compositions shifts from alluvium to organic materials.

In the south-central portion of the residential property, the stream is directed under an access road via a 400 mm culvert. At the southern boundary of the property a dam system has been installed to regulate the flow of water. During periods of low flow, water will be retained behind the dam and provide water for domestic use (*i.e.*, irrigation). At the time the stream was traversed, water withdrawal lines were observed within the stream. The dam structure would not represent a definitive barrier to upstream migration by anadromous salmonids as it would be passable, particularly during high flows.

At the dam structure the stream forks, forming a secondary channel (West Fork) that flows to the northwest and drains into the ocean. On the West Fork, a second dam structure exists. Downstream of the dam, the watercourse comprises a low-gradient (between 3% and 5% slope) and has an average bankfull width of 1.3 m. The channel morphology is consistent with that of a historically straightened watercourse, and portions of the right bank have been stabilized using rip-rap. The watercourse has been excavated through a mixed forest. Dominant tree species include red alder,

Douglas-fir and western redcedar. Salmonberry and sword fern were noted as being the dominant shrub and herb species within the riparian zone of the ditched section.

Over the length of the watercourse, substrate is composed of a mixture of organic materials and gravel. At the natural boundary of the marine environment, the West Fork flows down over a moderately steep (40% – 45% slope) ledge and over the cobble beach. This ledge represents a barrier to the upstream migration of anadromous fish species from the ocean.

Due to the fact the West Fork is likely ephemeral, there is a lack of spawning and rearing habitat and water levels are somewhat regulated by the dam system, the quality of fish habitat is poor. The only potential for fish to enter the West Fork is if they migrate up the main fork and water levels are optimal to pass down over the dam.

The middle reaches (between the dam structures and Savoie Road) of the main fork of the stream flow through a young forest which is composed mainly of Douglas-fir, red alder, salmonberry and sword fern. Portions of the stream bank also contain dense slough sedge growth. This riparian vegetation is providing proper biological function in the form of bank stability, shade, insect drop and LWD.

The channel morphology within the middle reaches is consistent with that of a historically straightened watercourse. The channel is linear and consistent with respect to width (average bankfull width of 1.25 m) and depth (up to 1 m deep). The middle reaches of the stream exhibit low gradient and range between 3% and 5% slope. Approximately 50 m downstream of Savoie Road, the stream flows into a constructed (approximately 10 m wide and 15 m long) ditch under a residential access road via three 400 mm culverts. At Savoie Road, the stream flows through a woodbox culvert that is approximately 2 m wide. The culvert is partially overgrown with vegetation; however, it does not represent a barrier to upstream fish migration.

Upstream of Savoie Road, the stream flows through a portion of a residential property that is composed of an undisturbed mature forest, dominated by western redcedar and Douglas-fir. Dull Oregon-grape and salal were also noted as being abundant. This section of the stream is characteristic of a riffle-pool system. The channel contains spawning gravel and several pools with undercut banks and LWD. Within this section of the stream, the bankfull width ranges between 1.5 m and 2 m.

Immediately upstream of the forested ecosystem, the stream has been extensively altered through the creation of two ponds and installation of a 3 m – 4 m high rock waterfall, which is a barrier to the upstream movement of fish. Each pond is approximately 5 m wide and 10 m long. It was not possible to determine the exact depth of the ponds at the time of the assessment; however, it appeared as though the water level was approximately 2 m deep. Riparian vegetation is lacking and either manicured lawn or areas of exposed soil extend up to the edge of the watercourse. Mapping was ceased in the middle portion of this property at the request of the property owner. Preliminary observations indicated that the quality of habitat throughout the impacted area was poor.

Mapping of the watercourse resumed to the south of Central Road for approximately 100 m, through a sedge wetland and was ceased at a point where evidence of surface water flow could no longer be identified. The termination point coincided with an elevation increase.

No definitive barriers were located on the main-stem, downstream of Savoie Road. The diversity of fish habitat decreases in the upper-most reaches of the watershed, based on the historical and recent modifications to the watercourse. The most likely segments of the stream to support fish occur in the lower reaches, downstream of Savoie Road.

3.2.4.1 Tributary 1

Tributary 1 enters the main-stem creek on river left, immediately downstream of the Savoie Road crossing. At the confluence, the watercourse flows down over a gravel ledge of approximately 7% – 8% slope. Immediately upstream of the ledge, the watercourse represents a well-defined roadside ditch as it flows in a northerly direction along Savoie Road. Along the assessed length, the ditch ranges between 0.85 m and 1.1 m and the substrate is a mixture of small gravel and organic material. Near Central Road, the ditch channel is inconspicuous as it flows through a dense blanket of reed canary grass.

Tributary 1 can be classified as having poor habitat potential for fish. The watercourse will only contain water after heavy rainfall events and dense vegetation growth likely makes the upper portion of the ditch is inaccessible. Mapping of this drainage was terminated at Central Road.

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Figure 6: Potential RAR Watershed3

PROJECT:
Hornby Island Riparian Area
Stream Mapping

CLIENT:
Islands Trust

MAP SCALE:	MAPPING DATE:
1:3,000	December 18, 2013
DOSSIER NO:	DRAWN BY:
13.0315	Anna Riionheimo

LEGEND

- Watershed Boundary
- Streams (10m SPEA under detailed RAR Assessment based on bankfull width)
- 5m. (Potentially Fish-Bearing Ditch)
- Not field verified due to lack of access permission

Onstream Ravine Extents
- Upstream
- Downstream
- Barrier

Wetlands Observed in Field
- Pond

Base Symbols
- Roads
- Properties
- Inaccessible property (no access permission)

N

0 15 30 60 90 120 m.

4.0 DISCUSSION AND RECOMMENDATIONS

Stream mapping performed in the target watersheds on Hornby Island resulted in the identification of approximately 9 km of streams that are applicable to the provincial RAR process. Connected wetlands, lakes and ponds located along each mapped stream are also applicable to the RAR.

While there may be no documented fish occurrence, potential fish habitat (albeit marginal) occurs in the outlet streams associated with the three "potential" RAR watersheds. As a result, these watersheds were included in the mapping process. Based on habitat conditions described in the Mimulus report (2012), habitat encountered in the upper Beulah Creek watershed and anecdotal evidence contained in the Mimulus report (2012), Beulah Creek represents the best fish habitat in any of the mapped watersheds.

Due to the RAR methodology, any watercourses that connect by surface flow to potential fish bearing systems, including modified watercourses and ditches, are subject to the regulation. A stream may not itself be inhabited by fish, but if it has a reasonable connection by surface flow to fish habitat, it is considered a stream under the RAR.

All streams were mapped for inclusion into appropriate bylaws to be set up by Islands Trust to allow conformance with the provincial RAR process. The edges of lakes, wetlands and ponds located along the stream traverses were not mapped in the field as part of the assessment process, but the edges were delineated using field observations and orthophoto interpretation. It is important that these features are included as RAR-applicable water bodies.

All efforts were made to establish a complete representation of the stream network in each of the target watersheds. It should be noted that lack of access permission prevented the mapping of certain areas. In all cases, areas that could not be mapped were identified on the mapping layers, and efforts were made to map the streams using contour and imagery analyses. In some instances where low-magnitude streams were being mapped in the Beulah Creek watershed, the dry conditions and lack of surface flow made it difficult to identify the location of streams, especially through low gradient areas.

As part of the project scope, bankfull widths were measured on each applicable stream to help determine the width of the SPEA under the RAR methodology (using the detailed assessment methodology). This information can be used by Islands Trust

as a planning tool to help implement bylaws that "meet or beat" the RAR. If this option is chosen, it is important to note that any bylaw that is set up would need to account for the fact that under the detailed RAR assessment methodology, a suite of measures are considered that help ensure the integrity of the SPEA during development activities. These measures include, but are not limited to: slope stability; erosion and sediment control; encroachment; management of danger trees; and windthrow.

Based on the low-magnitude of the streams throughout all the assessed watersheds and the measured bankfull widths, all mapped streams would be associated with 10 m SPEAs under the Detailed Assessment. No bankfull measurements were completed for those areas of the Beulah Creek watershed that had previously been mapped by Mimulus (2012). The level of detail contained in the Mimulus report (2012) appears sufficient to determine SPEA widths and to implement planning measures in the previously mapped areas.

It should be noted that the vast majority of mapping that was completed for Beulah Creek occurred throughout a regional park (Mt. Geoffrey Nature Park). The RAR would not currently apply to this park area, but future land use may change. In places, the mapped tributaries (e.g. Tributary 1) become part of the trail system, with water flowing over the trail surface.

One potential planning opportunity would be to add depth to the edge of the minimum SPEA DPA boundary (*i.e.,* increasing the DPA beyond the widths that have been provided in this project). This would help ensure the integrity of the setback area is maintained in the absence of detailed assessment measures. Landowners could then be given the opportunity to have a detailed assessment completed by a QEP if they were not prepared to accept the default bylaw riparian setback. If the default "meet or beat" setback option is accepted by a landowner, a site visit by a planner, building inspector or QEP may be required to ensure that the setback is being maintained and is being measured from the correct location. If a landowner chooses to complete a detailed assessment by a QEP, the precise location of the HWM and SPEA would be identified as part of the reporting procedure.

Setting up permanent riparian setbacks that would "meet or beat" the RAR would also need to take into account the fact that numerous riparian areas are currently developed, or encroached upon. Landowners should be encouraged to enhance riparian areas, especially adjacent to sensitive areas, or areas that are experiencing erosion due to the removal of riparian vegetation.

It is important that landowners are aware of the benefits of riparian areas. Landowners adjacent to streams often do not realize the financial incentives of maintaining a functioning riparian zone. For example, intact riparian vegetation can help prevent lateral bank movement, thus protecting valuable property from erosion. Potential hazards associated with flooding can also be ameliorated as a result of maintaining a functioning riparian area.

The SPEA dimension data could also be used to educate the public about the extent of riparian setbacks should 30 m DPAs be set up, which represents the maximum extent of the Riparian Assessment Area (RAA). Any new development proposed within any RAA would trigger the completion of a detailed assessment under the RAR methodology. In the case of all the assessed watersheds, SPEAs would be 10 m throughout, based on the low stream magnitude and corresponding bankfull widths.

Under the detailed assessment, wetlands and lakes that either provide fish habitat or connect by surface flow to fish habitat receive either a 30 m or 15 m setback, depending on aspect. Southern edges of wetlands and lakes are associated with 30 m setbacks, based on the function of shade, where-as north, west and east banks are associated with 15 m setbacks. In some cases where smaller ponds and wetlands are located on a main stream channel, a Qualified Environmental Professional may decide that the feature is part of the lotic system as opposed to being a separate lentic system. In such cases, the pond or wetland may be associated with the SPEA derived for the stream under the Detailed Assessment, as opposed to the default 15 m or 30 m setbacks associated with ponds and wetlands.

One ditch was identified during the assessment – Tributary 1 in potential RAR watershed 3. This ditch represents potential fish habitat, and also connects to a potentially fish bearing watercourse. As a result, the ditch is associated with a SPEA under the RAR. The identified ditch is a constructed waterway, with no significant headwaters or springs.

Under the RAR, fish bearing ditches can receive SPEAs up to a maximum width of 10 m (based on ditch width). The SPEA indicated for the ditch in this report is based on the average width of the ditch and the SPEA dimensions shown in the RAR Assessment Methodology for fish-bearing ditches. Based on the fact that ditches are associated with narrower SPEAs, the DPA that is implemented by Islands Trust could be less than the DPA associated with watercourses that are not classified as ditches.

The scope of the project involved the identification of stream centre lines. Under the RAR methodology, the RAA is measured as a horizontal distance from the TOB or TORB, where-as the SPEA is measured from the HWM. In the case of wetlands, lakes and ponds, the RAA and SPEA are measured as a horizontal distance from the HWM. During the fieldwork, the lateral extent of ravines was identified, in order to identify those sections of streams where the RAA (or DPA) would extend back from the TORB. In the case of wide ravines that exceed a width of 60 m, the RAA extends from the HWM to a point that is 10 m back from the TORB; ravines that are less than 60 m wide are associated with a RAA that extends 30 m beyond the TORB from the HWM. The scope of the project did not include surveying the width of ravines.

A means of addressing the issue of recognizing the TOB, TORB, or HWM at the bylaw implementation stage would be to ensure that any proposed development that is close to a point that is 30 m from the stream would trigger site specific confirmation. On extensive acreages, it would be a relatively straightforward task to determine whether the proposed development occurs within a DPA. Smaller properties may require a site visit by a building inspector, planner or QEP to determine whether the proposed development occurs within a DPA.

It is worth noting that farming activities are not subject to the RAR, but are subject to the federal Fisheries Act. The RAR does apply, however, to non-farming activities on ALR land.

The RAR does not apply to existing land uses and structures, as these are considered legally non-conforming. Any new developments inside a previously developed SPEA or RAA would trigger the RAR, and the new development would be subject to the RAR. Enhancement of riparian areas using appropriate techniques (e.g. replanting with native vegetation to stabilize banks) is encouraged in previously impacted riparian areas.

As part of the RAR bylaw planning and implementation phase, Islands Trust should liaise with the provincial government. Liaison with appropriate government personnel will help ensure that the bylaws that are enacted meet or beat the standards of the RAR.

If you have any questions or comments about the mapping project, please do not hesitate in contacting the undersigned.

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5.0 REFERENCES

Mimulus Biological Consultants. 2012. RAR Stream Identification of the Ford Creek and Lower Beulah Creek Watersheds.

Pitt, S and Bryden, G. Denman and Hornby Islands Water Allocation Plan. 1994. Regional Water Management, Vancouver Island Region, Nanaimo, BC.

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APPENDIX I – PHOTOS

Beulah Creek Watershed
Beulah Creek main-stem

Typical characteristics of Beulah Creek at the mapping start point (Coltsfoot trail crossing) – looking upstream.

Looking upstream along the middle segment of the mapped portion of Beulah Creek.

Typical characteristics of the upper segments of the mapped portion of Beulah Creek. Note poorly defined channel morphology and shallow surface flow over an organic substrate.

Dense sword fern and slough sedge at the source of Beulah Creek.

Tributary 1 and Tributary 1-1

Shallow surface flow through sword fern indicating the characteristics of Tributary 1 at the point where mapping commenced.

Looking downstream from the first trail crossing over Tributary 1. Note well defined ditch banks merging into a poorly defined channel in the low gradient forested ecosystem downstream.

Looking downstream along the ditch branching to the north from the main Tributary 1 ditch line.

Looking upstream along the ditch pictured above at the crossing under the trail. Note well defined ditch banks.

Looking downstream along the ditch pictured above. Note lack of channel definition beyond the ditched section.

Looking upstream along Tributary 1 where it is ditched immediately upstream of the first trail crossing.

Looking upstream along Tributary 1 where it is not confined along the trail in a ditch. Note poorly defined channel morphology and minimal surface flow through slough sedge.

Looking upstream along Tributary 1 immediately upstream of the Coltsfoot trail crossing.

Looking upstream along Tributary 1 where it flows adjacent to a trail.

Looking upstream along Tributary 1 where it flows over Spasm Chasm trail.

Looking upstream along Tributary 1 where it flows in a high-sided ditch parallel to Spasm Chasm trail.

Looking upstream along Tributary 1 upstream of Spasm Chasm trail. Note channel/bank instability and evidence of high, flashy flows.

Looking upstream along Tributary 1 upstream of Lox's Bagel trail.

Patchy slough sedge in a depression close to the height of land represents the source of Tributary 1.

Tributary 1-1

Looking downstream along the middle segment of Tributary 1-1.

Looking downstream along Tributary 1-1 where it flows through a narrow draw immediately upstream of the Northwind trail.

Looking upstream along Tributary 1-1 at the Northwind trail crossing.

Wide flat area close to the height of land represents the source of Tributary 1-1.

Tributary 2

Looking upstream along Tributary 2 close to the confluence with Beulah Creek. Note poorly defined channel morphology and shallow surface flow over an organic substrate.

Tributary 3

Looking downstream along Tributary 3 at the confluence with Beulah Creek.

Tributary 4

Looking upstream along Tributary 4 close to the confluence with Beulah Creek.

Tributary 5

Looking upstream along Tributary 5 close to the confluence with Beulah Creek. Note shallow surface flow through slough sedge over an organic substrate.

Slough sedge and patches of sword fern and surrounding red alder represents the source of Tributary 5.

Unconnected Watercourse

Looking upstream along the watercourse where it is defined in a ditch adjacent to Coltsfoot trail.

Looking downslope from the defined ditched segment of the watercourse towards the moist, flat forest where water from the drainage appeared to dissipate.

Looking upstream along the watercourse where it flows over Coltsfoot trail.

Looking upstream along the watercourse where it flows adjacent to (and over) the Slickrock trail surface. Note surface flowing water (albeit minimal) and cobble substrate.

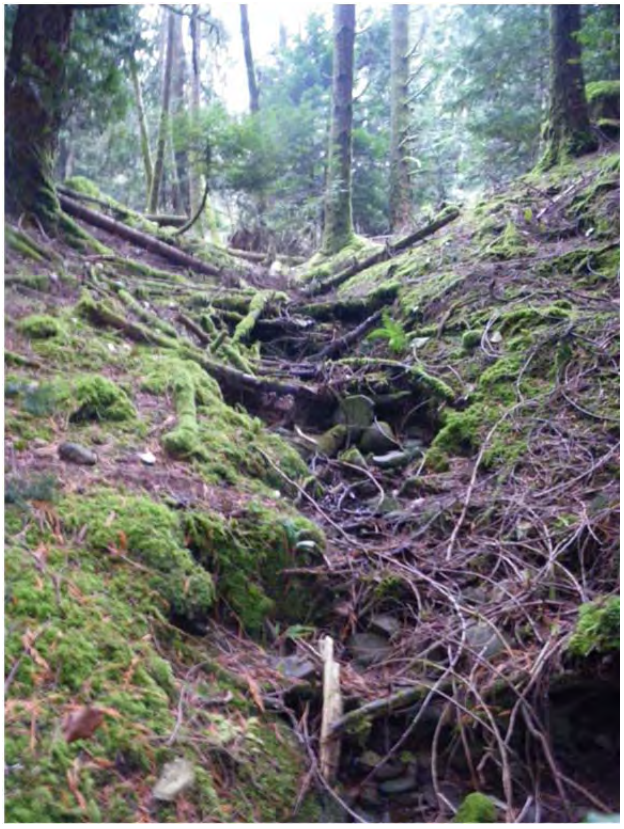
Looking upstream along the watercourse where it is defined adjacent to Slickrock trail.

Looking upstream along the watercourse upslope of Slickrock trail.

Moist depression with red alder, western redcedar and Douglas-fir represents the source of the watercourse.

Southern Tributary Sub-basin Extension

Looking upstream along the mapped extension of the tributary. Note relatively well defined channel and alluvial deposits.



Looking upstream along a higher gradient segment of the mapped extension of the tributary. Note cobble substrate, which indicates high energy seasonal flows.

Potential RAR Watershed 1

Looking upstream from the natural boundary of the marine environment. Note the accumulation of drift wood and dense reed canary grass growth.

Looking downstream at the subject drainage. Note the channel morphology, which is consistent with that of a constructed ditch.

Looking upstream at the headwaters of the subject drainage. This wetland contains a component of both open water habitat and densely vegetated areas.

Potential RAR Watershed 2

Looking east at the area where the stream flows into the intertidal habitat near Hidden Beach Park.

Typical channel morphology of the lower sections of the stream. Note the channel definition and alluvial substrate.

Looking downstream at the channel morphology of the East Fork of the drainage. Note the straight channel and excavated sidewalls, which are typical of ditches.

Looking west at the area where the East Fork flows through a roadside ditch immediately upstream of its convergence with the West Fork of the stream.

A photo depicting the anthropogenic influence on the subject stream. Note the lack of biologically functioning riparian vegetation, a common observation where the stream flows through residential areas.

Looking north at a portion of the stream which was excavated, forming a pond. Anecdotal evidence indicated this pond was constructed to provide a viable source of water for residential use.

Looking northwest from the high water mark of the slough sedge wetland, which is the headwaters of the watershed. Throughout this area channel definition is lacking and organic substrate dominates.

Tributary 1

The confluence of Tributary 1 and the main drainage channel. Note Tributary 1 flows from the southwest.

A photo depicting the general channel morphology of Tributary 1 throughout the assessed area. The upper section of Tributary 1 displays evidence suggesting that it is a constructed watercourse.

Potential RAR Watershed 3

Looking southeast from the natural boundary of the marine environment. Note the placement of boulders, cement and sandbags for the purpose of stabilizing the bank.

Looking south (upstream) at the stream as it nears Savoie Road.

Looking south at a dam system that was likely installed for the purpose of retaining water in particular areas of the stream to provide a water source for residential use.

Looking north (downstream) at the West Fork of the stream, which was excavated as a drainage ditch. Note the consistent depth and width of the channel.

Looking north at the area where the West Fork of the stream flows into the ocean. The drainage flows over a moderately steep ledge and is extensively overgrown.

Looking upstream at the culverts that direct the stream under a residential access road.

Tributary 1

The confluence of Tributary 1 with the main stem of the stream. Note that Tributary 1 is the watercourse in the foreground of the photo.

Tributary 1 flows north, adjacent to Savoie Road and possesses channel morphology typically observed in roadside ditches.