A NOTICE OF A BUSINESS MEETING OF **THE HORNBY ISLAND LOCAL TRUST COMMITTEE**
to be held at 11:30 am on Friday, June 6, 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 April 25, 2014 – *for adoption*	1-11	
3.2	Local Trust Committee Special Meeting Minutes of May 28, 2014 – *for adoption to be distributed*		
3.3	Section 26 Resolutions Without Meeting - *none*		
3.4	Advisory Planning Commission Meeting Minutes		
4.	**BUSINESS ARISING FROM MINUTES**		
4.1	Follow-up Action List dated May 27, 2014 - *attached*	12-13	
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.*		
5.1	Letter dated April 19, 2014 from Hornby Island Conservancy to Fisheries and Oceans Canada regarding Geoduck Aquaculture - *attached*	14-15	
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 June 3, 2014 – *to be distributed*		

12.	**REPORTS**		1:15 pm
12.1	**Work Program**		
	12.1.1 Top Priorities Report and Projects Report dated May 27, 2014 - *attached*	16-18	
12.2	**Applications Log**		
	12.2.1 Report dated May 27, 2014 - *attached*	19-20	
12.3	**Trustee and Local Expenses**		
	12.3.1 Final Fiscal Year-End Expenditures to March 31, 2014 - *attached*	21	
12.4	**Policies and Standing Resolutions**		
	12.4.1 Report – *attached for information*	22	
13.	**NEW BUSINESS**		
13.1	New Federal Marihuana for Medical Purposes Regulation		
	13.1.1 Staff Report dated April 28, 2014 - *attached*	23-46	
13.2	Islands Trust/Islands Trust Fund Forage Fish Habitat Mapping – Hornby Island		
	13.2.1 Memorandum dated May 27, 2014 - *attached*	47-124	
14.	**BYLAWS**		2:00 pm
15.	**ISLANDS TRUST WEBSITE**		
15.1	Hornby Pages – *for discussion*		
16.	**NEXT MEETING DATE**		
16.1	Friday, July 11, 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.

Hornby Island
Local Trust Committee
Minutes of a Regular Meeting

Date of Meeting:	Friday, April 25, 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 four (4) members of the public-am Approximately two (2) members of the public-pm

1. CALL TO ORDER

Chair Graham called the meeting to order at 11:32 am. He welcomed the public and introduced himself, the Local Trustees, Staff and Recorder. He acknowledged that the meeting is being held in traditional territory of Coast Salish First Nations.

2. APPROVAL OF AGENDA

The following additions to the agenda were presented for consideration:

3.3.6 Advisory Planning Commission Draft Meeting Minutes dated April 16, 2014
3.3.7 Advisory Planning Commission Draft Meeting Minutes dated April 17, 2014
11.1.3 Staff Report regarding Land Use Bylaw dated April 21, 2014
11.1.4 Land Use Bylaw No. 150
13.4 Mount Geoffrey, Hornby Island: Wildfire Protection
Email from Trustee Law and Report
13.5 Local Trust Committee Submission for 2013/2014 Annual Report
Memorandum dated March 31, 2014
13.6 Email from Brian Brooke dated April 24, 2014 regarding Hornby Island Land Use Bylaw Draft for Comment Version 6.1
13.7 Economic Development Essentials for Local Government Leaders Workshop
14.2 Land Use Bylaw No. 150 cited as “Hornby Island Land Use Bylaw No. 150, 2014” – for consideration of first reading

By general consent the agenda was approved, as amended.

3. MINUTES

3.1 Local Trust Committee Meeting Minutes of March 14, 2014

The following amendment to the minutes was presented for consideration:

- Page 4, item 9, second bullet, second line: change “and one late ferry sailing” to “regarding a late ferry sailing”.

By general consent the Local Trust Committee meeting minutes of March 14, 2014 were adopted, as amended.

3.2 Section 26 Resolutions Without Meeting Log dated April 15, 2014

The Section 26 Resolutions Without Meeting Log dated April 15, 2014 was reviewed.

3.3 Advisory Planning Commission Meeting Minutes

3.3.1 Adopted Minutes dated March 25, 2014

3.3.2 Adopted Minutes dated March 27, 2014

3.3.3 Adopted Minutes dated April 7, 2014

3.3.4 Adopted Minutes dated April 9, 2014

3.3.5 Draft Minutes dated April 14, 2014

3.3.6 Draft Minutes dated April 16, 2014

3.3.7 Draft Minutes dated April 17, 2014

The Advisory Planning Commission (APC) meeting minutes were received and will be discussed in conjunction with the Land Use Bylaw (LUB) Review at agenda item 11.1.4. Trustees acknowledged the numerous hours of volunteer work by APC members to complete their Official Community Plan/Land Use Bylaw review and expressed their gratitude.

HO-2014-009
It was MOVED and SECONDED,
that the Chair be requested to write a letter of appreciation to the members of the Advisory Planning Commission.

CARRIED

4. BUSINESS ARISING FROM MINUTES

4.1 Follow-up Action List dated April 15, 2014

Planner Milne reviewed the Follow-up Action List dated April 15, 2014. Trustees noted the completion of most of the listed activities and recognized Planner Milne's work in this regard.

5. CORRESPONDENCE – None.

6. TRUSTEES' REPORT

Trustee Allen did not provide a report.

Trustee Law reported that since the last Local Trust Committee meeting he has been involved in numerous activities relating to ferry issues. He noted that these include participation in a special committee of the Association of Vancouver Island and Coastal Communities focusing on ferry-related socioeconomic impacts on the region and attending Union of BC Municipalities meetings. He noted that the Ferry Advisory Committee has been involved with discussions and research regarding the possibility of ensuring that some space on the 8:00 a.m. ferry from Denman West is available for vehicles coming from Hornby Island.

Trustee Law advised that BC Ferries has agreed to discuss some fine-tuning of the off-season schedules and has committed to delay the planned cancellation of the night watch position until after a consultation meeting with Emergency Services. He reported that he has organized a meeting with representatives of the Ferry Advisory Committee Chairs and the BC Ferry Commission to discuss the Islands Trust request that the BC Ferry Commission conduct a review of BC Ferries with respect to cost effective management.

7. CHAIR'S REPORT

Chair Graham remarked that he attended the Association of Vancouver Island and Coastal Communities Annual General Meeting which was held in Qualicum Beach in April. He reported that Executive Committee is working on plans for the next quarterly Trust Council meeting which will be held in June on Saturna Island. He advised that the Executive Committee has provided a response to the Department of Fisheries and Oceans Geoduck Integrated Framework Plan.

8. DELEGATIONS – None.

9. TOWN HALL SESSION

Members of the public expressed concern regarding the zone that their property has been placed into in the draft Land Use Bylaw (LUB) and asked that consideration be given in this review to moving it from the R4 zone to the R2 zone and providing the rationale for that request. They asked for guidance on the process and procedure to follow in order to formally make that request.

Trustees suggested that the request be submitted in writing for consideration in the community feedback phase of the Land Use Bylaw review, noting that there will be many opportunities for input into this process. They advised that the request would be fully considered and reviewed while clarifying that this is a targeted LUB review and determination would need to be made as to whether to address the issue at this time or, if out of scope, at a later time.

Rudy Rogalsky, Chair of the Advisory Planning Commission (APC), wanted to acknowledge that one member of the APC, Carol Quin, was not at the meeting today and deserved thanks for the invaluable historical perspective that she brought to the review. He also thanked Planner Milne and Recorder Bockman for their help with the process.

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 Staff Report dated April 14, 2014

Planner Milne presented the Staff Report and reported that with the completion of the APC's LUB review, the draft OCP/LUB bylaws can be presented in tandem for the review process.

The Islands Trust Policy Statement Directives Only Checklist was reviewed and staff was requested to remove the checkmark from item 4.3 Wildlife and Vegetation as there are no directives in that section.

Discussion followed on a communications plan to reach as many community members as possible and provide a variety of approaches to allow opportunities for participation and feedback prior to the Community Information Meeting (CIM). Key points for strategies included:

- Holding two small venue, informal meetings prior to the CIM;
- Creation of a flyer with space for comments that can be returned;
- Placing information on the website for public viewing;
- Creation of a Frequently Asked Questions sheet based on issues arising at the informal meetings for posting to the website; and
- Consideration of a radio interview with Planner Milne.

Planner Milne advised that formal advertising and a Power Point presentation will be produced for the CIM. Possible dates for the Community Information Meeting were considered.

11.1.2 Official Community Plan Bylaw No. 149

HO-2014-010
It was MOVED and SECONDED,
that the Hornby Island Local Trust Committee give first reading to draft Bylaw No. 149 cited as the "Hornby Island Official Community Plan Bylaw No. 149, 2014".

CARRIED

HO-2014-011
It was MOVED and SECONDED,
that the Hornby Island Local Trust Committee confirms that proposed Bylaw No. 149 cited as the "Hornby Island Official Community Plan Bylaw No. 149, 2014" is not contrary to or at variance with the Islands Trust Policy Statement.

CARRIED

HO-2014-012
It was MOVED and SECONDED,
that proposed Bylaw No. 149 cited as the "Hornby Island Official Community Plan Bylaw No. 149, 2014" be referred to outstanding agencies and First Nations.

CARRIED

By general consent the meeting was recessed at 12:49 pm and reconvened at 1:00 pm.

11.1.3 Staff Report regarding Land Use Bylaw dated April 21, 2014

Planner Milne presented the Staff Report dated April 21, 2014. He advised that the draft LUB included in the agenda package for discussion does not include the APC recommendations. He commented that the APC invested many hours to review the LUB and that he had met with them over the course of their deliberations to discuss their recommendations and to answer questions that arose.

The Islands Trust Policy Statement Directives Only Checklist was reviewed and staff was requested to remove the checkmark from item 4.3 Wildlife and Vegetation as there are no directives in that section.

11.1.4 Land Use Bylaw No 150

There was discussion of the APC recommendations for revisions to the LUB and support was expressed for the changes proposed.

Planner Milne reported that the Trust's legal advisors had recommended that 3.1(1)(b), 3.2(1)(i) and (j) be deleted, as regulating the use of emergency heliports, airports and heliports is outside of the Islands Trust's jurisdiction. He requested direction as to whether to retain these regulations or remove them, noting that the APC had recommended their retention, even if unenforceable, in order to provide an

indication of intent. Trustees discussed the issues and determined that since the OCP provides direction on these uses they should remain in the LUB.

Planner Milne reviewed the Deliverable/Milestone target completion date for the LUB review and confirmed that the OCP and LUB will be presented together at the Community Information Meeting and Public Hearing.

Trustees requested that Planner Milne highlight areas of significant change at the Community Information Meeting to facilitate a forthright presentation of the changes for the community.

HO-2014-013
It was MOVED and SECONDED,
that the Hornby Island Local Trust Committee accept the recommendations from the Advisory Planning Commission consultation process on draft Bylaw No. 150.

CARRIED

HO-2014-014
It was MOVED and SECONDED,
that the Hornby Island Local Trust Committee give first reading to draft Bylaw No. 150 cited as the "Hornby Island Land Use Bylaw No. 150, 2014" as amended.

CARRIED

HO-2014-015
It was MOVED and SECONDED,
that the Hornby Island Local Trust Committee confirms that proposed Bylaw No. 150 is not contrary to or at variance with the Islands Trust Policy Statement.

CARRIED

HO-2014-016
It was MOVED and SECONDED,
that proposed Bylaw No. 150 cited as the "Hornby Island Land Use Bylaw No. 150, 2014" be referred to agencies and First Nations.

CARRIED

HO-2014-017
It was MOVED and SECONDED,
that staff be directed to conduct a Community Information Meeting for the proposed Official Community Plan and Land Use Bylaw on May 27 or 28, 2014.

CARRIED

HO-2014-018
It was MOVED and SECONDED,
that staff be requested to set up two informal community meetings to provide information on the proposed Official Community Plan and Land Use Bylaw in advance of the Community Information Meeting.

CARRIED

11.2 Riparian Areas Regulation Implementation

11.2.1 Staff Report dated April 7, 2014

Planner Milne presented the Staff Report dated April 7, 2014 outlining the strategy for Riparian Areas Regulation (RAR) Implementation. He pointed out that on Hornby Island the mapping contractor has established the Streamside Protection and Enhancement Areas, whereas in other local government areas, this has not been done and the property owners have had to incur the expense to hire a Qualified Environmental Professional to ascertain that information.

Planner Milne directed attention to the Project Charter, observing that this program will allow the Local Trust Committee to move forward to address the Provincial requirements in a timeframe that suites island sensibilities. He emphasized that it will be important to provide opportunities for community members to learn about the RAR process and how it may or may not affect them as land owners and residents.

Trustees reviewed the Project Charter and requested that staff correct two typographical errors in the Workplan Overview: change February, 2014 to February 2015 and change March, 2014 to March, 2015.

HO-2014-019
It was MOVED and SECONDED,
that the Hornby Island Local Trust Committee endorses the draft Riparian Areas Regulation Implementation Project Charter and Workplan Overview as further expanded upon in the Deliverables and Milestones in the Staff Report of April 7, 2014.

CARRIED

HO-2014-020
It was MOVED and SECONDED,
that the Hornby Island Local Trust Committee direct staff to proceed with the implementation of the Riparian Areas Regulation Implementation project as described in the endorsed Project Charter.

CARRIED

12. REPORTS

12.1 Work Program

12.1.1 Top Priorities and Projects List Report dated April 15, 2014

The report was reviewed.

Members of the public requested the ability to address the Local Trust Committee and Chair Graham opened the floor for public comment.

A community member commented that his realtor has advised that he can proceed with a Section 946 subdivision and he asked if the current bylaw review would impact that process. He asked if the most acceptable procedure would be to submit an application now or to wait. Planner Milne responded that application for a Section 946 subdivision is an option that is legally available at this time.

Sheila Farrington, administrator of Island Secure Housing Association (ISLA), asked if there would be a Community Information Meeting for the ISLA zoning, observing that incorporating zoning changes in the bylaw review rather than addressing it separately might cause some community concern about the process.

Planner Milne responded that inclusion of ISLA zoning with this review is supported and provided reasons for that position. He noted that there will be opportunity to discuss the project at the Community Information Meeting (CIM) and suggested that ISLA board members might attend the CIM to answer questions that might arise. Trustees suggested that public awareness might be created by discussing the ISLA development at the informal community meetings prior to the CIM and that questions or concerns that result from those meetings could then be included in the Frequently Asked Questions sheet and addressed at the CIM.

Discussion then returned to the Top Priorities and Projects List Report dated April 15, 2014.

HO-2014-021
It was MOVED and SECONDED,
that the Top Priorities List be amended by deleting No. 2, APC Bylaw review and update, and placing Riparian Areas Regulation mapping and implementation as No. 2.

CARRIED

12.2 Applications Log

12.2.1 Report dated April 15, 2014

The reported was reviewed.

12.3 Trustee and Local Expenses

12.3.1 Expenses posted to March, 2014

The report was reviewed.

12.4 Policies and Standing Resolutions

12.4.1 Report

The report was received for information.

13. NEW BUSINESS

13.1 Gulf Islands Groundwater Protection – A Regulatory Toolkit

13.1.1 Memorandum dated March 19, 2014

The memorandum was received for information. Trustees suggested that this would be useful information to consider at a future time.

HO-2014-022
It was MOVED and SECONDED,
that the following item be added to the Projects List: Review and consideration of the Gulf Islands Groundwater Protection – A Regulatory Toolkit.

CARRIED

13.2 Denman Island Local Trust Area Bylaw Referral Request for Response regarding Bylaw No. 210

HO-2014-023
It was MOVED and SECONDED,
that the Hornby Island Local Trust Committee respond to the referral of Denman Island Local Trust Committee Bylaw No. 210 as “Interests Unaffected by Bylaw”.

CARRIED

13.3 Denman Island Local Trust Area Bylaw Referral Request for Response regarding Bylaw No. 211

HO-2014-024
It was MOVED and SECONDED,
that the Hornby Island Local Trust Committee respond to the referral of Denman Island Local Trust Committee Bylaw No. 211 as “Interests Unaffected by Bylaw”.

CARRIED

13.4 Mount Geoffrey, Hornby Island: Wildfire Protection Email from Trustee Law and Report

The email and report were received for information.

Trustee Law provided the background that led to a meeting with the Hornby Island Fire Chief, President of Conservancy Hornby Island, the Chair of the Regional Parks Committee of Hornby Island Residents' and Ratepayers' Association and himself to create a joint statement offering key references and suggestions to be sent to Comox Valley Regional District, BC Parks and Ministry of Land, Forests and Natural Resources. He noted that the document created provides recommendations for vegetation management to reduce fuel loading and was created in advance of the joint park planning process for Mount Geoffrey Regional Park, Mount Geoffrey Escarpment Provincial Park and the adjacent Crown land which is to be initiated this year.

13.5 Local Trust Committee Submission for 2013/2014 Annual Report Memorandum dated March 31, 2014

HO-2014-025
It was MOVED and SECONDED,
that the Hornby Island Local Trust Committee endorses the Hornby Island Local Trust Committee's submission to the 2013/2014 annual report.

CARRIED

13.6 Email from Brian Brooke dated April 24, 2014 regarding Hornby Island Land Use Bylaw Draft for Comment Version 6.1

Trustees reviewed the email that requests that the Local Trust Committee consider changing the zoning of the writer's property from R4 to R2 and to reconsider the proposed amendment that sets the minimum size of a property eligible for subdivision under Section 946 at 8 hectares in the current bylaw review.

Trustees requested that this correspondence be included in the community input to the OCP/LUB review. They advised that the request will be reviewed and fully considered.

13.7 Economic Development Essentials for Local Government Leaders Workshop

Trustee Allen reported that he would like to attend this one-day workshop in Port Alberni and requested consideration be given to remuneration of his mileage and ferry travel expenses.

HO-2014-026
It was MOVED and SECONDED,
that the Hornby Island Local Trust Committee endorses Trustee Allen's attendance at the Economic Development Essentials for Local Government Leaders Workshop with respect to travel expenses.

CARRIED

14. BYLAWS

14.1 Official Community Plan Bylaw No. 149 cited as "Hornby Island Official Community Plan Bylaw No. 149, 2014"

This item was discussed at 11.1.2.

14.2 Land Use Bylaw No. 150 cited as "Hornby Island Land Use Bylaw No. 150, 2014"

This item was discussed at 11.1.4.

15. ISLANDS TRUST WEBSITE

15.1 Hornby Page

Trustees requested that the Latest News section of the Hornby Page be updated to include a post indicating that the Local Trust Committee has given first readings to the draft OCP and LUB bylaws as well as information on where to find the documents on the website.

16. NEXT MEETING DATE

16.1 Local Trust Committee Business Meeting

The next meeting will take place on Friday, June 6, 2014 at 11:30 am at Room to Grow, 2100 Sollans Road, Hornby Island, BC.

17. ADJOURNMENT

By general consent the meeting was adjourned at 2:54 pm.

_____

David Graham, Chair

CERTIFIED CORRECT:

_____

Vicky Bockman, Recorder

Islands Trust

Follow Up Action Report w/ Target Date

Hornby Island
Mar-14-2014

No.	Activity	Responsibility	Target Date	Status
1	**HO-2014-008** that staff be requested to provide information on eelgrass mapping to BC Parks and the Hornby Island Provincial Parks Committee with a request that this be taken into consideration in the management of the marine component of Tribune Bay Marine Park with the goal of protecting the recently identified eelgrass beds. Trustee Law to provide contact information.	Rob Milne		On Going

Apr-25-2014

No.	Activity	Responsibility	Target Date	Status
1	**HO-2014-010-**that the Hornby IslandLocal Trust Committee give first reading to draft Bylaw No. 149 cited as the 'Hornby Island Official Community Plan Bylaw No. 149, 2014'. **HO-2014-011-**that the Hornby Island Local Trust Committee confirms that proposed Bylaw No. 149 cited as the 'Hornby Island Official Community Plan Bylaw No. 149, 2014' is not contrary to or at variance with the Islands Trust Policy Statement. **HO-2014-012-**that proposed Bylaw No. 149 cited as the 'Hornby Island Official Community Plan Bylaw No. 149, 2014' be referred to outstanding agencies and First Nations.	Lisa Webster-Gibson		Done
1	**HO-2014-013-**that the Hornby Island Local Trust Committee accept the recommendations from the Advisory Planning Commission consultation process on draft Bylaw No. 150.	Rob Milne		Done

1	**HO-2014-014-**that the Hornby Island Local Trust Committee give first reading to draft Bylaw No. 150 cited as the 'Hornby Island Land Use Bylaw No. 150, 2014' as amended. **HO-2014-015** that the Hornby Island Local Trust Committee confirms that proposed Bylaw No. 150 is not contrary to or at variance with the Islands Trust Policy Statement. **HO-2014-016-**that proposed Bylaw No. 150 cited as the 'Hornby Island Land Use Bylaw No. 150, 2014' be referred to agencies and First Nations.	Lisa Webster-Gibson	Done
1	**HO-2014-017-**that staff be directed to conduct a Community Information Meeting for the proposed Official Community Plan and Land Use Bylaw on May 27 or 28, 2014.	Rob Milne	On Going
1	**HO-2014-018-**that staff be requested to set up two informal community meetings to provide information on the proposed Official Community Plan and Land Use Bylaw in advance of the Community Information Meeting.	Rob Milne	Done
1	**HO-2014-020-**that the Hornby Island Local Trust Committee direct staff to proceed with the implementation of the Riparian Areas Regulation Implementation project as described in the endorsed Project Charter.	Rob Milne	On Going
1	**HO-2014-021-**that the Top Priorities List be amended by deleting No. 2, APC Bylaw review and update, and placing Riparian Areas Regulation mapping and implementation as No. 2.	Rob Milne	Done
1	**HO-2014-022-**that the following item be added to the Projects List: Review and consideration of the Gulf Islands Groundwater Protection – A Regulatory Toolkit.	Rob Milne	Done
1	**HO-2014-023-**that the Hornby Island Local Trust Committee respond to the referral of Denman Island Local Trust Committee Bylaw No. 210 as "Interests Unaffected by Bylaw". **HO-2014-024-**that the Hornby Island Local Trust Committee respond to the referral of Denman Island Local Trust Committee Bylaw No. 211 as "Interests Unaffected by Bylaw".	Rob Milne	Done

PO. Box 55, Hornby Island ,B.C V0R 1Z0

Fisheries and Oceans Canada April 19, 2014

Aquaculture Consultations

Integrated Geoduck Management Framework

The Hornby Island Conservancy (CHI) suggest that the proposed Integrated Geoduck Management Program be excluded from the waters around Hornby Island. We are concerned that the Geoduck industry and the methods used in farming the geoduck will have a significant impact on Hornby's marine environment and shoreline resources as well as our economic wellbeing and tourism industry.

It has recently been determined from recent studies that 31.7% of the linear shoreline of Hornby is composed of eelgrass habitat, an important resource that has significant influence on biochemical cycling, sediment stability and the food web resource. These eelgrass habitat areas is one of the reasons why Hornby is so important to the herring fishery. It is our understanding that Lambert Channel is the most important herring spawning area in British Columbia. We believe that the proposed goeduck development could jeopardize the amount and quality of herring spawning habitat leading to a decline in the herring resource.

We have also found from recent mapping of Hornby's shorelines that important forage fish habitat exist here. CHI and the Sea Watch Society have found positive samples of sea lance eggs at the locations identified in the shoreline mapping program. This is good news as the forage fish resource is an important part of the food web as forage fish are preyed on by larger fish such as salmon as well as birds and mammals.

We need to protect these habitat values and you can help by not allowing the Geoduck industry to locate within our marine environment and interfere with the natural habitat.

Hornby Island is within the Islands Trust area which has the responsibility and mandate to preserve and protect the islands within the Trust area. That mandate include both the islands themselves and the surrounding waters as described in the Islands Trust Act. It is a special area recognized in legislation as an ecologically and environmentally special area of the Province. We hope that you will respect and acknowledge those Hornby Island Trust policies and regulation that pertain to the marine environment and ecosystems.

Tony Quin

Coordinator

CHI Board of Directors

Email qconsult@telus.net

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. Draft OCP including APC recommendation on March 14th agenda for review.	Feb-03-2012	Rob Milne		On Going
2	Riparian Areas Regulation mapping and implementation.	Project charter revised at April 25, 2014 LTC meeting.	Feb-03-2012	Rob Milne	Dec-31-2012	On Going

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 the marine environment		Feb-07-2014	On Going
1	Provide information on shoreline protection		Mar-14-2014	On Going
1	Review and consideration of the Gulf Islands Groundwater Protection – A Regulatory Toolkit.		Apr-25-2014	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

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

File Number	Applicant Name	Date Received	Purpose
HO-SUP-2014.2	Jeffrey & Judy Smith **Planner:** Linda Prowse	May-22-2014	2900 High Salal Drive, Hornby Island one workshop/garage/office

Planning Status

Islands Trust

LTC EXP SUMMARY REPORT F2014

Invoices posted to Month ending March 2014

635 Hornby	Invoices posted to Month ending March 2014	Budget	Spent	Balance
65000-635	LTC "Trustee Expenses"	1,300.00	855.98	444.02
LTC Local				
65200-635	LTC - Local Exp - LTC Meeting Expenses	3,000.00	2,165.24	834.76
65210-635	LTC - Local Exp - APC Meeting Expenses	1,000.00	1,111.58	-111.58
65220-635	LTC - Local Exp - Communications	500.00	744.19	-244.19
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	5,521.01	1,228.99
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.

STAFF REPORT

Date: April 28, 2014 **File No.:** 6500 -20

To: Executive Committee acting as a Local Trust Committee ***(Ballenas – Winchelsea Islands)***
Denman Island Local Trust Committee
Gabriola Island Local Trust Committee
Gambier Island Local Trust Committee
Hornby Island Local Trust Committee
Lasqueti Island Local Trust Committee
Thetis Island Local Trust Committee

From: Marnie Eggen, Planner 1

CC: Regional Planning Managers
David Marlor, Director of Local Planning Services

Re: New Federal *Marihuana for Medical Purposes Regulation*

THE PROPOSAL:

The purpose of this report is to provide Local Trust Committees with the following:

- an overview of the new *Marihuana for Medical Purposes Regulation;*
- an overview of its implications for the Islands Trust Northern Region;
- an analysis of zones in Northern Region local trust areas that would currently permit medical marihuana production and request direction on amending bylaws; and
- an explanation of how notices of intent from proponents are being processed when received in the Northern Office.

BACKGROUND:

Implementation of the new Federal *Marihuana for Medical Purposes Regulations* (MMPR) is underway. The new regulations (June 2013) came into force on April 1, 2014. However, as a result of a Federal Court Order, brought down March 21, 2014, those operating under the old regulations, *Medical Marihuana Access Program* (MMAR), are allowed to continue to produce medical marihuana past the original expiry date of March 31, 2014. The Order, however, does not affect the right of commercial medical marihuana producers to proceed with applications to Health Canada for licenses under the MMPR.

The new system relies on a more secure supply and distribution system that is based on federally licensed production facilities.

The federal government has indicated the following:

1. That it will respect local government zoning and bylaws when determining whether to issue production licenses;
2. That only enclosed and indoor grow operations will be licensed;
3. That only dried marihuana may be produced and sold;
4. The site must be designed in a manner that prevents unauthorized access and there must be visual monitoring of the perimeter of the site at all times.

Marihuana for Medical Purposes Regulation may be found at: http://gazette.gc.ca/rp-pr/p2/2013/2013-06-19/html/sor-dors119-eng.php

Health Canada

Health Canada indicates, as of November, 2013, that it has received over 250 applications from individuals or companies seeking to become certified producers. Under the new regulation, applicants for a production licence are required to notify the local government, local police force and local fire officials of intention to apply to Health Canada.

As defined within the Regulation,

> *" "local government" includes the government of*
>
> - *(a) an incorporated or unincorporated city, metropolitan area, town, village or municipality;"*

Health Canada has indicated that it will not publically release the location of production sites. In the licencing process, it is looking to assure that producers are familiar with and able to comply with local government land use, development and servicing provisions. Health Canada does enable producers to publicize the location, and recognizes that an application to amend zoning or for a variance permit requires notification of the location.

Agricultural Land Commission

The British Columbia Agricultural Land Commission (ALC) has released an information bulletin stating that "if a land owner is lawfully sanctioned to produce marihuana for medical purposes, the farming of said plant in the Agricultural Land Reserve (ALR) is permitted and would be interpreted by the Agricultural Land Commission as being consistent with the definition of "farm use" under the *ALC Act*." Production of the plant indoors is considered farming, similar to a vegetable greenhouse operation. A small business office, testing lab, processing and drying, packaging shipping areas, cloning room and anything else directly related to the growing and processing of the plant are considered to be accessory uses associated with farm use. Determining an accessory use is contingent on the use being necessary and commensurate with the primary function of the property/building to produce an agricultural product. If a land use activity is proposed that is not specifically related to the growing of an agricultural product including a stand-alone research and development facility, an application to the Land Commission for non-farm use would be required.

Anecdotally, the Land Commission advises that a standard production and distribution facility may range from 10,000 to 50,000 square feet in size. Similarly to other indoor plant production,

common nuisances for surrounding property owners may include odors, noise associated with air ventilation and generators, and night time lighting.

The Information Bulletin may be found at:
http://www.alc.gov.bc.ca/publications/ALC_Info_Bulletin_Marijuana_Amended_Jan_2014.pdf

Union of BC Municipalities

The Union of BC Municipalities (UBCM) wrote to the federal Health Minister in June 2013 to draw attention to gaps in the federal licensing process that could allow an application to be approved which does not meet local government regulations. Responding to this concern, Health Canada is initiating phone confirmation directly to local governments to ensure that it has received notice of the application. Staff is not aware of any licenses issued under the new regulations to date within the Islands Trust Area. Islands Trust has received a handful of notices of intent.

Notice of intent to Local Governments

Health Canada has designed a program that provides improved security of production and responds to the medical needs of Canadians. Implementing the program across Canada has not enabled federal authorities to tailor its process to each unique level of local government.

Health Canada requires that applicants, prior to submitting an application, must "provide written notice to local authorities to inform them of their intention to submit an application". It also states that notice must be delivered to a senior official of the local government, of the RCMP, and of the local fire authority. To date, two notices of intent have been received for the Northern Region and the letter of response, copied to Health Canada, has included the following information:

- provisions of the applicable Land Use Bylaw, any applicable Development Permit Area provisions;
- reference to other agencies that work in cooperation with Islands Trust to manage development and servicing within the Trust Area; and
- a request that Health Canada refer the completed application with site plan for confirmation of compliance with the applicable Local Trust Committee bylaws.

Further information from Health Canada indicates that Health Canada won't be referring the completed application to local governments. As a result, staff will be requesting a full set of site plans from the applicant. As further information is provided from Health Canada, these processes may change. Local trust committees are not being copied or otherwise notified of these responses to notices of intent.

Health Canada is working with the Federation of Canadian Municipalities to develop a Fact Sheet. It has not confirmed if local elected officials are to be advised of the application, nor has it reconciled how the perspectives of the locally elected officials would be gathered if the location and address is protected by federal privacy and security provisions. At best, the comments of a local trust committee may be considered in-camera under section 90 (1) (m) of the *Community Charter*.

Local Government Development and Servicing Regulations

Land use and zoning bylaws of an individual local trust area provide regulations concerning land use. Servicing of new development may be governed by bylaws of an applicable regional district, water purveyor, fire service area, or community association.

Bylaws applicable to the Northern local trust areas that regulate land use and servicing of new development include those of Cowichan Valley Regional District, Nanaimo Regional District, Comox Valley Regional District, Sunshine Coast Regional District, Metro Vancouver (e.g. Building Bylaws), applicable Water Purveyors (e.g. Comox Valley RD), and the local trust area land use bylaws.

Islands Trust Policy Statement

The *Islands Trust Act* established the Islands Trust as a unique land-use planning agency, acting for residents and having a special conservation-oriented responsibility. The Policy Statement provides a general strategy for land use planning in partnership with provincial and federal agencies to achieve Object of the Trust (Reference BC *Islands Trust Act* and *Islands Trust Policy Statement*, 1993). Specific strategies addressed include ecosystem protection, stewardship of resources, and sustainable communities. Within the policy statement, there is commitment that some uses are not suited to the Trust Area.

The production of marihuana for medicinal purposes is not addressed explicitly in the Policy Statement. Several policies address all forms of development and essential servicing such as transportation or water supply, and environmental quality such as the following:

3.1.9 *Trust Council encourages actions and programs of other government agencies which… prevent pollution of the air, land and fresh and marine waters of the Trust Area.*

4.1.2 *Trust Council shall consult with the Ministry of Agriculture (name changed) and the British Columbia Land Reserve Commission to request that agricultural policies applied to the Trust Area are appropriate to the nature of agriculture within the Trust Area, including, but not limited to, the smaller island scale of agricultural activities.*

4.4.1 *It is Trust Council's policy that islands in the Trust Area should be self-sufficient in regard to their supply of freshwater.*

5.1.2 *It is Trust Council's policy that the intensity of noise and lighting in and through the Trust Area should be compatible with community character.*

STAFF COMMENTS:

Medical marihuana production under the MMPR is best considered an industrial land use due to the scale and characteristics of the buildings the use must be carried out in for security and economic reasons. It is also considered an agricultural land use by the Agricultural Land Commission (ALC). As the ALC has recognized the licensed production of medical marihuana as a "farm use" under the *ALC Act*, medical marihuana production facilities are permitted on all lands that are located in the Agricultural Land Reserve. Local trust committees should consider

whether to permit the production of medical marihuana use elsewhere, e.g. as an industrial use. Additionally, as outlined in the Islands Trust Policy Statement above, the production of medical marihuana may not be an appropriate use for some areas; for example, small lots, smaller islands that are solely residential in character, or islands that have no ALR or industrial zoned lands. Also, consideration should be given to the likelihood of such operations on islands where services are limited, such as no connection to power, no ferry service, limited water supply. Staff advise local trust committees to use a clear land use planning rationale in their decision making process.

It is very difficult to predict how many, if any, producers will be licensed in the Northern local trust areas. Although Health Canada has received at least 250 applications, it is also very hard to predict how many producers will fill the market in Canada. Health Canada has not imposed any limits, but is taking the approach of letting the market decide.

Many BC local governments have adopted or are currently adopting bylaw amendments addressing the new MMPR. The zones where this use is generally being permitted is industrial and agricultural. Setbacks and minimum parcel size are key components of bylaw amendments. Setbacks are generally being set at 30 m and larger, and minimum parcel size ranges from approximately 2 ha to 260 ha.

Zones that Currently Permit the Production of Medical Marihuana in the Northern Region

The following outlines the various land use bylaws and zones where the production of medical marihuana, licensed under the MMPR, would be permitted currently in the land use bylaws in the Northern Region. Staff has provided comments on considerations for the local trust committees. The details of the applicable zoning provisions related to the production of medical marihuana for each Northern Region land use bylaw listed below are included in the attachments to this report.

Executive Committee Local Trust Area (Ballenas – Winchelsea Islands)

The Ballenas-Winchelsea Islands (B-W LTA (EC)) proposed Land Use Bylaw No. 28 permits the production of medical marihuana under the new MMPR in the Residential (R) zone because "agriculture" is a permitted use and "agriculture" as defined in the bylaw would encompass such a use (see Table 1 in Attachments). While horticulture is permitted in all zones, it does not permit commercial production except as a home occupation under Residential (R) zoning, where floor area limitation (700 sq. ft. max) would likely preclude this use. Industrial uses are prohibited in all zones and there are no ALR lands. Given this and the small size of the islands, limited services, and relatively high ecological value, staff suggests that the LTC consider amending the LUB to prohibit the production of medical marihuana in all zones.

Denman Island Local Trust Area

The current Denman Island LUB No. 186 permits the production of medical marihuana licensed under the MMPR in the following zones because "agriculture" and "horticulture" are permitted uses, and "agriculture" and "horticulture" as defined in the bylaw would encompass such a use (see Table 2 in Attachments):

- Residential (R1)
- Rural Residential (R2)
- Cohousing (R3)
- Agriculture (AG)
- Forest (F)
- Resource (RE)

Denman Island has a light industrial zone, but it does not permit medical marihuana production as currently written. Staff suggest that the LTC should consider amending the LUB to further limit the zones in which the activity can be conducted, but consider allowing the use in the light industrial zone.

Gabriola Island Local Trust Area

The current Gabriola Island LUB No. 177 and Draft Bylaw Amendment No. 275 permits the production of medical marihuana licensed under the MMPR in the following zones because "agriculture," "horticulture," "commons agriculture," and/or "light industry" are permitted uses, and as defined in the bylaw, they would encompass such a use (see Table 3 in Attachments):

- Small Rural Residential (SRR) on lots over 2 ha
- Large Rural Residential (LRR) on lots over 2 ha
- Agriculture (AG)
- Resource (R)
- Resource Residential (RR1)
- Forestry (F) (as per Draft Bylaw Amendment No. 275 (17/04/14))
- Seniors and Special Needs (as per Draft Bylaw Amendment No. 275 (17/04/14))
- Gabriola Commons Comprehensive Development Zone (GC)
- Industrial – Light (I)

Staff suggest that the LTC consider amending the LUB to further limit the zones in which the activity can be conducted, but continue to allow the use in the light industrial zone.

The current Mudge Island LUB No. 228 (includes Mudge, Link and Round Islands) is considered to permit the production of medical marihuana licensed under the MMPR in the Rural Residential zone because agriculture is a permitted use (see Table 4 in Attachments). Although agriculture is not defined in the bylaw, staff conclude that the production of medical marihuana wouldn't be precluded. These small islands do not have any ALR land or industrial zoned lands. Since Link and Round Islands are not serviced by power, a medical marihuana operation under the MMPR may not be feasible. Given the small size of the islands and residential character, staff suggests that the LTC consider amending the LUB to prohibit the production of medical marihuana in all zones.

The current Decourcy Island Zoning Bylaw No. 44 permits the production of medical marihuana licensed under the MMPR in the Rural zone because "agriculture" is a permitted use, and as defined in the bylaw, "agriculture" would encompass such a use (see Table 5 in Attachments). This small island does not have any ALR land or industrial zoned lands. Given its small size and residential character, staff suggests that the LTC should consider amending the LUB to prohibit the production of medical marihuana in all zones.

Gambier Island Local Trust Area

The current Gambier Island LUB No. 86 permits the production of medical marihuana licensed under the MMPR in the following zones because "agriculture" is a permitted use, and as defined in the bylaw, "agriculture" would encompass such a use (see Table 6 in Attachments):

- Settlement Residential (SR)
- Rural Residential (RR)
- Agriculture (A)
- Sea Ranch Comprehensive Development (CD1) (Areas 1 & 2)

Gambier has some ALR lands and some industrial zoned lands. Staff suggest that the LTC consider amending the LUB to further limit the zones in which the activity can be conducted, but consider allowing the use in the industrial zone.

The current Keats Island LUB No. 78 permits the production of medical marihuana licensed under the MMPR in the following zones because "agriculture" is a permitted use, and as defined in the bylaw, "agriculture" would encompass such a use (see Table 7 in Attachments):

- Rural Residential (RR)
- Rural Comprehensive (RC)
- Private Institutional 2 (PI2)

Keats Island does not have any ALR lands or any industrial zoned lands. Given this and that the island is largely residential in character, staff suggest that the LTC consider amending the LUB to prohibit the use.

The current Gambier Associated Islands LUB No. 120 permits the production of medical marihuana licensed under the MMPR in the Rural Residential (RR1) zone because "agriculture" is a permitted use, and as defined in the bylaw, "agriculture" would encompass such a use (see Table 8 in Attachments). These relatively small islands do not have any ALR land currently or any industrial zoned lands. Since the majority of the islands are not serviced, a medical marihuana operation under the MMPR may not be feasible. Given the foregoing and that the islands are mainly residential in character, staff suggests that the LTC consider amending the LUB to prohibit the production of medical marihuana in all zones.

Hornby Island Local Trust Area

The current Hornby Island LUB No. 86 permits the production of medical marihuana licensed under the MMPR in the following zones because "agriculture" is a permitted use, and as defined in the bylaw, "agriculture" would encompass such a use (see Table 9 in Attachments):

- Rural Residential (R3) & R3(a)
- Large Lot Residential/Water Resource Protection (LR/WSPA)
- Agriculture (A)
- Upland (UP)
- Land Cooperative 1 (LC1)

There are ALR lands, but no industrial zoned lands currently on Hornby. See the proposed Hornby Island LUB No. 150 below for staff comments.

The proposed Hornby Island LUB No. 150 permits the production of medical marihuana licensed under the MMPR in the following zones because "agriculture" is a permitted use in those zones, and as defined in the bylaw, "agriculture" would encompass such a use (see Table 10 in Attachments):

- Residential 2 – Large Lot (R2)
- Residential 4 – Forest (R4)
- Agriculture 1 (A1)
- Agriculture 2 – Agriculture/Residential (A2)
- Agriculture 3 – Agriculture/Residential (A3)
- Agriculture 4 – Agriculture/Residential (A4)

There are ALR lands on Hornby, but no industrial zoned lands in the proposed bylaw. Staff suggests that the LTC consider revising the proposed LUB to further limit the zones in which the activity can be conducted.

Lasqueti Island Local Trust Area

The current Lasqueti Island LUB No. 78 permits the production of medical marihuana licensed under the MMPR in the Land Based (LB) zone because "agriculture" is a permitted use in that zone, and as defined in the bylaw, "agriculture" would encompass such a use (see Table 11 in Attachments). There are ALR lands and industrial zones on Lasqueti Island, but the industrial zones do not permit medical marihuana production as currently written. Since there are no electrical transmission lines currently to Lasqueti Island or anticipated in the future, a medical marihuana operation under the MMPR may not be feasible. Staff suggests that the LTC may consider amending the LUB to further limit the activity in the LB zone, but consider allowing the use in the industrial zones.

Thetis Island Local Trust Area

The current Thetis Island LUB No. 89 doesn't permit the production of medical marihuana licensed under the MMPR because "agriculture" and "intensive agriculture" as defined in the bylaw and the *Local Government Act* do not encompass such a use (see Table 12 in Attachments). However, the use would be permitted regardless on ALR lands, which are zoned A1 on Thetis Island. There are no industrial zoned lands on Thetis Island. Staff suggests that the LTC consider amending the LUB to allow this use in the A1 zone on ALR lands.

The current Valdes Island Rural Land Use Bylaw No. 42 permits the production of medical marihuana licensed under the MMPR in the following zones because "agriculture" is a permitted use in those zones, and as defined in the bylaw, "agriculture" would encompass such a use (see Table 13 in Attachments):

- Rural 1 (R1)
- Rural 2 (R2)

There are no ALR lands on Valdes Island or are there any industrial zones. Since, there are no utilities supplying electrical power to Valdes currently and they are discouraged in the RLUB, a medical marihuana operation under the MMPR may not be feasible. Given the foregoing and

that the island is largely residential/recreational in character, staff suggest that the LTC consider amending the LUB to prohibit the use.

The current Ruxton Island Zoning Bylaw No. 13 does not permit the production of medical marihuana licensed under the MMPR in any zone. Ruxton is included in the Thetis Associated Islands OCP and LUB project; see the proposed Thetis Associated Islands proposed LUB No. 94 for staff comments.

The Thetis Associated Islands proposed LUB No. 94 does not permit the production of medical marihuana licensed under the MMPR in any zone because the definition of horticulture specifically excludes the commercial production of medical marihuana. There are no ALR lands, and the proposed Official Community Plan recognizes that there are no current or anticipated agricultural or industrial operations in these small islands. Given this and the fact that the islands are relatively small and residential in character, staff suggests no amendments to the proposed LUB.

SUMMARY OF OPTIONS:

Staff recommends that local trust committees consider and direct staff on their preferred approach for bylaw amendments in consideration of the new MMPR. Local Trust Committees have the following options:

a) **Do nothing:** this may be an appropriate response for some islands, for example, if it is considered to be unlikely that anyone would establish a medical marihuana production facility under the new MMPR, especially on islands with no ALR. Should be balanced with consideration of the suitability of the use given the character/zoning of some islands.

b) **Add to the projects list:** this may also be an appropriate response balancing the likelihood of someone establishing a medical marihuana production facility under the new MMPR with the other projects on an LTC's work program.

c) **Add to the top priorities list and direct staff to provide more information:** If the LTC chooses this option, direction on the nature of bylaw amendments the LTC would like to consider should be provided. For example, the LTC is encouraged to consider if the use should be limited to agriculture zone only. Staff will then return with more information on other considerations such a minimum lot size for the use, setbacks and screening.

RECOMMENDATIONS:

1. **THAT**, with regard to the production of medical marihuana under the new *Marihuana for Medical Purposes Regulation*, the (*insert Island*) Local Trust Committee not amend (insert Island name) Island Bylaw No. (insert no.) at this time.

   OR

2. **THAT** the (*insert Island*) Local Trust Committee direct staff to add to the projects list an amendment to the (insert Island name) Island Bylaw No. (insert no.) regarding the production of medical marihuana under the *Marihuana for Medical Purposes Regulation*.

   OR

3. **THAT** the (*insert Island*) Local Trust Committee direct staff to add to their top priorities list an amendment to the (insert Island name) Island Bylaw No. (insert no.) regarding the production of medical marihuana under the *Marihuana for Medical Purposes Regulation* and direct staff to provide further information on limiting and/or including the use by (insert direction), and provide further information regarding other provisions such as minimum lot size, setbacks and screening.

Prepared and Submitted by:

Marnie Eggen	April 28, 2014
Marnie Eggen, Planner 1	Date

Concurred in by:

Courtney Simpson	May 6, 2014
Courtney Simpson, Regional Planning Manager	Date

Attachments:

1. Table 1: Ballenas – Winchelsea Islands (B-W LTA (EC)) proposed LUB No. 28

2. Table 2: Denman Island LUB No. 186

3. Table 3: Gabriola Island LUB No. 177
   Table 4: Mudge Island LUB No. 228
   Table 5: Decourcy Island Zoning Bylaw No. 44

4. Table 6: Gambier Island LUB No. 86
   Table 7: Keats Island LUB No. 78
   Table 8: Gambier Associated Islands LUB No. 120

5. Table 9: Hornby Island LUB No. 86
   Table 10: Proposed Hornby Land Use Bylaw No. 150

6. Table 11: Lasqueti Island LUB No. 78

7. Table 12: Thetis Island LUB No. 89
   Table 13: Valdes Island Rural Land Use Bylaw No. 42

Attachment 1

Table 1: Ballenas – Winchelsea Islands (B-W LTA (EC)) proposed LUB No. 28

Agriculture: means the use of land for the growing, rearing, harvesting, or production of plants, crops, livestock and other farm animals but does not include aquaculture, intensive livestock operations, fur farming or mushroom farming.

Zones Where Permitted	***Provisions limiting the extent of the use***
Residential (R)	• 10% lot coverage • 6 m setback to any lot line; 15 m from NB of Sea

Horticulture: means the use of land for the rearing of plants

Zones Where Permitted	***Provisions limiting the extent of the use***
Permitted in all zones	• Commercial production only permitted as a Home Occupation under Residential (R) zoning, where floor area limitation (700 sq. ft. max) would likely preclude this industrial use.

The indoor production of medical marihuana is not permitted in the remaining zones on the Ballenas – Winchelsea Islands:

- Community Service (CS)
- Conservation (CN)
- Park (P)
- Nature Protection (NP)

Attachment 2

Table 2: Denman Island LUB No. 186

AGRICULTURE means the use of land, buildings or structures for any of the following activities: growing, producing, raising or keeping animals or plants, including mushrooms, or the primary products of those plants or animals;
Storage, processing or direct marketing by a farmer of farm products ….

And

HORTICULTURE means the growing of flowers, fruits, vegetables and other plants and includes the sale of such products when grown by the land owners on their lot.

Zones Where Permitted	***Provisions limiting the extent of the use***

Residential (R1)
Rural Residential (R2)
Cohousing (R3)
	• 25% lot coverage in R1 and R2, and not applicable in R3;
	• 8m setback in R1 and R2 zones;
	• Setbacks:
	  • from the front lot line – R1 and R2=7.5m / R3=30m;
	  • from the rear or side lot line – R1 and R2=3m / R3 = 30m;
	  • from the exterior side lot line – R1 and R2=4.5m / R3 = 30m.

Agriculture (AG)
Forest (F)
Resource (RE)
	• Lot coverage including greenhouses:
	  • Agriculture = 75%;
	  • Forest = 5%;
	  • Resource = 10%;
	  • Lot coverage excluding greenhouses;
	  • Agriculture = 35%;
	  • Forest = 5%;
	  • Resource = 10%;
	• Setbacks for buildings and structures other than residential:
	  • Front or exterior = A= 10m; F and RE = 30m;
	  • Rear or side = A = 4.5m; F and RE = 15m.

The indoor production of medical marihuana is not permitted in the following zones on Denman Island:

- Commercial (C)
- Light Industrial (L)
- Institutional (IN)
- Conservation (CN)
- Park (P)

Attachment 3

Table 3: Gabriola Island LUB No. 177

agriculture means growing, rearing producing or harvesting agricultural crops, livestock and other animals for economic gain and includes the processing on a *lot* of primary agricultural products harvested, reared or produced on that *lot*, plus the storage of machinery, implements and agricultural supplies for the farm;

Zones Where Permitted	***Provisions limiting the extent of the use***
Residential: • SRR on lots over 2 ha; • LRR lots over 2 ha	• 20% lot coverage for SRR; 10% for LRR; • On lots 1 ha or larger, 10 m setback; • Setback for greenhouses > 46 sq. m. floor area in size is 20 m from any lot line.

Agriculture:
• AG (ALR)
	• Lot coverage:
	  • outside ALR - 35%;
	  • on ALR - 35% excluding greenhouses;
	  • on ALR - 75% total;
	• 20 m setback for agricultural buildings;
	• 7.5 m setback for greenhouses in ALR;
	• 20 m setback for greenhouses > 46 sq. m. in size outside of ALR.

Resource:
• R;
• RR1
	• On both R and RR1, 10% lot coverage;
	• On R, lots 1 ha or more, 10 m setback from all lot lines and on lots < 1 ha, setbacks are:
	  • 6.0 m from the front lot line;
	  • 4.5 m from exterior side lot line;
	  • 1.5 m from interior lot line.
	• On RR1, lots less than 2 ha, 6 m setback from all lot lines and lots 2 ha and larger, 10 m setback from all lot lines;
	• Setback for greenhouses > 46 sq. m. floor area in size is 20 m from any lot line.

As Per Draft Bylaw Amendment No. 275 (17/04/14):
• F
	• 10% lot coverage;
	• On lots 1 ha or more, 10 m setback from all lot lines and on lots lots < 1 ha, setbacks are:
	  • 6.0 m from the front lot line;
	  • 4.5 m from exterior side lot line;
	  • 1.5 m from interior lot line
	• Setback for greenhouses > 46 sq. m. floor area in size is 20 m from any lot line.

horticulture means growing of fruits, vegetable, flowers or ornamental plants for resale

Zones Where Permitted	***Provisions limiting the extent of the use***
Residential: • SRR including the sale of	• See above.

products	
Resource: • RR1	• See above
Per Draft Bylaw Amendment No. 275 (17/04/14): • SSN	• 20% lot coverage; • 6 m setback from all lot lines.

commons agriculture means community based agricultural uses that include; growing, rearing, producing or harvesting agricultural crops, livestock and other animals and includes the processing on a lot of primary agricultural products harvested, reared or produced on that lot, plus the storage of machinery, implements and agricultural supplies for the farm, and includes the sale of agricultural products grown or raised on the lot, but specifically excludes intensive agriculture

Zones Where Permitted	***Provisions limiting the extent of the use***
Resource: GC	• 12% lot coverage, including greenhouses; • Minimum setback for all agriculture buildings and structures is 20 metres from any lot line.
Regulations applicable to agriculture in all zones	• Height of agricultural buildings is 12 m max.

light Industry means processing, fabricating, assembling, storing, transporting, distributing, wholesaling, testing, servicing, repairing or salvaging goods or materials;

Zones Where Permitted	***Provisions limiting the extent of the use***
Industrial - Light(I) not requiring sanitary sewer for disposal of industrial wastes	• 50% lot coverage; • Max. floor area ratio is 0.35; • 10 m setback from all lot lines; • Max. of two industrial buildings.

The indoor production of medical marihuana is not permitted in the following zones on Gabriola Island as per LUB No. 177 and proposed bylaw amendment No. 275:

- Forestry/Wilderness Recreation 1(FWR1)
- Gravel Pit (GP)
- Village Commercial 1(VC1)
- Village Commercial 2 (VC2)
- District Commercial 1 (DC1)
- Local Commercial 1 – Neighbourhood Pubs(LC1)
- Local Commercial 2 –Restaurants(LC2)
- Local Commercial 3 - Garden Centres(LC3)
- Ferry Parking(FP)
- Tourist Commercial 1 (TC1)
- Tourist Commercial 2 - Campground(TC2)
- P1 Parks 1 – Provincial and Regional
- P2 Parks 2 – Passive Recreation Community Park

- P3 Parks 3 – Active Recreation Community Park
- IN1 Institutional 1
- IN2 Institutional 2
- IN3 Institutional 3
- YC Yacht Club Outstation - Upland

Table 4: Mudge Island LUB No. 228

Agriculture – (no definition)	
Zones Where Permitted	***Provisions limiting the extent of the use***

Rural Residential (RR)	• On lots 0.4 ha or less setbacks are:
	  • 6 m from front or rear lot line;
	  • 1.5 m from interior lot lines;
	  • m from any exterior side lot line.
	• On lots 0.4 ha or larger, 10 m setback to all lot lines.

The indoor production of medical marihuana is not permitted in the following zones on the Mudge Island:

- Park and Institutional (PI)

Table 5: Decourcy Island Zoning Bylaw No. 44

"AGRICULTURE" means the growing, harvesting, processing, storage, and selling of crops, livestock, and poultry originating on the site, and includes the storage, repair, and servicing of farm machinery and implements used on that site, and includes accessory buildings and structures, excluding those used for human habitation, necessary for farm operations	
Zones Where Permitted	***Provisions limiting the extent of the use***
Rural Zone	• 10% lot coverage; • 15 m height max. for buildings; • 30 m setback from any lot line.

The indoor production of medical marihuana is not permitted in the following zones on the Decourcy Island:

- Settlement Residential (S)
- Public Recreation (PR)

Attachment 4

Table 6: Gambier Island LUB No. 86

AGRICULTURE means the use of land, buildings or structures for the growing, rearing, producing or harvesting of agricultural plants, crops, livestock, and other farm animals and includes the processing and sale of products harvested, reared or produced on that lot and the storage of machinery, implements and supplies for use by the agricultural operation.

FARM USE means activities designated as farm use by the Agricultural Land Reserve Use, Subdivision and Procedure Regulation.

(INTENSIVE AGRICULTURE (prohibited in all zones) means for the purposes of this Bylaw the confinement of livestock and fur bearing animals, the growing of mushrooms, land-based aquaculture, hydroponic growing of plants, or growing of plants in illuminated greenhouses between dusk and dawn, whether the use is conducted outside or within a building or structure.)

Zones Where Permitted	***Provisions limiting the extent of the use***

Settlement Residential (SR), agriculture permitted on lots 2 ha or larger
 	
Rural Residential (RR) agriculture is permitted on lots 1 ha or larger
	• Lot coverage for SR AND RR:
	  • Lots less than 1 hectare in area: 25%;
	  • Lots 1 hectare to less than 2 hectare in area: 20%;
	  • Lots 2 hectares to less than 3 hectares in area: 18%;
	  • Lots 3 hectares to less than 4 hectare in area: 15%;
	  • Lots 4 hectares to less than 10 hectares in area: 12%
	  • Lots 10 hectares and greater in area: 10%.
	
	• Setbacks for SR and RR zones:
	  • 7.5 metres from any front or rear lot line;
	  • 3 metres from any interior side lot line;
	  • 4.5 metres from any exterior side lot line.

Agriculture (A)	• Lot coverage is 10% • Setback of 30 m from front lot line, 15 from rear, interior, exterior lot lines.
Sea Ranch Comprehensive Development (CD1), agriculture permitted in “Area 1” and Farm Use permitted in “Area 2”	• Lot coverage - maximum 3000 sq ft for all buildings and structures on common property. • Minimum setback for any building or structure accessory to farm use from any lot line, including a strata lot line, is 15 metres.

The indoor production of medical marihuana is not permitted in the following zones on Gambier Island:

- Forest (F)
- Local Commercial (C1)
- Industrial (I)
- Community Service (S1)
- Local Service (S2)
- Recreation Service (S3)

- Community Nature Park (P1)
- Community Park (P2)
- Provincial Park (PP)
- Wilderness Conservation (G1)
- Nature Reserve (G2)

Table 7: Keats Island LUB No. 78

AGRICULTURE means the use of land for the growing, rearing, harvesting, or production of agricultural plants, crops, livestock, and other farm animals on land-based areas.

Zones Where Permitted	***Provisions limiting the extent of the use***

Rural Residential (RR), agriculture permitted on lots larger than 2 ha
 	
Rural Comprehensive (RC), agriculture permitted on lots larger than 2 ha
	• Lot coverage for RR is 25% & 20% for RC;
	• Setbacks for RR and RC zones:
	  • 5.0 m of any front lot line;
	  • 1.5 m of any rear lot line;
	  • 1.5 m of any interior side lot line; or
	  • 3.0 m of any exterior side lot line.

Private Institutional 2 (PI2), agriculture permitted on lots larger than 2 ha	• Lot coverage is 5%;
	• Setbacks:
	  • 5.0 metres of any front lot line;
	  • 1.5 metres of any rear lot line;
	  • 1.5 metres of any interior side lot line;
	  • 3.0 metres of any exterior side lot line.

The indoor production of medical marihuana is not permitted in the following zones on Keats Island:

- Community Residential (CR1)
- Community Residential (CR2)
- Comprehensive Development (CD1)
- Private Institutional 1 (PI1)
- Private Conservation (PC)
- Community Service 1 (CS1)
- Community Service 2 (C2)
- Natural Area Community Park (P1)

Table 8: Gambier Associated Islands LUB No. 120

AGRICULTURE means the use of land for the growing, rearing, harvesting, or production of agricultural plants, crops, livestock and other farm animals.

Zones Where Permitted	***Provisions limiting the extent of the use***
Rural Residential (RR1), Anvil Island, North and South Thormanby Islands, Turnagain Island, Jack Tolmie Island, Echo Island, Tiki Island, Grant Island, North, East, South and West Trail Islands, Surrey Islets, Bertha Islet, Merry Island, Franklin Island, Woolridge Island, Popham Islands, Mickey Island, Ragged Island, New (Silver) Island and Hermit Island.	• 25% lot coverage; • 7.5 m setback from any lot line.

The indoor production of medical marihuana is not permitted in the following zones on the Gambier Associated Islands:

- Small Lot Rural Residential (SRR)
- Rural Residential 2 (RR2)
- Rural Residential 3 (RR3)
- Rural Residential 4 (RR4)
- Rural Residential 5 (RR5)
- Private Institutional (PI1)
- Park (Park)
- Private Conservation (PC)
- Forest (F)
- Community Service (CS)

Attachment 5

Table 9: Hornby Island LUB No. 86

agriculture means the use of land for the growing, rearing, producing and harvesting of agricultural products and animals, including the processing on an individual farm of the primary agricultural products harvested, reared or produced on that farm;

Zones Where Permitted	***Provisions limiting the extent of the use***

Rural Residential (R3) Zone and R3(a) (Agriculture as an accessory use)	• 10% lot coverage on lots 1 ha or larger
	• 15% lot coverage on lots less than 1 ha
	• Setbacks:
	  • 8 m from a front lot line;
	  • 8 m from a rear lot line, and on lots less than 1 ac, 6 m;
	  • 6 m from an interior side lot line, and on lots less than 1 ac, 3 m;
	  • 8 m from an exterior side lot line, and on lots less than 1 ac, 6 m.

Large Lot Residential/Water Resource Protection (LR/WSPA) Zone	• 10% lot coverage on lots 1 ha or larger;
	• 15% lot coverage on lots less than 1 ha;
	• Setbacks:
	  • 8 m from a front and rear lot line;
	  • 8 m from the interior side lot line adjacent to lot 3 of Plan 48077, and at least 6 metres from any other interior side lot line;
	  • 8 m from an exterior side lot line.

Agricultural (AG) Zone	• 10% lot coverage; • 8 m setback from all lot lines;
Upland (UP) Zone	• 5% lot coverage; • 8 m setback from all lot lines.

Land Cooperative 1 (LC 1) Zone	• 10% lot coverage;
	• Setbacks:
	  • 8 m setback from front, rear and exterior lot lines;
	  • 6 m setback from interior lot lines.

The indoor production of medical marihuana is not permitted in the following zones on Hornby Island:

- Small Lot Residential (R1) Zone
- Compact Residential (R2) Zone
- Public Use (PU) Zone And Pu(B)
- Institutional Residential (I2) Zone
- Rural Service (C1) Zone
- Retail Commercial (C2) Zone
- Service Station Commercial (C2-1) Zone
- Comprehensive Commercial (C3) Zone
- Commercial Resort (C4) Zone
- Commercial Resort-Marina (C5) Zone

- Commercial Resort-Marina 1 (C5-1) Zone
- Commercial Campground (C6) Zone
- Commercial Campground 1 (C6-1) Zone
- Commercial Parking (C7) Zone
- Groundwater Recharge Area/Sustainable Ecosystem Management Area (GW-EMA) Zone
- Public Park (PR1) Zone
- Public Park Undeveloped (PR2) Zone

Table 10: Proposed Hornby Land Use Bylaw No. 150

agriculture means the use of land, buildings or structures for the growing, rearing, harvesting, processing, marketing or production of agricultural plants, crops or livestock.

Zones Where Permitted	***Provisions limiting the extent of the use***
Residential 2 – Large Lot (R2) Zone, agriculture permitted on lots 2 ha and larger	• On lots 1 ha or more, 10 % lot coverage & on lots < 1ha lot coverage is 15%; • 8 m setback from front, rear, exterior lots lines and 6 m from interior lot lines.
Residential 4 – Forest (R4) Zone, agriculture permitted on lots 2 ha and larger	• Lot coverage is 5%; • 8 m setback from all lot lines.
Agriculture 1 (A1) Zone	• On lots 1 ha or more , 10 % lot coverage & on lots < 1ha lot coverage is 15%; • 8 m setback from all lot lines.
Agriculture 2 – Agricultural/Residential (A2) Zone	• On lots 1.0 ha or more, lot coverage is 5 % & on lots < 1 ha, lot coverage is 15%; • 8 m setback from all lot lines.
Agriculture 3 - Agriculture/Residential (A3) Zone	• 10% lot coverage; • 8 m setback from front, rear, exterior lots lines and 6 m from interior lot lines.
Agriculture 4 – Agricultural/Residential (A4) Zone	• On lots 1.0 ha or more, lot coverage is 5 %, on lots < 1 ha lot coverage is 15%; • 8 m setback from all lot lines.

The indoor production of medical marihuana is not permitted in the following zones in the proposed bylaw:

- Residential 1 – Small Lot (R1) Zone
- Residential 3 – Community Housing (R3) Zone
- Residential 3A – Community Housing (R3A) Zone
- Commercial 1 – Retail (C1) Zone
- Commercial 2 – Limited Commercial (C2) Zone
- Commercial 3 – Comprehensive Commercial (C3) Zone
- Commercial 4 – Resort (C4) Zone
- Commercial 5 – Comprehensive Commercial (C5) Zone
- Commercial 6 – Resort (C6) Zone
- Commercial 7 – Campground (C7) Zone
- Commercial 8 – Campground (C8) Zone
- Ecosystem Protection/Groundwater Recharge (EP1) Zone
- Water Supply Protection Area (WS) Zone
- Public Park 1 (P1) Zone
- Public Park 2 – Undeveloped (P2) Park Zone
- Public Use (PU) Zone

Attachment 6

Table 11: Lasqueti Island LUB No. 78

AGRICULTURE means:
on non-Agricultural Land Reserve areas, means the use of land, buildings or structures for the growing, rearing, producing or harvesting of crops, livestock, poultry and other animals subject to Provincial Regulation and includes the processing and sale of products harvested, reared or produced on that parcel and the storage of machinery, implements and supplies for use by the agricultural operation; and
on land within the Agriculture Land Reserve, in addition to the above, means the use of land for activities designated as farm use in terms of the *Agricultural Land Reserve Use, Subdivision and Procedure Regulation* and the use of land for farm operation, as defined in the *Farm Practices Protection (Right to Farm) Act*; and
agricultural uses include the processing of farm products grown off the farm where at least 50% (by volume) of the inputs for the processed farm products are grown or reared on the farm;

Zones Where Permitted	***Provisions limiting the extent of the use***
Land Based (LB)	• No lot coverage regulations; • No setback regulations.

The indoor production of medical marihuana is not permitted in the following zones on Lasqueti Island:

- Institutional 1 (IN1)
- Commercial 1 (C1)
- Commercial 2 (C2)
- Commercial 3 (C3)
- Industrial 1 (I1)
- Industrial 2 (I2)
- Industrial 3 (I3)
- Industrial 4 (I4)
- Industrial 5 (I5)

Attachment 7

Table 12: Thetis Island LUB No. 89

AGRICULTURE means the use of land for the rearing of plants and animals.
NOTE: This bylaw defines "intensive agriculture as below in Section 915 of the *Local Government Act*.

Section 215 *Local Government Act*:
In this section, "intensive agriculture" means the use of land, buildings and other structures by a commercial enterprise or an institution for
(a) the confinement of poultry, livestock or fur bearing animals, or
(b) the growing of mushrooms.
(2) Despite a zoning bylaw, if land is located in an agricultural land reserve under the *Agricultural Land Commission Act* and that land is not subject to section 23 (1) of that Act, intensive agriculture is permitted as a use.
(3) Subsections (1) and (2) cease to have effect in an area after a zoning bylaw for that area is approved under section 903 (5).

Indoor production of medical marihuana would NOT be permitted under the above definitions; however, regardless, the use is permitted on ALR lands.

Zones Where Permitted	***Provisions limiting the extent of the use***

Agriculture (A-1) ALR Lands	• Lot coverage is 10%;
	• Setbacks:
	  • Buildings and structures for agriculture use, not intensive agriculture must be sited not less than:
	  • 10 metres from front and exterior side lot lines;
	  • 4.5 metres from rear or side lot lines; and
	  • 4.5 metres from all wells and streams.
	  • All other buildings and structures must not be sited less than:
	  • 7.5 metres from front, rear and exterior lot lines;
	  • 3.0 metres from an interior side lot line.

The indoor production of medical marihuana is not permitted in the following zones on Thetis Island:

- Rural 2 (R2)
- Institutional 1, 2, 3 (I1, I2, I3)
- Public Utility 2 (S2)
- Rural Residential (R1)
- Commercial 1 (C1)
- Commercial 2 (C2)
- Community Service (C1)

Table 13: Valdes Island Rural Land Use Bylaw No. 42

AGRICULTURE means a use providing for the growing, rearing, producing and harvesting of agricultural products including the processing on an individual farm of the primary agricultural products harvested, reared or produced on that farm and the storage or repair of farm machinery and implements.

Zones Where Permitted	***Provisions limiting the extent of the use***
Rural 1, 2 (R1,R2)	• Agriculture permitted in Rural 1 and 2 zones; • Lot coverage is 5%; • No building shall be located within 3 metres (9.8 feet) of any lot line or within 4.5 metres (14.8 feet) of front and exterior lot lines.

The indoor production of medical marihuana is not permitted in the following zones on Valdes Island:

- Forest Wilderness (FW)
- Recreational Resource (RR)
- Recreation Home (RH)

Islands Trust

ISLANDS TRUST FUND

Memorandum

200 1627 Fort Street, BC V8R 1H8
Telephone 250**. 405.5186** FAX: 250. 405.5151
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www.islandstrust.bc.ca www.islandstrustfund.bc.ca

Date: May 27, 2014

To: Hornby Island Local Trust Committee

From: Kate Emmings, Ecosystem Protection Specialist, Islands Trust Fund

Re: Islands Trust/Islands Trust Fund Forage Fish Habitat Mapping – Hornby Island

DESCRIPTION OF ISSUE:

Forage fish habitat was mapped on Denman, Hornby and Thetis islands in 2013-2014. The attached report offers details of the surveys.

Thirty-four (34) beaches on Hornby were deemed suitable for surf smelt and Pacific sand lance spawning for a total of 7.25 km of shoreline (21.7% of the Hornby Island coastline). Most of the habitat was suitable for both surf smelt and sand lance, although some areas were species specific. Of the 34 beaches identified, 6 had foreshore modifications (e.g. docks, break waters, boat ramps, stairs, etc.) and 31 had modified backshore zones (e.g. buildings and upland structures associated with foreshore modifications). Aquaculture infrastructure was present on suitable spawning beaches. Generally, landowners should be encouraged to promote and maintain natural vegetation that provides overhanging shade as it was noted absent in several areas.

Nearby Denman Island has lost forage fish spawning habitat due to invasive *Spartina* spp (Cordgrass). Spread of this invasive weed to Hornby should be monitored and it should be eradicated if observed. See http://www.coastalisc.com/images/stories/Documents/2009spartina%20id%20cards-2.pdf for information on reporting and removing *Spartina*.

Conclusions of the Report:
Healthy spawning habitat requires appropriate sediment inputs and outputs, good water quality, marine riparian vegetation and overhanging shade vegetation. The following are some recommendations of the "Thetis, Hornby and Denman Islands Beach Spawning Forage Fish Habitat Suitability Assessments":

- Restore and replant marine riparian and overhanging shade vegetation in areas where it is absent.
- Encourage landowners to trim tree branches and shrubs, rather than removing them.
- Prevent construction of shoreline modifications wherever possible, especially those that harden the shoreline.
- Have appropriate shoreline setbacks, especially in areas of erosion.
- Manage storm water inputs to marine areas by encouraging landowners to place structures and land modifications away from the shoreline and encouraging the use of pervious surfaces over impervious surfaces.
- Encourage beach accesses that serve several landowners rather than individual beach accesses, especially in high bank and bluff areas. Sign beach accesses well.

- Consider shoreline regulations and associated bylaw enforcement resources to support healthy forage fish beaches.
- Enforce existing shoreline regulations and provide adequate resources for bylaw enforcement.
- Provide information to landowners regarding good stewardship of forage fish beaches.

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), 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.

Project History:
The forage fish mapping project began in the 2012-2013 fiscal year with a pilot project on North and South Pender. A contract with the BC Marine Conservation and Research Society to map forage fish habitat on Hornby, Denman and Thetis concluded in March 2014. In 2014-2015, the mapping project will be expanded to Gambier and Bowen islands and will be managed by Local Planning Services and Bowen municipal staff.

Forage Fish:
Forage fish are "small schooling fishes that are prey for larger animals." They are an important component of the marine food web, for example, 72% of the diet of Chinook salmon is made up of surf smelt and Pacific sand lance and Chinook are a favoured fish for resident Killer Whales. The beach spawners that were the subject of the habitat suitability assessments in 2013-2014 were surf smelt and Pacific sand lance.

NEXT STEPS: The report and maps have been posted to the Islands Trust Fund website. ITF staff will also issue a news release regarding the new mapping and will make the mapping and data available to the public on the MapIT website and via the GIS Coordinator.

Options for Local Trust Committees:
Local trust committees may consider directing planning staff as follows:
1) Provide links to the forage fish habitat mapping on the local trust committee websites;
2) Research options to include forage fish habitat protection in their official community plans and regulatory bylaws as per the Islands Trust Policy Statement, section 3.4.4 (see background above); and,
3) Work with island communities to create and distribute information about forage fish spawning areas and best practices for land management in forage fish spawning areas.

Trustees may also consider promoting forage fish mapping in trustee reports and through trustee mailing lists.

ATTACHMENTS:

Report: Thetis, Hornby and Denman Islands Beach Spawning Forage Fish Habitat Suitability Assessments Hornby Island
Map: Suitable Forage Fish Habitat, Hornby Island

Thetis, Hornby and Denman Islands
Beach Spawning
Forage Fish Habitat Suitability Assessments

Henry Bay, Denman Island
Photo: D. Woodward

Prepared for the Islands Trust and Islands Trust Fund

Prepared by:
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British Columbia Marine Conservation and Research Society
March 30, 2014

Beach Spawning Forage Fish Habitat Suitability Assessments Thetis, Hornby, and Denman Island Sept 2013 – Feb 2014

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Acknowledgements

Island residents and BC Shore Spawners Alliance community groups on Thetis, Hornby and Denman assisted with accommodation and field logistics: Peter and Simone Luckham, Howard and Mary Jane Stewart, Dorrie Woodward, Morley and Shelley McKeachie, Tony and Carol Quin, Friends of Forage Fish Thetis Island, Association of Denman Island Marine Stewards, and Conservancy Hornby Island. Dorrie Woodward assisted in the field during Denman Island assessments. Many shoreline property owners provided access to shoreline areas. For laboratory assistance and technical overview, I thank Mr. Dan Penttila, Salish Sea Biological, former Forage Fish Expert with the Washington Department of Fish and Wildlife.

Island community groups working with the BC Shore Spawners Alliance project have been involved with conducting spawning surveys. Association of Denman Island Marine Stewards have been conducting spawning surveys with the BC Shore Spawners Alliance project from 2010 to present. Hundreds of hours of volunteer work have been contributed by numerous Denman Island volunteers as well as training, lab processing and data management by the author and Mr. Dan Penttila. Conservancy Hornby Island contributed data from earlier field efforts and recent spawning surveys (Dec 2013- Jan 2014). Thetis Island Friends of Forage Fish earlier field assessments assisted with field logistics.

1. Introduction

The term “forage fish” refers to small schooling fishes that are prey for larger animals. Forage fish include species such as herring, anchovy, sardines, capelin, smelt and sand lance. This study focusses on beach spawning forage fish: Pacific sand lance and surf smelt.

Beach spawning forage fish are a critical prey source for hundreds of marine predators in the Strait of Georgia. Pacific sand lance are often referred to as the most important fish in the North East Pacific due to this species role as forage for marine fishes, seabirds and marine mammals (Robards 1999). Surf smelt are also important prey for marine predators. Surf smelt are managed by the Department of Fisheries and Oceans under the Surf Smelt Management Plan for commercial and recreational fishers and their population abundance in the Strait of Georgia is declining (Therriault et al 2002). Surf smelt and Pacific sand lance spawning habitats are protected under Section 35 of the Federal *Fisheries Act*.

1.1 Role of forage fish in marine ecosystems

Pacific sand lance and surf smelt are important to the recovery of marine species at risk (from Humpback and Killer whales to Marbled Murrelets); the marine survival of salmon (such as Chinook and Coho); and the survival of provincially blue-listed coastal cutthroat trout. Both Chinook and Coho feed on sand lance both as juveniles and as adults.

Numerous fish, seabird, and marine mammal populations are in precipitous decline in British Columbia and scientists have started to look at the link between forage fish biomass reduction and these declining populations.

1.2 Connections to other valued ecosystem components

Forage fish depend on nearshore habitat for their survival. Herring spawn on marine vegetation such as eelgrass and seaweeds and Pacific sand lance and surf smelt spawn high up the beach near the log line. Like numerous fish species, surf smelt and Pacific sand lance also require subtidal areas such as kelp forests for rearing.

2. Beach Spawning Forage Fish Habitat

Beach spawning forage fish of commercial, recreational and ecological value in the Strait of Georgia are the capelin, surf smelt (*Hypomesus pretiosus)* and Pacific sand lance (*Ammodytes hexapterus)*. The Washington Department of Fish and Wildlife has conducted extensive surveys in Puget Sound and produced maps of spawning habitat (Penttila, D. 2007). Approximately 10% of Puget Sound beaches are used by surf smelt for spawning and 10% are used by Pacific sand lance (Penttila 2007). Unfortunately critical spawning habitat of these two forage fishes has not been mapped in British Columbia.

Surf smelt and Pacific sand lance depend on a healthy nearshore and beach habitat, and they are vulnerable to impacts from shoreline development. Beaches with natural erosion processes supplying appropriate sized gravels and extant marine riparian zones are an optimal state for spawning surf smelt and sand lance. Of primary importance for spawning is the mixture of gravels and sand.

Komas Feeder Bluff, Denman Is.
Photo: D.Woodward

3. Spawning Habitat Characteristics

3.1 Intertidal Elevation

The highest densities of embryos found to date have been in the upper beach slope between the high water seaweed wrack zone and the low high water seaweed wrack zone. Consistently, mixed embryo stages are found in samples taken from +1.5 m to +4.5 m above chart datum and can be found at the highest extent of the maximum high tides. Sand lance spawn may also be found on the sand flat edge near the beach slope (Penttila 2001b, Penttila 2007, de Graaf unpublished data); however, this area of the intertidal has been sparsely sampled.

3.2 Sediment Characteristics

Both surf smelt and sand lance embryos can be found on certain beaches in the same beach sediment sample collected along the upper beach slope. Surf smelt are reported to spawn in sediments of fine “pea pebble”/sand to coarse pebble/sand beaches with the bulk of the pooled data set having material of 1-10 mm; although full grain size spectra show numerous sample sets with a

wide range of pebble/sand including coarse pebble greater than 2.6 cm (Penttila 2001c). Surf smelt do not spawn in coarse sand beaches without pebble due to the unique attachment pedestal of the osmerid egg (they are gravel-dependent spawners). Sand lance are reported to spawn in sediments of coarse sand/pebble with the bulk of the pooled data set (67%) having material of a median grain size of 0.2 – 0.4 mm and a portion of the data set (25%) being gravel-coarse sand from 1 – 7mm (Penttila 2001c; 2007). Recent findings in British Columbia reveal that sand lance embryos are also found in beaches bearing a high percentage of coarse pebble greater than 2.6 cm (de Graaf unpublished data). Sand lance embryos are found throughout the range of surf smelt bearing sediments as well as coarse sand. Pacific Sand lance do not spawn on fine silt and cobble (Penttila 2007). In British Columbia, both surf smelt and sand lance embryos can be found throughout a beach drift cell in the erosion, transport and accretion zones (de Graaf, unpublished data, presented at American Fisheries Society Conference Sept 2011). Over 40 years of government sponsored surveys in Puget Sound and carried out by Mr. Penttila has yielded important data on the spawning habitat of these two species. With recent attention to surveys in the Strait of Georgia and the outer coast of Vancouver Island, our understanding of beach spawning habitat types has increased.

3.3 Beach Biophysical Characteristics

Beaches in British Columbia bearing surf smelt and Pacific sand lance spawning sites are typically of sand/pebble in the upper component of the beach slope, a cobble component seaward, followed by a sand or mud flat toward the low tide zone. The width of the sand/pebble component (commonly referred to as the B1 component) is variable and can range from 0.5 m to over 10 m in width.

4. Spawning Seasons

Surf smelt are known to spawn year round in Puget Sound and also have distinct winter and summer spawning stocks (Penttila 2007). In British Columbia, summer and year round spawning beaches have been detected (de Graaf unpublished data). Sand lance spawning is from Nov – January with incubating embryos detected into February (30-45 day fall/winter incubation period). Data compilation for spawning periods for regions of British Columbia has begun due to the extraordinary effort of 30+ communities working with the author through the BC Shore Spawners Alliance (BCSSA), a project of the BC Marine Conservation and Research Society. In the Islands Trust Area, communities are presently undertaking spawning surveys with the BCSSA as the Gulf Islands Forage Fish Initiative.

5. Threats to Beach Spawning Forage Fish Habitat

Shoreline modifications can negatively impact the nearshore marine food web in numerous ways, but are a primary threat to surf smelt and sand lance spawning beaches (Penttila 2007).

Many human activities impact and alter marine shorelines either through disruption of the sediment drift cell or by physical alteration of the beach, including: piers, pilings, docks, jetties, groins, breakwaters, riprap, seawalls and others. Marine shellfish aquaculture in foreshore areas can affect beach spawning forage fish habitat. Diversion of sediment-bearing streams through culverts can also starve beaches of spawning sediment. Many of these activities render beaches unusable for spawning. These shoreline modifications can also limit sediment exchange in the shallow subtidal where sand lance is known to burrow.

The presence of overhanging vegetation in marine riparian zones is important for the ecological function of nearshore marine habitats providing insect prey for migrating fish (Levings and Jamieson 2001; Brennan and Culverwell 2004) and having a positive effect on summer surf smelt spawn survival (Penttila 2001a, Penttila 2007, Rice 2006). The loss of shade increases thermal stress and desiccation to incubating eggs as sediment temperatures rise resulting in increased mortality of buried eggs (Penttila 2007, Rice 2006). Vegetation buffers the drying effect of winds; and where beaches have lost riparian zones, eggs can also suffer a higher mortality than normal due to wind-induced desiccation effects.

Other threats to surf smelt and sand lance eggs include contamination from acute oil spill events and chronic oiling which can result in 100% mortality of surf smelt eggs. Oiling from vessel operations near beaches can potentially cause mortality of incubating forage fish eggs (herring, sand lance, and surf smelt) (Penttila 2005).

6. Introduction to the Beach Spawning Forage Fish Habitat Assessment

6.1 General Introduction

To refine the study area, a sediment maps were produced from the Coastal Resource Information Management System, DataBC (DataBC Catalogue 2013). The data layer used to produce the sediment map was the shoreline biophysical classification by repetitive shore type. All shore-units of unconsolidated sediments were investigated along the entire shoreline length of Thetis, Hornby and

Denman Islands. Unconsolidated sediments include silt, mud, sand, and gravels. Shore-units of consolidated sediment (rock) were also reviewed to ensure that no suitable habitats were present.

Thetis Island surveys took place on September 14-16, 2013, November 8, 2013, and February 5, 7, and 9, 2014. Hornby Island surveys took place on October 17-21, 2013. Denman Island surveys took place on September 19-22, 2013, November 19-24, 2013, and February 17-21, 2014.

From October to November, 2013, no major storm activity was noted for the Strait of Georgia. During February 2014 surveys, weather events did not appear to change the beach sediment character as comparisons with data sets from 2009-2012 showed similar beach sediment attribute scores.

Data acquired by the author and by BC Shore Spawners Alliance community groups (Thetis Island Friends of Forage Fish, Conservancy Hornby Island, and Association for Denman Island Marine Stewards) have been incorporated into this report.

6.2 Area Surveyed

The entire coastlines of Thetis, Hornby, and Denman Islands were surveyed by foot with the exception of some areas of consolidated sediment (rocky beaches, rock terraces etc.). Areas with consolidated sediment types interspersed with unconsolidated sediment types were mapped to provide an estimate of total shoreline area surveyed. Contiguous shoreline areas of consolidated sediments were surveyed by kayak and boat to ensure the absence of pocket coves.

Areas surveyed included areas with drift cell attributes of erosional faces that graded into beach areas. These are areas with unconsolidated sediments of gravel/sand as well as mud/silt areas. Gravel is defined as pebble, cobble and boulder.

Beach units of pebble and sand were assessed for spawning habitat suitability. Areas of mud/silt were assessed for the presence of upper bands of pebble and sand.

7. Methods

Forage Fish Habitat Assessments – Assessing Suitable Forage Fish Spawning Habitat

Actual forage fish spawning beaches are determined after a two-year embryo survey and the presence of two or more embryos in a sample (Moulton and Penttila 2001). In the absence of such comprehensive surveys, beaches may be classified as suitable surf smelt/Pacific sand lance spawning habitat following a habitat assessment. The habitat assessment protocol used in this project, the Forage Fish Habitat Assessment, has been developed through a collaboration of forage fish biologists from British Columbia and Washington State. Due to the current transition of the Department of Fisheries and Oceans Habitat Program to the Fisheries Protection Program and numerous staff reassignments, the FFHA protocol vetting process has been stalled.

7.1 General Methodology

A habitat suitability model is based on the observed response of an animal to specific environmental attributes (Robinson et al 2013). The Forage Fish Habitat Assessment (FFHA) entails a survey of habitat attributes for each area of unconsolidated sediments making up the upper component of intertidal beaches (beach berm/beach face and mid intertidal). Measurements are taken of physical variables of the beach units and grain-size samples assessed. Additional variables are measured to assess human activities that may have directly modified the foreshore or adjacent backshore areas. Assessments are conducted by experienced beach spawning forage fish biologists/technicians. These data are used to predict the suitability of beach units relative to beach units observed to be spawning habitat for spawning activity by surf smelt and Pacific sand lance.

Physical variables from suitable beaches are compared to a database of habitats that were monitored using spawning surveys (over 2 years) for surf smelt and/or Pacific sand lance in British Columbia and Washington State. The software program PRIMER-E, a multivariate statistical program, set at an 80% similarity threshold, is used to test suitable beaches to this BC/WA database. The PRIMER-E software program is used extensively by ecologists to describe similarities and differences among biological communities, habitat types, or for monitoring biological communities and habitats.

Using statistical analyses, a statistical probability can be assigned to each beach unit measured. Beaches are assigned as being suitable spawning habitat for surf smelt, Pacific sand lance, or both

surf smelt/Pacific sand lance. Beach units assessed in the field but failing statistical analysis are assigned as “Not Suitable Spawning Habitat”. Beach units assigned as “Not Spawning Habitat" are those consisting of mud, silt, rock or shallow pebble layers (veneers) over rock.

For shoreline property owners undertaking works that may impact fish and their habitat, a project review by the Department of Fisheries and Oceans (DFO) may be required. In the absence of a two-year spawning survey, a FFHA can provide a good indication of suitable surf smelt and sand lance habitat for use by landowners and other agencies responsible for shoreline management.

A detailed description of the survey methodology has been provided to the Islands Trust/Islands Trust Fund and is available upon request for the purposes of verifying the validity of the data collection and analysis.

7.2 Confirmed Spawning Habitats

On Denman Island, the Association of Denman Island Marine Stewards has been working as part of the BC Shore Spawners Alliance Project since 2009. Surf smelt and Pacific sand lance spawning activity on Denman Island beaches has been detected. These data are to be produced separate report.

On Hornby Island, Conservancy Hornby Island has been working as part of the BC Shore Spawners Alliance Project since 2009. Pacific sand lance spawning activity on Hornby Island beaches has been detected. These data are to be provided in a separate report.

7.3 GPS/GIS Methodology

7.3.1 Spatial Data Specifications

A Trimble Juno 3B receiver was used to acquire spatial data. GPS data were post-corrected using Path Finder Office software. GPS data were collected according to the GPS Specifications provided by the Islands Trust as part of this contract (Appendix G).

7.3.2 Digitizing Spatial Data and Map Production

Maps of line segments were produced by digitizing spatial data following the protocol in Appendix H.

8.0 Project Limitations

The project was limited to assessing beaches as suitable spawning habitat for two species of beach spawning forage fish, surf smelt and Pacific sand lance. Data for this study was compiled before major fall/winter storm events. The methods used in a forage fish habitat assessment do not allow one to determine the presence or absence of spawning activity as sediments are not collected for nor screened for the presence of embryos. Spawning surveys are conducted over two spawning seasons (24 months) and follow strict protocols (Moulton and Penttila 2001). The project undertaken grades beaches as being “suitable” spawning beaches, but it does not confirm the presence or absence of spawning activity.

The degree to which aquaculture structures located on the mid-lower portions of the foreshore affect sediment delivery to upper spawning areas is uncertain and would require further research to assess.

9. Results

9.1 Thetis Island

9.1.1 Grain-Size and Statistical Analyses

In total, 65 beach units were assessed during field assessments or using statistical analyses. In the field, 12 beach units were classified as “not spawning habitat” being composed of either consolidated sediment types (boulder or rock ramp habitats) or unconsolidated sediments unfavourable for spawning (mud, silt, cobble, or shallow pebble veneer layers). Fifty-three (53) beach units were composed of unconsolidated sediments representing potential forage fish spawning habitat.

Grain-size analyses were used to test for likelihood of beaches to support spawning. All grain-size frequencies curves were classified to Type curves. All of the 53 beach units showed grain-size frequencies curves that were within 80% and higher similarity to known positive spawning beaches (Appendix B).

Principal Component Analysis of beach metrics, including grain-size analyses, clustered all 53 beaches within 80% similarity to known positive beaches in BC and Washington State. Forty-eight (48) of these beaches had continuous habitat and five (5) had discontinuous habitat. Nine (9) beaches were comprised of unconsolidated sediments such as mud, silt, cobble that are not suitable as spawning habitat (Figure 1).

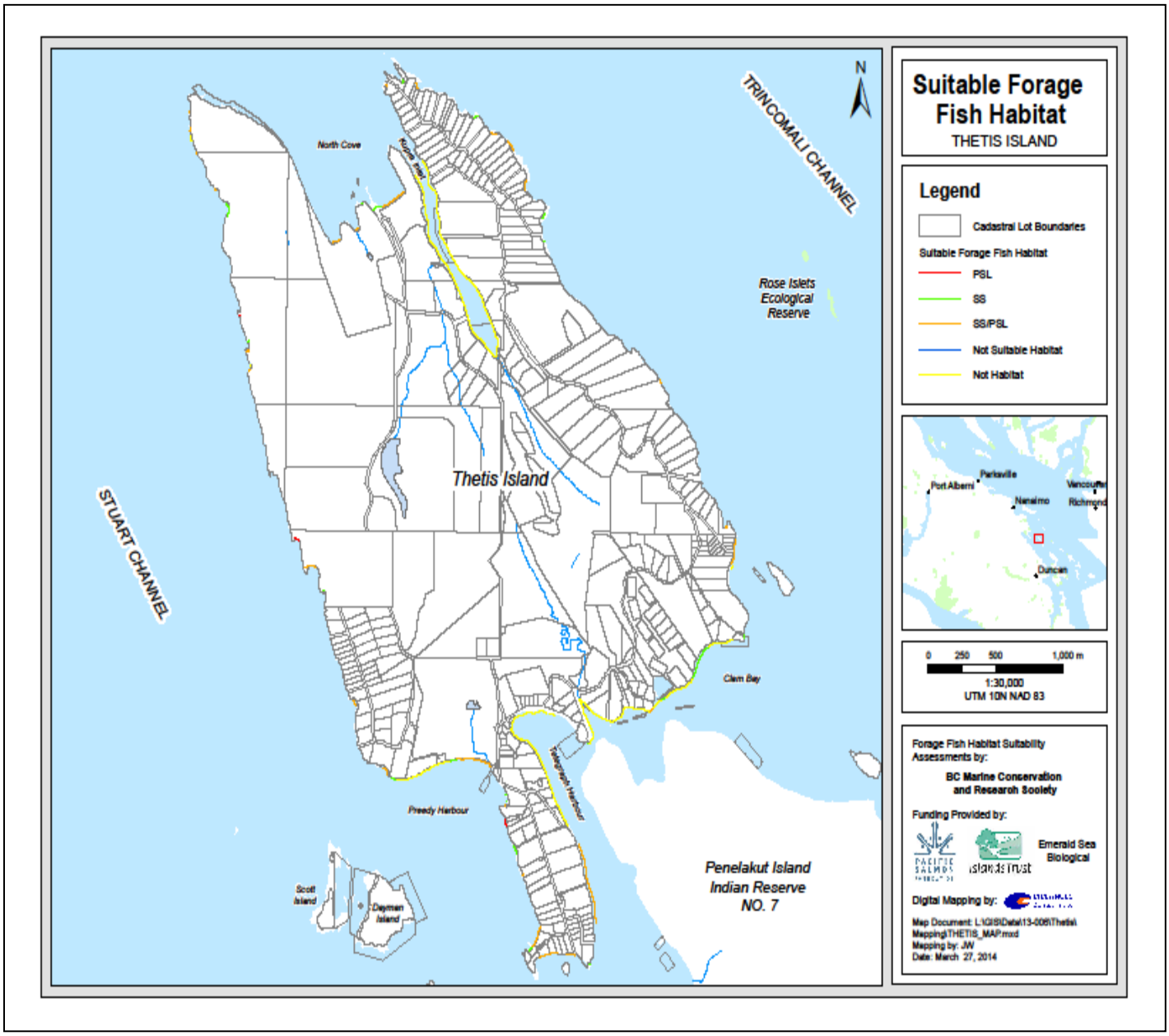


Figure 1: Thetis Island:
Suitable surf smelt and Pacific sand lance Spawning Habitats

9.1.2 Length of Suitable Forage Fish Spawning Habitat

A total of 9,096 m of shoreline was assessed. The total length of suitable spawning habitat is 3,180 meters and classified as 825 m specific to surf smelt (26%), 94 m specific to Pacific sand lance (3%), and 2,261 meters as mixed surf smelt/Pacific sand lance spawning habitat (71%) (Table1). Beach units assessed as "not spawning habitat" encompassed 5,916 m.

The shoreline perimeter distance (length) of Thetis Island is 26.6 kilometers (26,651.1 m). Suitable forage fish spawning beaches are distributed along approximately 11.9% of the Thetis Island shoreline length with 3.1% as surf smelt, 0.4% as Pacific sand lance, and 8.5% as mixed surf smelt/Pacific sand lance spawning habitats (Table 1).

Table 1: Classification of Thetis Island
Suitable Forage Fish Beach Units

	SS	PSL	SS/PSL	Total
Length (m)	825	94	2261	3,180
Length Percentage (%)	26%	3%	71%	
Percentage of Thetis Shoreline	3.10%	0.35%	8.50%	11.90%

SS - Surf smelt
PSL - Pacific sand lance

9.1.3 Suitable Forage Fish Spawning Habitat Types

Of the 53 suitable spawning beaches, 21 were classified as surf smelt, 3 as Pacific sand lance, and 29 as mixed surf smelt/Pacific sand lance spawning habitat (Table 2). Of the surf smelt beaches, grain size analyses assessed 15 as Type 1; 4 as Type 2; and 2 as Type 3 Surf Smelt beaches. Of

the Pacific sand lance beaches, grain size analyses assessed 1 as Type 1 and 2 as Type 3 Pacific Sand lance beaches. Of the mixed surf smelt/Pacific sand lance beaches, grain size analyses assessed 2 as Type 1, 18 as Type 2, 7 as Type 3, and 2 as Type 4 Surf Smelt beaches (Appendix A).

Table 2: Thetis Island Grain-Size Types

	SS	PSL	SS/PSL
PSL TYPE 1		1	
PSL TYPE 2			
PSL TYPE 3		2	
SS TYPE 1	15		2
SSTYPE 2	4		18
SS TYPE 3	2		7
SS TYPE 4			2
SS TYPE 5			

9.1.4 Geographic Distribution of Suitable Forage Fish Spawning Beaches

Dividing Thetis Island into north, south, west and east coast lines, 5 beach units are located on the north coast (2 SS, 3, SS/PSL); 21 beach units are located on the south coast (11 SS, 1 PSL, 9 SS/PSL); 16 beach units on the west coast (4 SS, 2 PSL, 10 SS/PSL); and 11 on the east coast (4 SS and 7 SS/PSL) (Table 3).

Table 3: Thetis Island
Geographic Distribution of
Suitable Forage Fish Beach Units

	SS	PSL	SS/PSL	Total
North	2	0	3	5
South	11	1	9	21
West	4	2	10	16
East	4	0	7	11

9.1.5 Foreshore Modification

Modification of the foreshore is classified as a percentage of the length of the beach unit that has been altered from a natural state by structures that would impede movement of sediments either to the beach or along the beach. Of the 53 beach units suitable for forage fish spawning, 62% (33) had unmodified shorelines ; 19% (10) were 1-25% impacted; 7.5% (4) were 26-50% impacted; 4% (2) were 51-75% impacted; and 7.5% (4) were 75-100% impacted(Table 4).

Table 4: Foreshore Modification - Thetis Island

	0% impact	1-25% Impact	26-50% Impact	51-75% Impact	76-100% Impact
Count	33	10	4	2	4
Percentage	62	19	7.5	4	7.5

9.1.6 Foreshore and Backshore Structures

Of the 53 suitable forage fish spawning beach units, 20 were classified as having modified foreshore zones. Within the foreshore, the presence of sediment impeding structures were classified and enumerated. In total 28 structures were classified into 10 categories (Table 5).

Three beach units had 1 foreshore structure each, 5 beach units had 2 different foreshore structures, and 2 beach units had 3 foreshore structures.

Of the suitable spawning beach units, 47 (89%) had modified backshore zones. Buildings (cabins, houses, sheds, etc.) are not enumerated but only classified as present or absent. All other individual structures were counted. The 59 backshore structures were classified into seven categories (Table 5).

Table 5: Foreshore and Backshore Structures - Thetis Island

	Foreshore		Backshore	
	Count	Percentage	Count	Percentage
Building			42	71
Boat Ramp	4	14	2	3
Break Water	2	7		0
Boat House		0		0
Concrete Posts	1	4		0
Dock/Wooden Pier	2	7	1	2
Patio Deck	1	4		0
Railway ties	1	4		0
Road	1	4	4	7
Riprap	9	32	1	2
Seawall	4	14	4	7
Stairs to Beach	3	11	5	8
Total	28	100%	59	100%

9.1.7 Overhanging Shade Vegetation

Marine riparian overhanging shade is classified into percentage of the length of the beach unit with tree branches overhanging the spawning zone. Trees and shrubs located above the high water mark are generally subject to removal by property owners. Of the 53 suitable forage fish spawning habitat beach units, 26% of the beach units had no overhanging shade; 25% had 1-25% overhanging shade; 13% had 26-50% overhanging shade; 6% had 51-75% overhanging shade; 30% had 76-100% overhanging shade)(Table 6).

Marine riparian vegetation may be absent due to soil conditions, the type of land form, or due to landscaping. Of the beach units suitable for forage fish spawning there were: 14 beach units with 0% overhanging shade, 29% had modified foreshore and 93% modified backshore zones; 13 beach units with 1-25% overhanging shade, 54% had modified foreshore and 92% modified backshore zones; 7 beach units with 26-50% overhanging shade had 29% modified foreshore and 100% modified backshore zones; 3 beach units with 51-75% overhanging shade had 0% modified foreshore and 76% modified backshore zones; and 16 beach units with 75-100% overhanging shade had 44% modified foreshore and 81% modified back shore zones (Table 6). In general, foreshore and backshore areas had significant losses of overhanging shade vegetation with 64% (34) of beach units having only 1-50% overhanging shade cover.

Table 6: Overhanging Shade Vegetation and Shoreline Modification - Thetis Island

	Fully exposed	1-25% Shade	26-50% Shade	51-75% Shade	76-100% Shade	Total
Count	14	13	7	3	16	53
Percentage	26	25	13	6	30	
Foreshore Modification Percentage	29%	54%	29%	0%	44%	
Backshore Modification Percentage	93%	92%	100%	67%	81%	

9.2 Hornby Island

9.2.1 Grain-Size and Statistical Analyses

In total, 59 beach units were assessed during field assessments or using statistical analyses. In the field, 17 beach units were classified as “not spawning habitat” being composed of either consolidated sediment types (boulder or rock ramp habitats) or unconsolidated sediments unfavourable for spawning (mud, silt, cobble, or shallow pebble veneer layers).

Of the beach units classified as “not spawning habitat”, there was habitat degradation due to compaction or alteration of sediments for industrial roads by shellfish aquaculture in the upper intertidal at one beach unit.

Grain-size analyses were used to test for likelihood of beaches to support spawning. All grain-size frequencies curves were classified to Type curves. All of the 34 beaches showed grain-size frequencies curves that were within 80% and higher similarity to known positive spawning beaches (Appendix D). The grain-size frequencies of 8 beaches did not meet the statistical standards of the analysis.

Principal Component Analysis of beach metrics, including grain-size analyses assessed 34 beach units within 80% similarity to known positive beaches in BC and Washington State and were classified as “suitable habitat”(Figure 2). Eight (8) beach units failed statistical analyses, the same beach units with non-conforming grain-sizes, and were classified as “not suitable habitat”. Of the 34 beach units comprising “suitable habitat” 26 beach units these beach units had continuous habitat and 8 had discontinuous habitat.

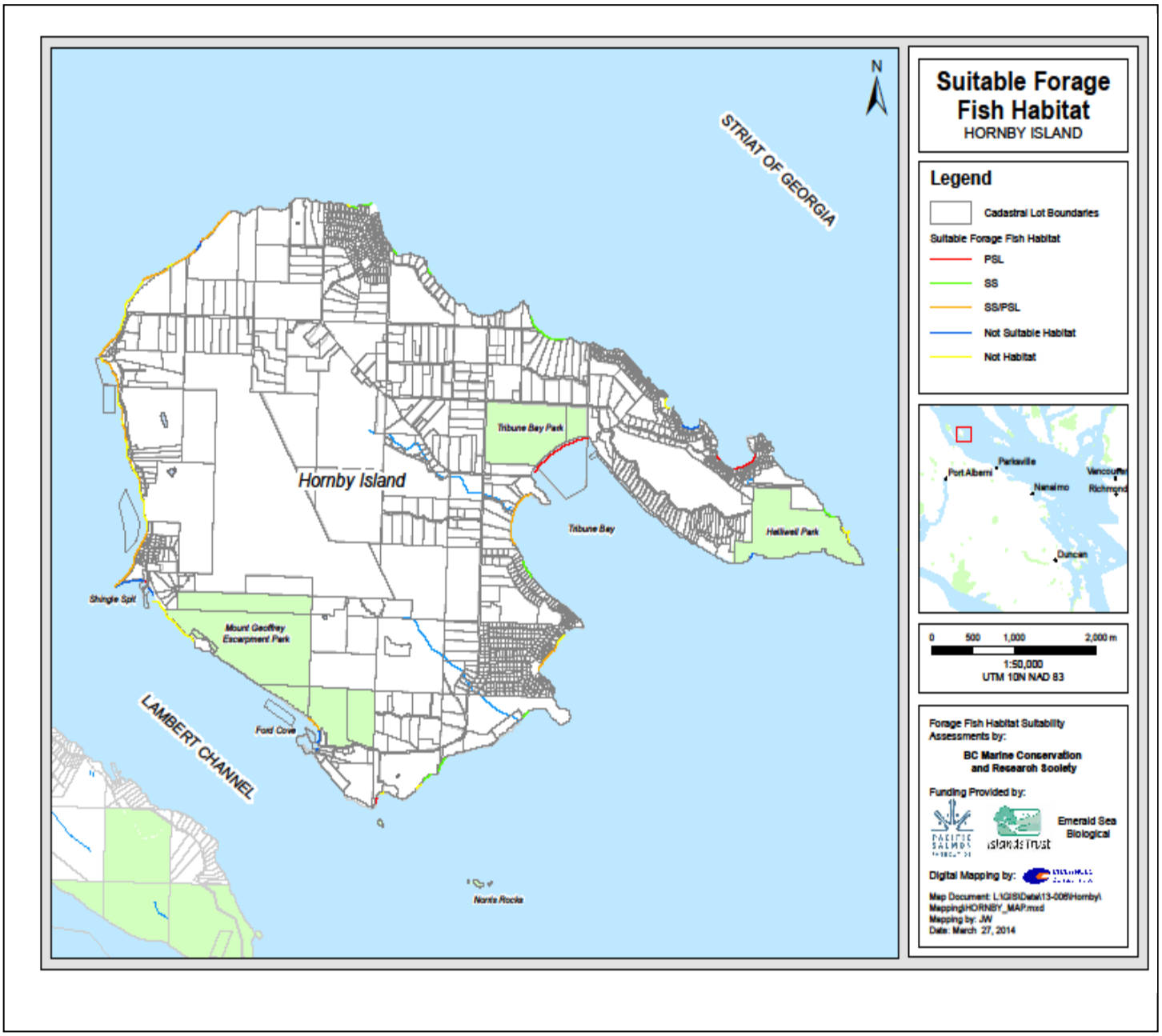


Figure 2: Hornby Island
Suitable surf smelt and Pacific sand lance Spawning Habitats

9.2.2 Length of Potential Forage Fish Spawning Habitat

A total of 11,317.5 m of shoreline were assessed. The total length of suitable spawning habitat on Hornby Island is 7,252.5 meters and classified as 1,607 m specific to surf smelt (22%), 1,293.6 m Pacific sand lance (18 %), and 4,351.9 meters as mixed surf smelt/Pacific sand lance spawning habitat (60%) (Table 7). 1,014.8 m of habitat was assessed as "not suitable spawning habitat" (Section 9.2.1) and 3,049.7 m as "not spawning habitat" (Section 9.2.1).

The shoreline perimeter distance of Hornby Island is 26.6 kilometers (26,651 m). Suitable forage fish spawning beaches are distributed along approximately 21.7% of the Hornby Island shoreline length with 4.8% as surf smelt, 3.9% as Pacific sand lance, and 13.0% as mixed surf smelt/Pacific sand lance spawning habitats.

Table 7: Classification of Hornby Island
Suitable Forage Fish Beach Units

	SS	PSL	SS/PSL	Total
Length (m)	1607	1294	4352	7,253
Length Percentage (%)	22%	18%	60%	
Percentage of Hornby Shoreline	4.8%	3.9%	13.0%	21.70%

SS - Surf smelt
PSL - Pacific sand lance

9.2.3 Suitable Forage Fish Spawning Habitat Types

Of the 34 suitable spawning beach units, 10 were classified as surf smelt, 6 were classified as Pacific sand lance, and 18 as mixed surf smelt/Pacific sand lance spawning habitat (Table 8). Of the beach units, grain size analyses assessed 6 as Type 1, 1 as Type 2, 3 as Type 5 surf smelt habitats. Of the

beach units, grain size analyses assessed 6 as Pacific sand lance Type 3 habitats. Of the mixed surf smelt/Pacific sand lance beaches, grain size analysis assessed 1 as Type 1; 5 as Type 2; 8 as Type 3, and 4 as Type 4 Surf Smelt beaches (Appendix C).

Table 8: Hornby Island Grain-Size Types

	SS	PSL	SS/PSL
PSL TYPE 1			
PSL TYPE 2			
PSL TYPE 3		6	
SS TYPE 1	6		1
SSTYPE 2	1		5
SS TYPE 3			8
SS TYPE 4			4
SS TYPE 5	3		
Totals	10	6	18

9.2.4 Geographic Distribution of Suitable Forage Fish Spawning Beaches

Dividing Hornby Island into north, south, west and east coast lines, 5 beach units are located on the north coast (3SS, 2PSL); 5 beach units are located on the south coast (3 SS, 1 PSL, 1 SS/PSL); 15 beach units on the west coast (2 PSL, 13 SS/PSL); and 9 on the east coast (5 SS and 4 SS/PSL) (Table 9).

Table 9: Hornby Island Geographic Distribution
Suitable Forage Fish Beach Units

	SS	PSL	SS/PSL	Total
North	3	2		5
South	3	1	1	5
West		2	13	15
East	5		4	9

9.2.5 Foreshore Modification

Foreshore modification was assessed for beach units scored as suitable habitat. Modification of the foreshore is classified as a percentage of the length of the beach unit that has been altered from a natural state by structures that would impede movement of sediments either to the beach or along the beach. Of the 34 beach units suitable for forage fish spawning, 28 (82%) of the beach units had unmodified shorelines and 6 (18%) were modified (15% were 1-25% impacted; and 1 (3%) was 75-100% impacted) (Table 10).

Table 10: Foreshore Modification - Hornby Island

	0% impact	1-25% Impact	26-50% Impact	51-75% Impact	76-100% Impact
Count	28	5			1
Percentage	82	15			3

9.2.6 Foreshore and Backshore Structures

Of the 34 suitable forage fish spawning beach units, 9 beach units had modified foreshore zones, the presence of sediment impeding structures was classified and counted. Aquaculture structures were not enumerated but classified as present or absent. Twelve (12) structures were classified into 8 categories (Table 11). Six (6) beach units had 1 foreshore structure each and 3 beach units had 2 foreshore structures each.

Of the beach units suitable for forage fish spawning, 91% (31) had modified backshore zones. Buildings (cabins, houses, sheds, etc.) are not enumerated but only classified as present or absent.

All other structures were counted. Forty-six (46) backshore structures were classified into 5 categories. 31 beach units had backshore structures (Table 11).

Table 11: Foreshore and Backshore Structures - Hornby Island

	Foreshore		Backshore	
	Count	Percentage	Count	Percentage
Building			31	67
Boat Ramp			1	2
Break Water				
Boat House				
Concrete Posts				
Dock/Wooden Pier	1	8		
Jetty (ferry, other)	2	17		
Pilings	1	8		
Pier, concrete	1	8		
Road			6	13
Riprap	1	8	1	2
Seawall				
Stairs to Beach			7	15
Aquaculture berming (bivalve)	4	33		
Aquaculture Groins	1	8		
Aquaculture Roads	1	8		
Aquaculture Driving				
Total	12		46	

9.2.7 Overhanging Shade Vegetation

Marine riparian overhanging shade is classified into percentage of the length of the beach unit with tree branches overhanging the spawning zone. Trees and shrubs are, generally, located above the high water mark and subject to removal by property owners. Of the suitable forage fish spawning beach units, 57% of the beach units had no overhanging shade; 29% had 1-25% overhanging shade; 9% had 26-50% overhanging shade; and 6% had 51-75% overhanging shade; 0% had 76-100% overhanging shade (Table 12).

Marine riparian vegetation may be absent due to soil conditions, the type of land form, or due to landscaping. Of the suitable forage fish spawning beach units with no overhanging shade, 10.5% had modified foreshore and 100% modified backshore zones; beaches with 1-25% overhanging shade had 1% modified foreshore and 80% modified backshore zones; beaches with 26-50% overhanging shade had 67% modified foreshore and 100% modified backshore zones; beaches with 51-75% overhanging shade had 50% modified foreshore and 50% modified backshore zones (Table 12). In general, the absence of overhanging shade vegetation within the beach units (foreshore and backshore zones) was apparent. Ninety-four percent (94%) of the beach units had 1-50% overhanging shade vegetation, 6% had 51-75% overhanging shade vegetation, and no beach units had 76-100% overhanding shade vegetation.

Table 12: Overhanging Shade Vegetation - Hornby Island

	Fully exposed	1-25% Shade	26-50% Shade	51-75% Shade	76-100% Shade	Total
Count	19	10	3	2	0	34
Percentage	56	29	9	6		
Foreshore Modification Percentage	11%	1%	67%	50%	0%	
Backshore Modification Percentage	100%	80%	100%	50%		

9.3 Denman Island

9.3.1 Grain-Size and Statistical Analyses

In total, 152 beach units were assessed. In the field, 26 beach units were classified as “not habitat” being composed of either consolidated sediment types (boulder or rock ramp habitats) or unconsolidated sediments unfavourable for spawning (mud, silt, cobble, or shallow pebble veneer layers). It is possible that some of these beach units classified as cobble and boulder lack fine sediments due to blockage of sediment movement by aquaculture structures in the mid and lower foreshore zones but determination of this is beyond the scope of this survey.

An additional 14 beach units were determined not to be habitat due to modifications of the upper shoreline area. Residential riprap armouring completely buried habitat at one (1) beach unit. There was habitat degradation due to complete intrusion of *Spartina* spp. at one (1) beach unit. There was habitat degradation due to compaction or alteration of sediments for industrial roads by shellfish aquaculture in the upper intertidal together with co-occurrence of *Spartina* spp. at twelve (12) beach units. These particular modifications accounted for approximately 2,678.9 meters of habitat modification not accounted for in foreshore modification scores of suitable spawning habitats (Figure 3).

One hundred and twelve (112) beach units were composed of unconsolidated sediments. Grain-size analyses were used to test for likelihood of beaches to support spawning. All grain-size frequencies curves were classified to Type curves. One hundred and nine (109) of the beach units showed grain-size frequencies curves that were within 80% and higher similarity to known positive spawning beaches. The grain-size frequencies of three (3) samples did not meet the statistical standards of the analysis due to high mud/silt contents (Appendix F).

Principal Component Analysis of beach metrics, including grain-size analyses, assessed 109 beach units within 80% similarity to known positive beaches in British Columbia and Washington State and were classified as “suitable spawning habitat” (Figure 3). Three (3) of the beach units failed statistical analyses, the same beach units with non-conforming grain-sizes, and were classified as “not suitable spawning habitat”. Of the 109 beach units classified as suitable forage fish spawning habitat, 88 had continuous habitat and 21 had discontinuous habitat (Figure 3).

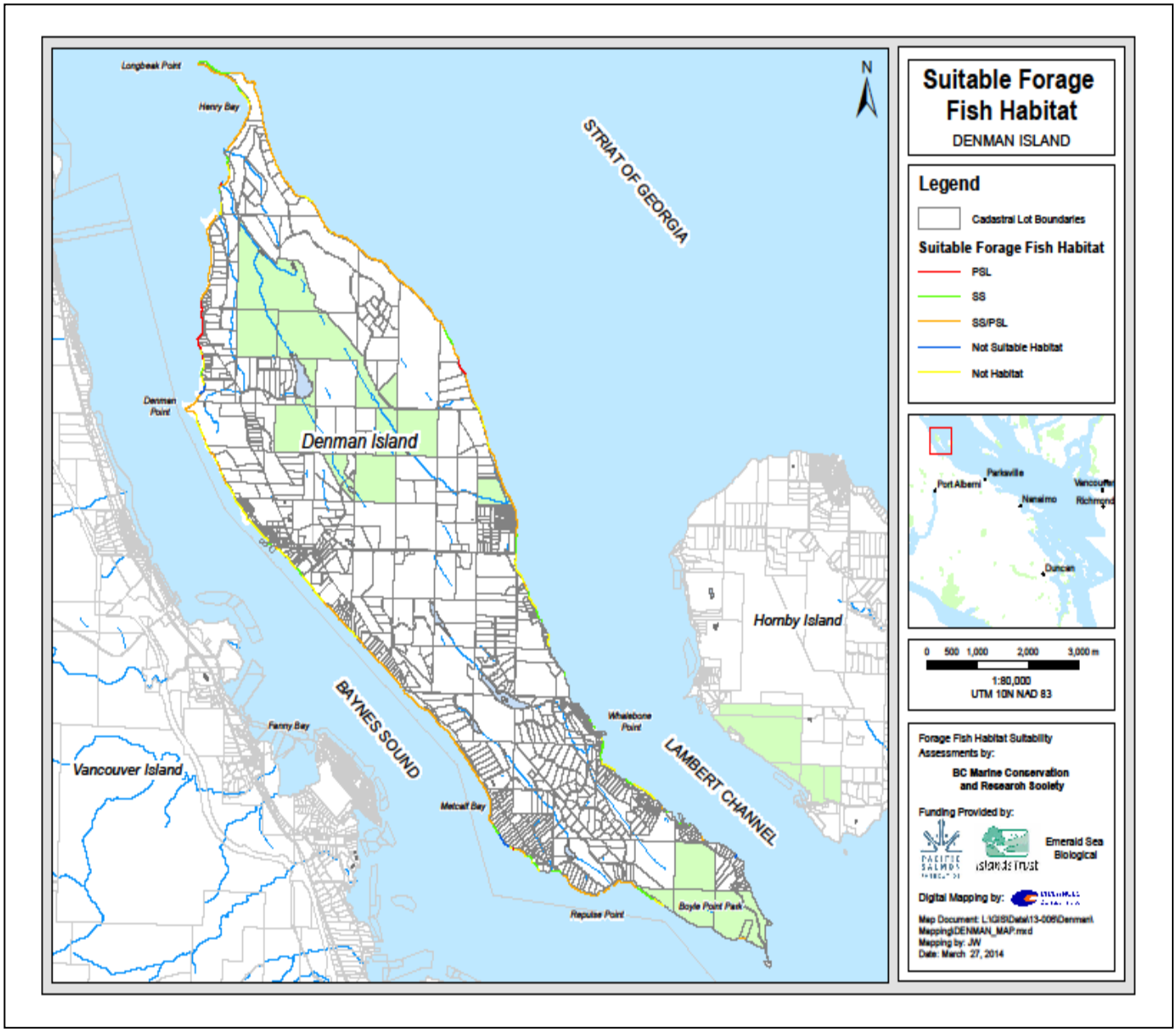


Figure 3: Denman Island
Suitable surf smelt and Pacific sand lance Spawning Habitats

9.3.2 Length of Suitable Forage Fish Spawning Habitat

The total length of suitable spawning habitat on Denman Island is 26,341 m and was classified as 4,102 m specific to surf smelt (15.6%), 1,410.1 m Pacific sand lance (5.4%), and 20,828.1 meters as mixed surf smelt/Pacific sand lance spawning habitat (79.0%) (Table 13). 563.5 m of habitat was assessed as “not suitable spawning habitat” (Section 9.3.1) and 8,228.6 m as “not spawning habitat” (section 9.3.1).

The shoreline perimeter distance of Denman Island is 44 kilometers (44,092.7 m). Suitable forage fish spawning beach units are distributed along approximately 59.7% of the Denman Island shoreline length with 9.3% as surf smelt, 3.2% as Pacific sand lance, and 47.2% as mixed surf smelt/Pacific sand lance habitats.

Table 13: Classification of Denman Island Suitable Forage Fish Beach Units

	SS	PSL	SS/PSL	Total
Length (m)	4102	1410.1	20,828	26,341
Length Percentage (%)	15.6%	5.4%	79.0%	
Percentage of Denman Shoreline	9.3%	3.2%	47.2%	59.7

SS - Surf smelt
PSL - Pacific sand lance

9.3.3 Suitable Forage Fish Spawning Habitat Types

Of the 109 suitable spawning beaches, 30 were classified as surf smelt, 8 as Pacific sand lance, and 71 as mixed surf smelt/Pacific sand lance spawning habitat (Table 14). Of the surf smelt beaches, grain size analysis assessed 17 as Type 1, 6 as Type 2, 1 as Type 3, 1 as Type 4, and 5 as Type 5. Of the Pacific sand lance beaches, grain size analysis assessed 6 as Type 1 and 2 as Type 3 Pacific sand lance beaches. Of the mixed surf smelt/Pacific sand lance beaches, grain size analysis assessed 11 as Type 1; 18 as Type 2; 26 as Type 3; and 16 as Type 4 surf smelt beaches (Appendix E). Denman Island surf smelt beaches show the complete range of heterogeneous surf smelt grain-size types which is an uncommon result.

Table 14: Denman Island Grain-Size Types

	SS	PSL	SS/PSL
PSL TYPE 1		6	
PSL TYPE 2			
PSL TYPE 3		2	
SS TYPE 1	17		11
SSTYPE 2	6		18
SS TYPE 3	1		26
SS TYPE 4	1		16
SS TYPE 5	5		
Totals	30	8	71

9.3.4 Geographic Distribution of Suitable Forage Fish Spawning Beaches

Dividing Denman Island into north, south, west and east coast lines, 10 beach units are located on the north coast (4 SS, 6 SS/PSL); 6 beach units are located on the south coast (1SS, 5SS/PSL);

50 beach units on the west coast (10SS, 7 PSL, 33 SS/PSL); and 45 beach units on the east coast (15 SS, 1 PSL, and 27SS/PSL) (Table 15).

Table15: Denman Island - Geographic Distribution of Suitable Forage Fish Beach Units

	SS	PSL	SS/PSL	Total
North	4		6	10
South	1		5	6
West	10	7	33	50
East	15	1	27	45
Totals	30	8	71	109

9.3.5 Foreshore Modification

Beach units scored as suitable habitat were assessed for modifications. Modified beach units were classified by percentage of the length of the beach that has been altered from a natural state by structures that would impede movement of sediments either to the beach or along the beach foreshore, including the beach berm, beach slope, and beach flat (to chart datum).

The majority of intertidal (foreshore) shellfish aquaculture and subsequent infrastructure on Denman Island is found on the West and South coast lines, with the exception of the northern extent of Henry Bay (along Longbeak Point). Applications for subtidal aquaculture leases for geoduck cultivation within Henry Bay and areas of Lambert Channel (east coast) are under review.

Although structures such as boulder groins are known to impede sediment delivery throughout the foreshore (upper to lower zones), the effect on sediment delivery of other structures such as aquaculture berms (bivalve culture) and anti-predator nets is unclear. Due to the unknown effect on sediment delivery by shellfish aquaculture structures/activities in the mid and lower foreshore components, the criteria of percent foreshore modification across the beach foreshore on Denman Island was amended to include only foreshore structures located within the distribution of the beach berm and beach face, the upper beach spawning area.

Eighty-five, 85, (78%) of the beach units had unmodified shorelines and 24 (22%) were modified. Of the 24 beach units, 78% were in a natural state; 15% were 1-25% impacted; 4% were 26-50% impacted; 1.5% were 51-75% impacted; and 1.5% were 75-100% impacted (Table 16).

Table 16: Foreshore Modification of beach slope (B1) - Suitable Spawning Beach Units Denman Island

	0% impact	1-25% Impact	26-50% Impact	51-75% Impact	76-100% Impact
Count	85	16	4	2	2
Percentage	78%	15%	4%	1.50%	1.50%

Within the upper intertidal zone (B1), the number of beach units with modifications due to residential land use was 16, including some boulder groins. The number of beach units with modifications due to shellfish aquaculture tenure usage was 15. Two beach units were modified by ferry terminals.

As noted in Section 9.3.1, 2,606.4 meters of upper beach habitat (B1 component) has been lost to aquaculture roads and the co-occurrence of aquaculture roads with invasion of *Spartina* spp. over 13 beach units. Of these, 11 beach units accounting for 1,852.6 meters were contiguous with suitable spawning areas and would likely have been scored as suitable forage fish spawning habitats. Aquaculture industrial roads are also present in the mid and lower foreshore components.

9.3.6 Foreshore and Backshore Structures

Of the 24 suitable forage fish spawning beach units with modified upper foreshore zones, the presence of sediment impeding structures was classified and enumerated. Aquaculture structures were not enumerated but classified as present or absent. Evidence of aquaculture driving was also noted in areas not compacted but where tire treads were evident. In total 45 structures/activities were classified into 16 categories (Table 17). Including structures from beach units classified as “not habitat”, 58 structures/activities were classified in 16 categories. 14 beach units had 1 foreshore structure each; and 10 beach units had 2 foreshore structures.

Of the suitable spawning beach units, 76 (70%) had modified backshore zones and 11 beach units at the toe of high bluffs were unable to be assessed for presence of structures or modifications. Buildings (cabins, houses, sheds, etc.) are not enumerated but only classified as present or absent. All other structures were numerated. Eight-two (82) backshore structures were enumerated and classified into 7 categories (Table 17).

Four (4) beach units had three backshore structures and 25 beach units had two backshore structures. The most common combination of three structures was building, seawall and riprap armouring. The most common combination of two structures was buildings and stairways to beaches and buildings with roadways.

Table 17: Upper Foreshore Structures/Activities and Backshore Structures - Denman Island

	Upper Foreshore		Backshore	
	Count Suitable Habitats (Count Not Habitat)	Percentage Suitable Habitats	Count	Percentage
Boulder Berms	2	4.4%		
Building	1	2.2%	45	54.9%
Boat Ramp				
Break Water	2	4.4%		
Boat House			2	2.4%
Concrete Posts				
Dock/Wooden Pier				
Groins (Residential)	5	11.1%		
Jetty (ferry, other)	2	4.4%		
Other	2	4.4%	4	4.9%
Pilings	2	4.4%		
Pier, concrete				
Road	1	2.2%	19	23.2%
Riprap	11(1)	24.4%	2	2.4%
Seawall	3	6.7%	2	2.4%
Spartina	1	2.2%		
Stairs to Beach	1	2.2%	8	9.8%
Aquaculture berming (bivalve)	1	2.2%		
Aquaculture Groins	2	4.4%		
Aquaculture Roads	1(12)	2.2%		
Aquaculture Driving	8	17.8%		
Total	45(58)		82	

9.3.7 Overhanging Shade Vegetation

Marine riparian overhanging shade is classified into percentage of the length of the beach unit with tree branches overhanging the spawning zone. Trees and shrubs are generally located above the high water mark and subject to removal by property owners. Of the 109 suitable beach units, 37% of the beach units had no overhanging shade; 25 had 1-25% overhead shade; 16 had 26-50% overhanging shade; 7 had 51-75% overhanging shade; 16 had 76-100% overhanging (Table 18).

Marine riparian vegetation may be absent due to soil conditions, the type of land form, or due to landscaping. Of the 40 suitable beach units with no overhanging shade vegetation, 18% had modified foreshore and 70% had modified backshore zones; of the 27 beach units with 1-25% overhanging shade, 33% had modified foreshore and 74% modified backshore zones; of the 17 beach units with 26-50% overhanging shade 18% had modified foreshore and 53% had modified backshore zones; of the 8 beach units with 51-75% overhanging shade 25% had modified foreshore and 75% had modified backshore zones; and of the 17 beach units with 75-100% overhanging shade 18% had modified foreshore and 47% had modified backshore zones (Table 18). In general, foreshore and backshore areas had significant losses of shade bearing trees with 84 beach units (77%) having only 1-50% overhanging shade.

Table 18: Overhanging Shade Vegetation - Denman Island

	Fully exposed	1-25% Shade	26-50% Shade	51-75% Shade	76-100% Shade	Total
Count	40	27	17	8	17	109
Percentage	37%	25%	16%	7%	16%	
Foreshore Modification Percentage	18%	33%	18%	25%	18%	
Backshore Modification Percentage	70%	74%	53%	75%	47%	

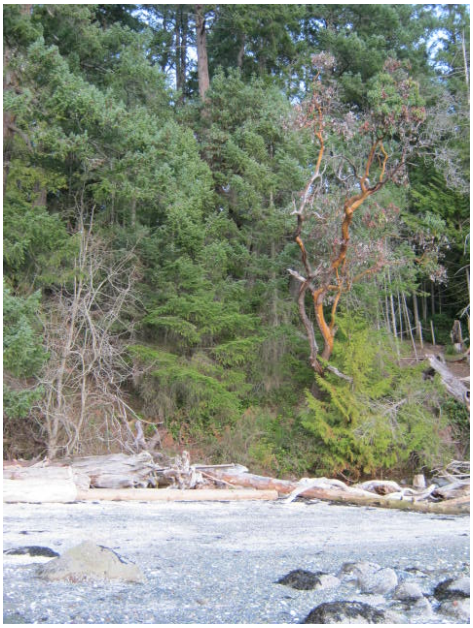
10. Summary and Recommendations

10.1 General

As stated in the introduction, particular marine shorelines are critical fish habitat for spawning surf smelt and Pacific sand lance, and also provide rearing grounds for juvenile salmonids. Forage Fish Habitat Assessments (FFHAs) can grade beaches as to their spawning suitability only. Where resources permit, the Islands Trust and the Island Trust Fund should support further forage fish habitat spawning surveys and community involvement in marine habitat stewardship.

Marine riparian vegetation, gravel/sand beaches and good water-quality are important to the health of these spawning areas. A healthy surf smelt/Pacific sand lance spawning beach has an intact marine riparian buffer zone, overhanging shade vegetation, a supply of pebble and sand and clean water. Shade from overhanging shoreline vegetation keeps summer surf smelt eggs moist. Removing shoreline vegetation increases temperatures within the spawning gravels; and on hot summer days, surf smelt egg mortality is high (Penttila 2001, Rice 2006). Key to maintaining and restoring these shoreline areas will be measures to limit physical structures that negatively affect sediment transport as well as actions that protect marine riparian vegetation and water quality. Land-owner education and expanded spawning surveys are all central to protecting these beaches.

Marine riparian vegetation is a valued ecosystem component that provides benefits for human security and benefits to the ecosystem. Recent studies from Puget Sound and Squamish confirm the use of marine shorelines as rearing habitat for juvenile salmonids, such as Chinook. Dietary analyses show that up to 50% of the stomach contents of juvenile Chinook were composed of insect “windfall”, insects transported by winds from marine shoreline vegetation to the water’s surface (Brennan and Culverwell 2004).



Marine Riparian Vegetation
Thetis Island - Photo: RC de Graaf

10.2 Specific Recommendations

With approximately 37 kilometers of suitable spawning habitat Thetis, Hornby and Denman Islands provide excellent opportunities to safeguard and protect these critical fish habitats.

Overhanging Shade Vegetation:

Foreshore areas lacking vegetation and overhanging vegetation could benefit by restoring vegetation. Overtime, restoration of shrubs, alders, arbutus, maples and other trees in some areas would also provide overhanging shade for summer surf smelt embryos and insect prey for juvenile salmonids. Replanting vegetation benefits property owners by stabilizing shoreline sediments. This is particularly important on high bank and bluff habitats. With careful site planning, shoreline vegetation and other landowner values, such as views, can be maintained.

Overhanging Shade Vegetation
North Pender
Photo: RC de Graaf

The islands had different percentages of remaining marine riparian vegetation along the foreshore with reduced overhanging shade habitat. On Thetis, 64% of beach units had only 1-50% cover of overhanging shade, Hornby 94% of beach units had only 1-50% cover of overhanging shade, and on Denman 77% of beach units had only 1-50% cover of overhanging shade. These differences may be due to land forms, soils, and landscaping. Encouraging stewardship practices that involve trimming tree branches and shrubs, rather than vegetation removal, will maintain nutrient subsidies to marine ecosystem as well as protect shorelines from accelerated rates of erosion.

Shoreline structures:

Thetis, Hornby Island, and Denman Islands have a low number of modified shorelines supporting suitable forage fish spawning habitats (38%, 18%, and 22% respectively). While the number of concrete/wooden seawalls and riprap revetments affecting potential forage fish beaches was not high, there were some shoreline properties that had significant hardening. In light of future sea level change predictions, as well as shoreline development, pressures to harden shorelines will increase.

Structures placed along shorelines can impede sediment delivery to shorelines either by blocking transport along the beach or blocking sediment transport from eroding land forms. Overtime, beaches lack sediment "nourishment" and will coarsen. Some structures, such as hard structures (seawalls, riprap boulders, retaining walls) have various impacts on the foreshore, but generally these structures can increase erosion due to wave-induced scouring on the face of these structures. Overtime, fine sediments are scoured from the beach surface, slopes steepen, and sediments coarsen. Foreshore structures may also be placed directly on top of spawning habitat. The cumulative effects of shoreline structures have a detrimental impact on beach spawning forage fish habitat.

On Thetis Island, 38% of beach units suitable as forage fish spawning habits were impacted by structures that impeded the delivery of sediments to the beaches or the transport of sediments along the drift cell. On Hornby 18% were impacted by these structures, and on Denman 22% were impacted by these structures. Denman had significant areas of foreshore severely degraded on the upper beach slope resulting in the loss of approximately 2.6 km of habitat likely suitable as spawning habitat.

Only potential forage fish beaches were inventoried for foreshore structures such as seawalls and private docks. There are a significant number of shoreline properties without unconsolidated sediment beaches that have private docks and seawalls as well as areas of mud flats with un-elevated docks and boat ramps. On Thetis Island, numerous un-elevated dock structures are encountered within Telegraph Harbour and "The Cut".

Observations of the presence of suitable forage fish habitat along shoreline areas within shellfish aquaculture tenures are hopefully informative to tenure operators. The information presented is to aid in efforts to better manage these tenures and protect critical fish habitats pursuant to the Federal *Fisheries Act*.

Shoreline Management – Drift Cells and Land forms:

More generally, it was noted that high banks and bluffs are a common land form on Hornby and Denman Islands. Thetis also has some bluffs at the mouth of Telegraph Harbour.

Protecting soils and vegetation on bluff tops is critical to managing erosion. A common perception is that wave forces are largely responsible for eroding bluffs. However, human activity on bluff tops and high-bank land forms often contributes more significantly to slumping bluffs and damage to residential properties (Washington State Department of Ecology 2014). Denman has a large number of properties located on bluff tops along southern, eastern and western coast lines. Maintaining shoreline vegetation in these areas is important.

Landowner response to bluff slumping sometimes includes addition of riprap or seawalls at the high water mark along property lines. The riprap and seawalls can encroach on the foreshore and forage fish spawning areas. Public educational materials about managing surface water runoff are a major recommendation of this report. Modification of bluff top activities would reduce the need for erosion protection at bluff toes, preventing damage to spawning habitat. Managing storm water, setting structures back from the edge, maintaining vegetation and using pervious gravels in driveways are all common ways of protecting bluff top properties. Controlling storm water runoff and reducing impervious surfaces is not just for the shoreline property owner but is part of good management throughout a watershed. Excellent resource materials for managing building on many land forms, including bluffs, are available on the Washington State, Department of Ecology website and through the BC Coastal Stewardship series available at Washington Department of Ecology (www. http://www.ecy.wa.gov) and Green Shores (www.stewardshipcentrebc.ca/greenshores).

Stairways to the beach down bluff faces are a common occurrence on Thetis, Hornby and Denman. The majority of stairways that were constructed down bluffs and high-banks were excellent and appeared to maintain vegetation within the stair footprint. There were some exceptions where vegetation within the construction footprint had been completely removed (Repulse Bay, Denman Island). Along some of these high bank and bluff shores, stairways, gazebo and landings co-occurred with significant areas of vegetation removal (East Road, Denman Island). In some communities, providing better signage and frequency of public beach accesses helps to reduce development of private accesses.

Land-Owner Stewardship

Throughout the islands, continued good stewardship of shoreline vegetation should be actively encouraged and formalized in regulation where appropriate. Section 3.4.4 of the Islands Trust Policy Statement requires that local trust committees address protection of sensitive coastal areas in official

community plans and regulatory bylaws. Section 3.4.5 requires that local trust committees address the planning for and regulation of development in coastal regions to protect natural coastal processes. Suitable forage fish spawning beaches are a sensitive nearshore habitat and protection measures for these beaches could be included in Official Community Plans, Land Use Bylaws and shoreline development permit areas. In creating regulatory protection mechanisms, there should also be consideration of bylaw enforcement.

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Appendix A Beach Type Classifications Thetis Island

Beach Type Classifications - Thetis Island

Surf Smelt Type 1			Surf Smelt Type 2		
Beach Number	Thetis Island Beach Name	Beach Type	Beach Number	Thetis Island Beach Name	Beach Type
3	PIONEERCAMP	SS1	9	CLAMBAYEAST	SS2
6	HBERRYCLAMBAY	SS1	27	THETISTHECUT	SS2
7	CLAMBAY1	SS1	41	OVERBURYFARM2SOUTH	SS2
12	BH_HB3POSITIVE	SS1	50	ENDOFFORBESRD	SS2
20	BELLAVISTARD1	SS1	2	NORTHCOVE2	SS2
23	PREDDYHRSECT2NORTH	SS1	4	PIONEERCAMP2	SS2
26	FAIRVIEWRDEND	SS1	14	TEHRS	SS2
30	COMMDOCKCOVE2	SS1	15	TEHRS2	SS2
31	COMMDOCKCOVE3	SS1	18	FOSTERPNTRDSE1	SS2
32	FOSTERSOUTHEAST	SS1	19	FOSTERPNTRDSE2	SS2
48	NORTH2NOFIRES	SS1	21	BELLAVISTARD2	SS2
54	THETIS-COVENE1	SS1	22	PREDDYHARBSOUTH1	SS2
58	TRINCOLMIRDEND	SS1	29	COMMDOCKCOVE1	SS2
59	PORLIERRDSOUTH1	SS1	34	NR373LUPIN	SS2
62	PORLIERRDNORTH1	SS1	35	SOUTH373LUPIN	SS2
45	THETISNWEST4	SS1	39	CAMPCOLUMBIASOUTH	SS2
47	N1NOFIRES	SS1	46	THETISNWEST5	SS2
			49	RUPERTRD1	SS2
			51	LAWRENCE RD	SS2
			53	SUNRISEPNTRD2	SS2
			56	TRINCOLMIRDCOVE2	SS2
			60	SUNRISENORTHEAST1	SS2

Beach Type Classifications - Thetis Island

Surf Smelt Type 3			Surf Smelt Type 4		
Beach Number	Thetis Island Beach Name	Beach Type	Beach Number	Thetis Island Beach Name	Beach Type
1	NOCOVE1	SS3	10	BH_HB1	SS4
37	BELOWYURT373LUPIN	SS3	55	THETISNECOVE2	SS4
5	PIONEERCAMP3	SS3			
28	FAIRVIEWNORTH1	SS3			
40	OVERBURY FARM	SS3			
42	THETISCOVENW1	SS3			
43	NWESTTHETISIS1	SS3			
57	TRINCOLMIRDCOVE1	SS3			
61	LOT167SOUTH	SS3			
Pacific sand lance Type 1			Pacific sand lance Type 3		
33	373LUPIN	PSL1	38	CAMPCOLUMBIANORTH	PSL3
			25	CUNNINGHAMRD1	PSL3

Appendix B: Beach Type Grain-Size Curves Thetis Island

Appendix B

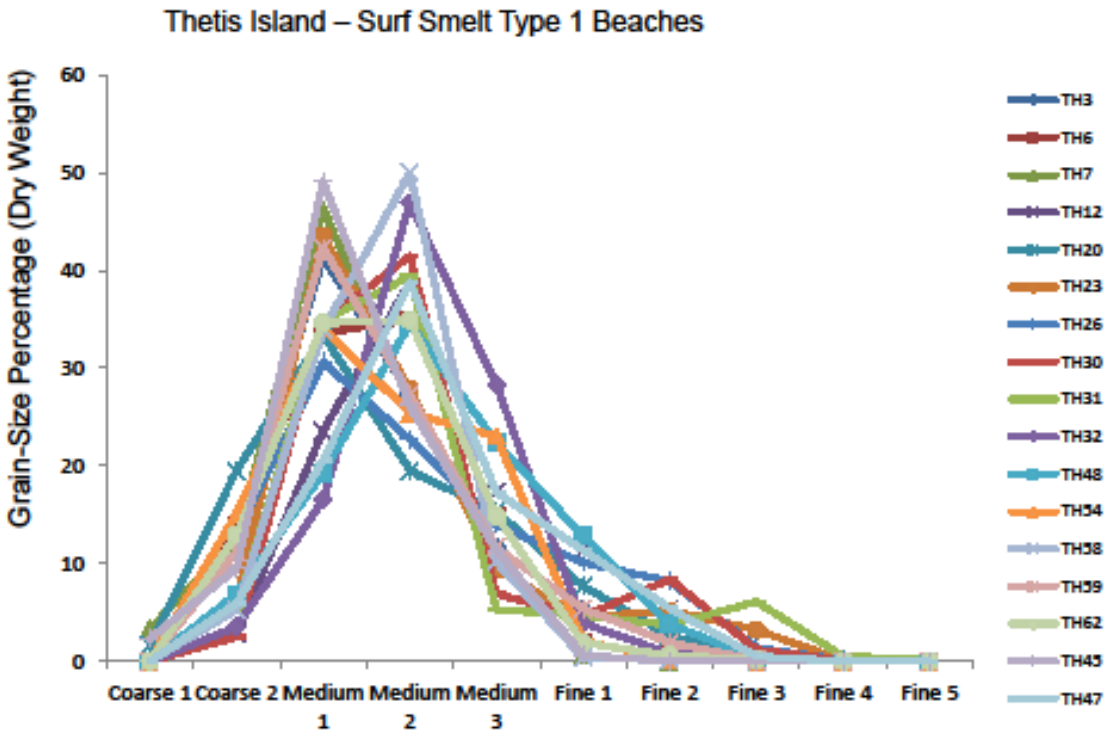


Figure 4: Thetis Island – Surf Smelt Type 1 Beaches

Appendix B

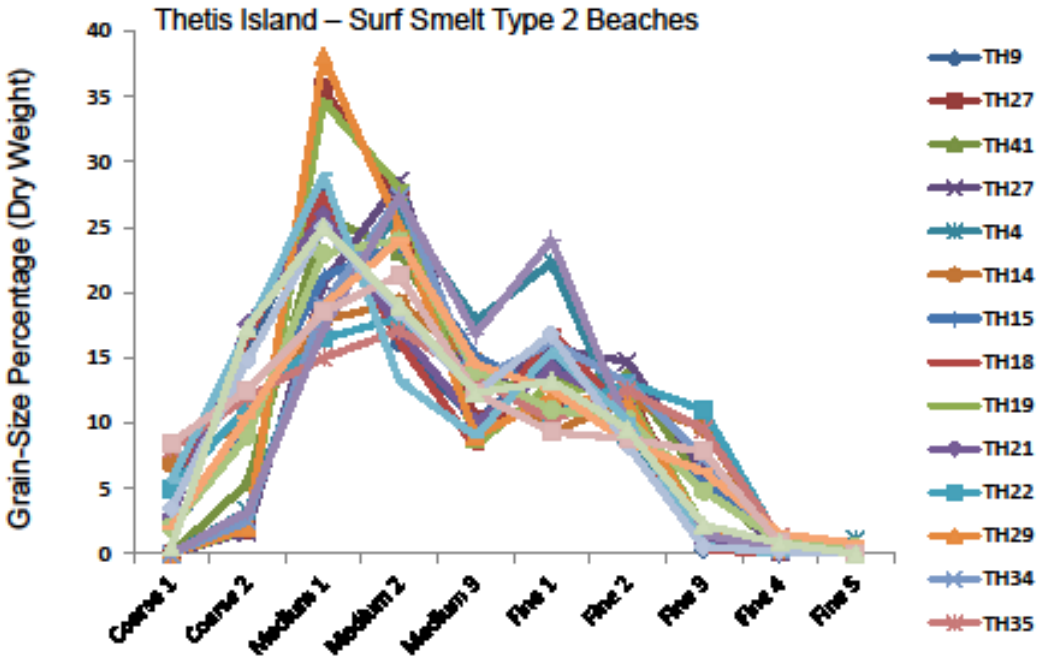


Figure 5: Thetis Island – Surf Smelt Type 2 Beaches

Appendix B

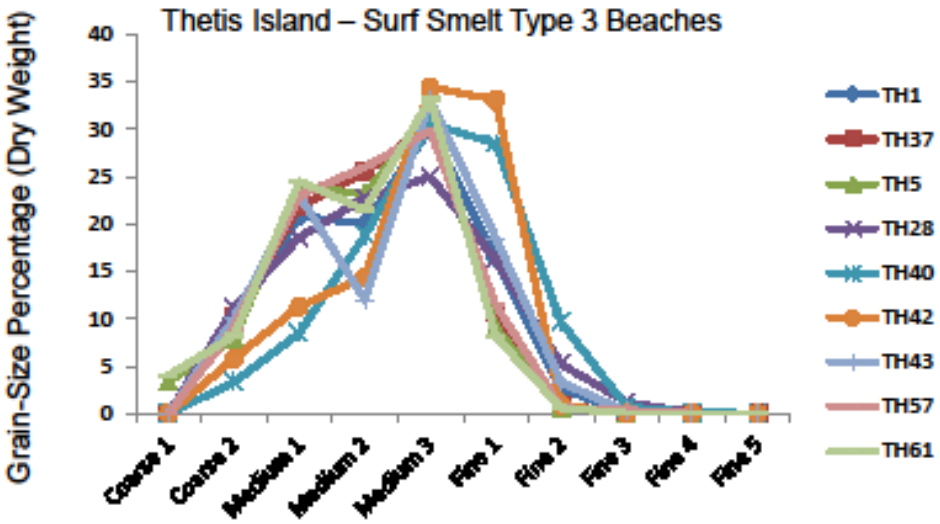


Figure 6: Thetis Island – Surf Smelt Type 3 Beaches

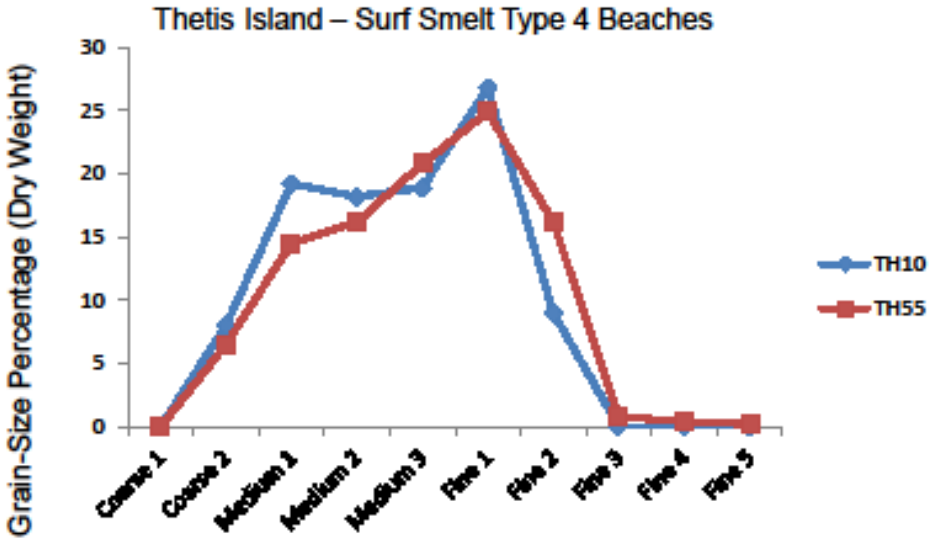


Figure 7: Thetis Island – Surf Smelt Type 4 Beaches

Appendix B

Thetis Island – Pacific sand lance Type 1 Beaches

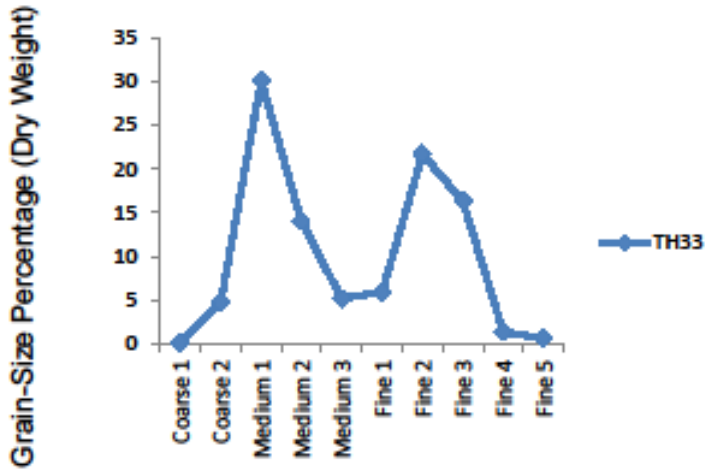


Figure 8: Thetis Island – Pacific sand lance Type 1 Beaches

Thetis Island – Pacific sand lance Type 3 Beaches

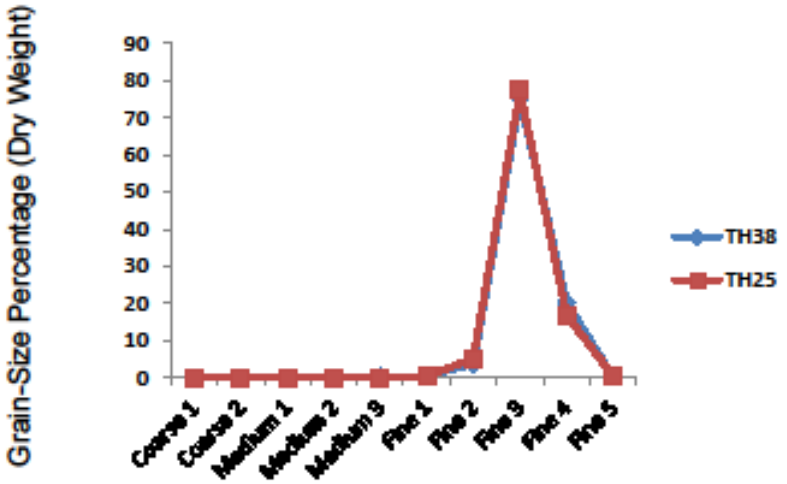


Figure 9: Thetis Island – Pacific sand lance Type 3 Beaches

Appendix C Beach Type Classifications Hornby Island

Appendix C

Beach Type Classifications - Hornby Island

Surf Smelt Type 1			Surf Smelt Type 2		
Beach Number	Hornby Island Beach Name	Beach Type	Beach Number	Hornby Island Beach Name	Beach Type
H15	.THESPIT.	SS1	H22	.SHINGLERDPOSITIVE4.	SS2
H40	.WESTGRASSYPNTPOSITIVE.	SS1	H24	.SHINGLRD3POSTITVE.	SS2
H41	.GRASSYPNTPARK.	SS1	H55	.LITTLETRIB.	SS2
H43	.GALLEONSOUTH_HIDDEN	SS1	H56	.SEAWRIGHTRDPOSITIVES.	SS2
H44	.SSOFGALLEOON.	SS1	H58	.SANDPIPER1.	SS2
H49	.HELLIWELLNORTH.	SS1	H59	.SANDPIPER2.	SS2
H6	.DOWNESPNT.	SS1			

Surf Smelt Type 3			Surf Smelt Type 4		
Beach Number	Hornby Island Beach Name	Beach Type	Beach Number	Hornby Island Beach Name	Beach Type
H16	.SHINGLEPOS7.	SS3	H29	PHIPPSPOS1	SS4
H18	.SHINGLEPOS6.	SS3	H34	SAVOIERDPOST2	SS4
H20	.SHINGLPOST5.	SS3	H35	SAVOIERDPOS1	SS4
H26	SHINGLERDNSECTION2	SS3	H54	.LITTLETRIB2.	SS4
H28	SHINGLERDSECTION1	SS3			
H32	SAVRDP3	SS3			
H38	NSAVOIERD1	SS3			
H9	.FORDCOVENORTH.	SS3			

Appendix C

Beach Type Classifications - Hornby Island

Surf Smelt Type 5

Beach Number	Hornby Island Beach Name	Beach Type
H1	.NORTHSANDDOLLAR1.	SS5
H2	.NORTHSANDDOLLAR2.	SS5
H42	.TRALEEPNTPOSITIVE.	SS5

Pacific sand lance Type 1

Beach Number	Hornby Island Beach Name	Beach Type
H13	.PUB.	PSL3
H37	GEORGEFARM	PSL3
H4	.SANDDOLLARPOSITIVE.	PSL3
H47	.WHALINGSTATIONNORTH.	PSL3
H48	.WHALINGSTSOUTH.	PSL3
H53	.BIGTRIB.	PSL3

Appendix D: Beach Type Grain-Size Curves _- Hornby Island

Appendix D

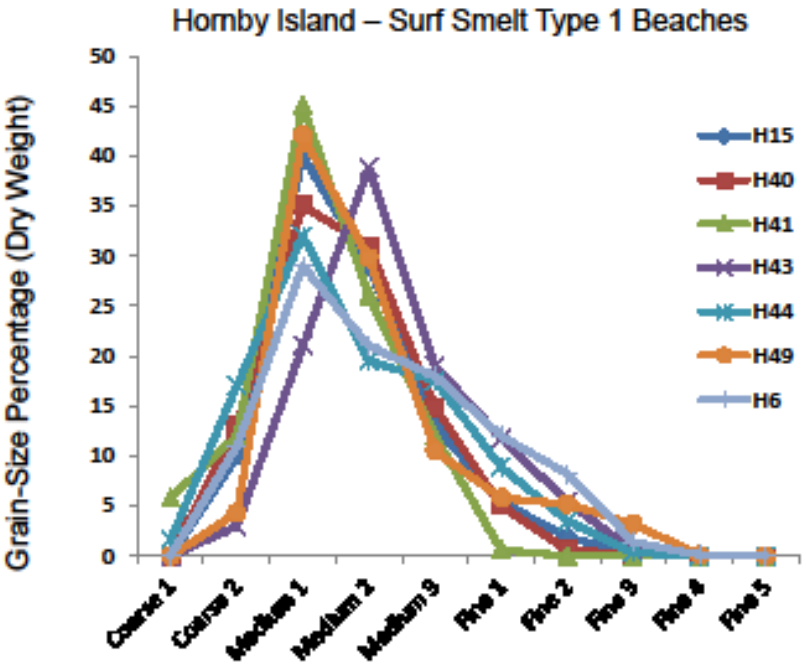


Figure 10: Hornby Island – Surf Smelt Type 1 Beaches

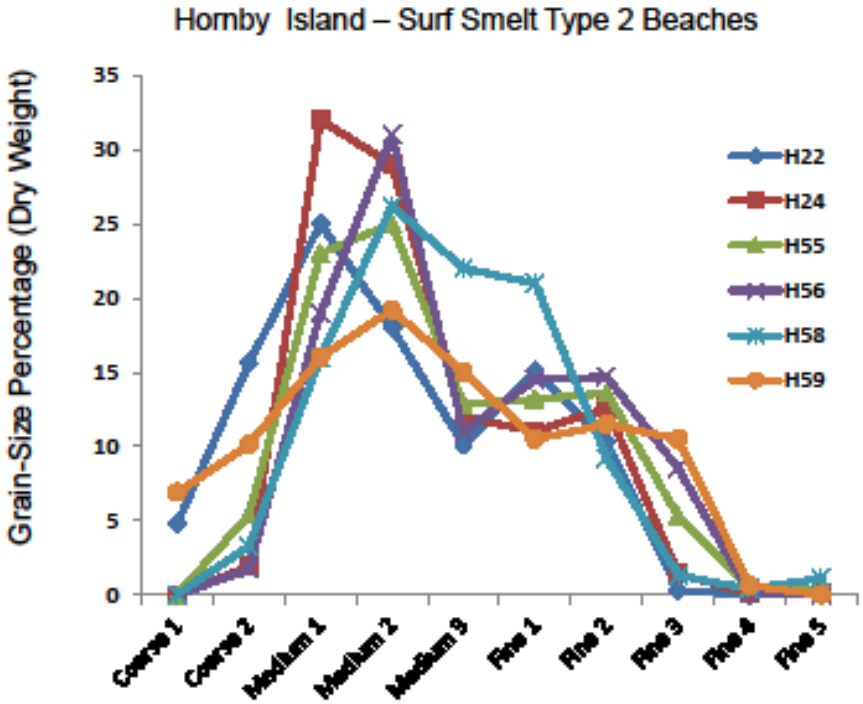


Figure 11: Hornby Island – Surf Smelt Type 2 Beaches

Appendix D

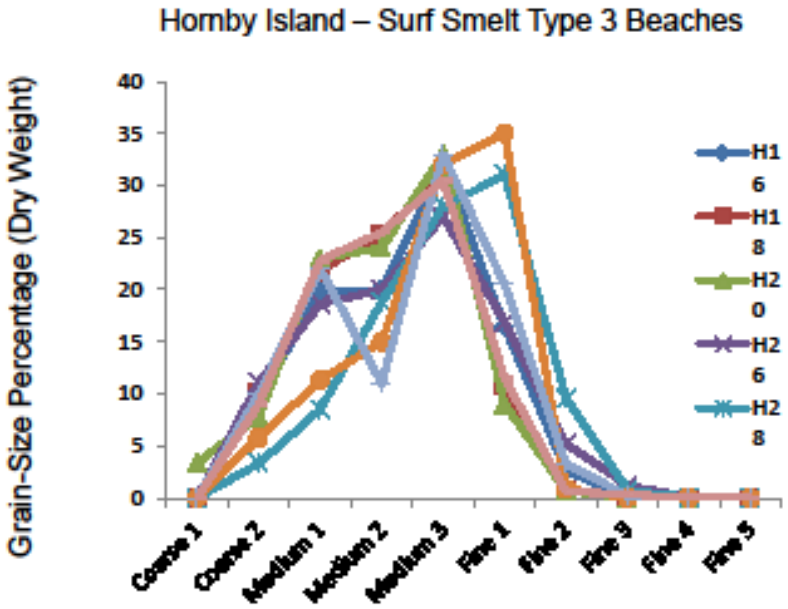


Figure 12: Hornby Island – Surf Smelt Type 3 Beaches

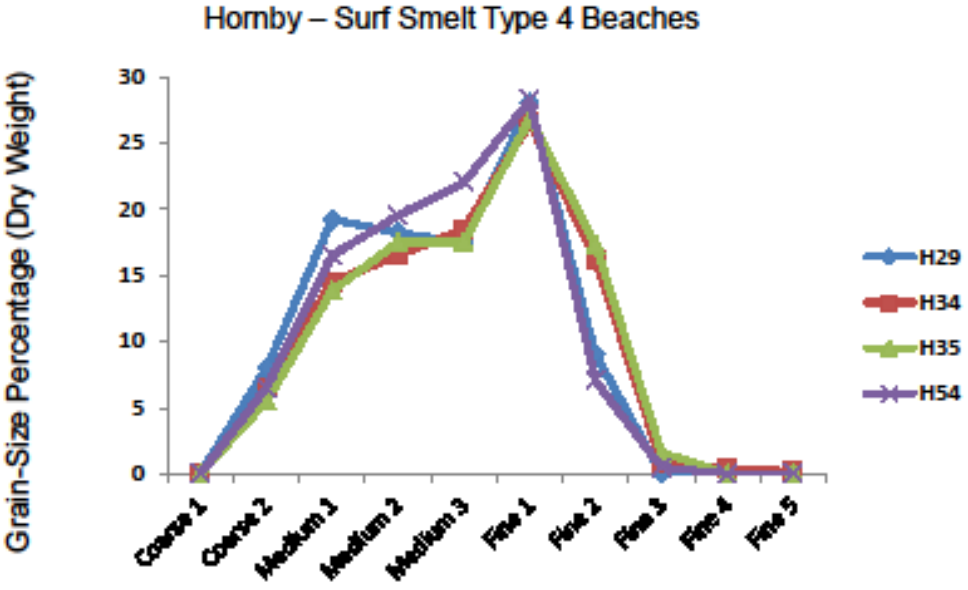


Figure 13: Hornby Island – Surf Smelt Type 4 Beaches

Appendix D

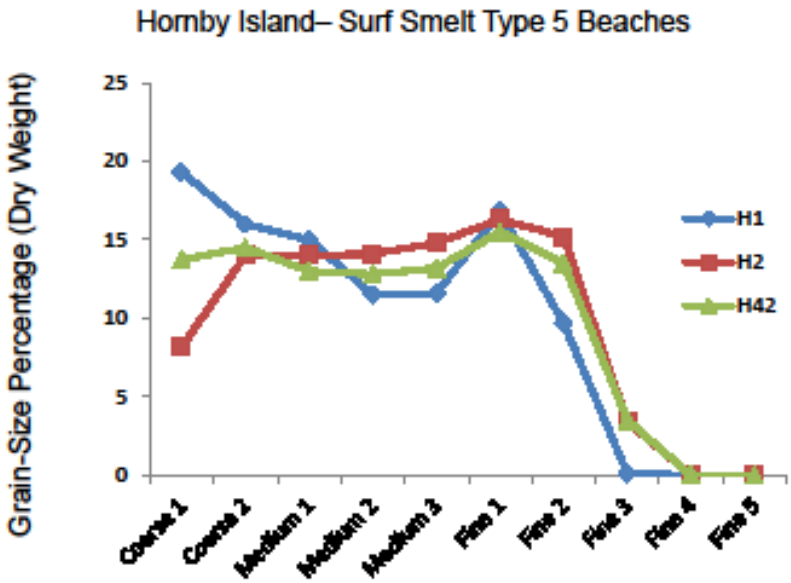


Figure :14 Hornby Island – Surf Smelt Type 5 Beaches

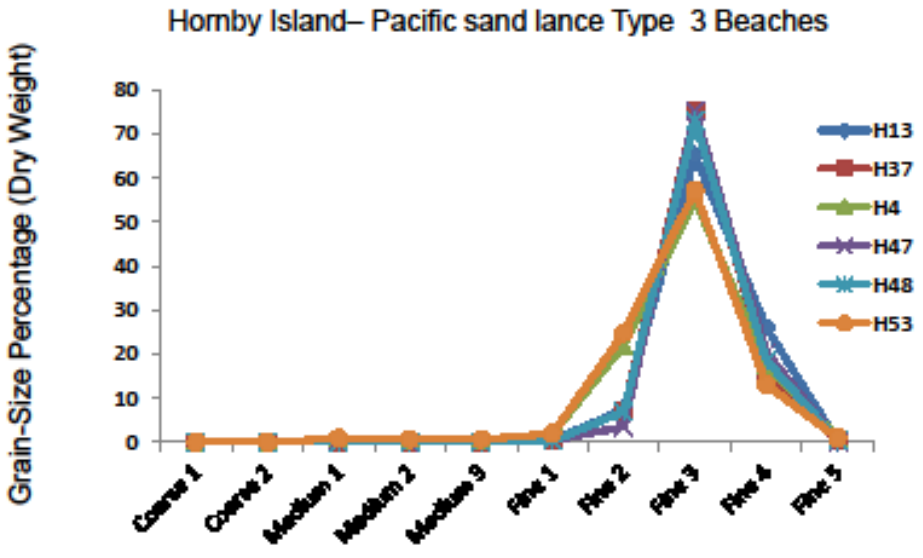


Figure :15 Hornby Island – Pacific sand lance Type 3 Beaches

Appendix E: Beach-Type Classifications - Denman Island

Appendix E

Beach Type Classifications - Denman Island

Surf Smelt Type 1		
Beach Number	Denman Island Beach Name	Beach Type
DI50	DENMAN- LONEPINEFARM1	SS1
DI9	DENMFERRYDOCK	SS1
DI10	DENM-FERRYSOUTH	SS1
DI11	DENM-HINTONRDS2B	SS1
DI12	HENRYBAYSOUTH1	SS1
DI62	HENRYBAYSOUTH3	SS1
DI13	HENRYBAYSOUTH6	SS1
DI65	METCALFEBAYS1	SS1
DI16	METCALFEBAYSOUTH2	SS1
DI76	BEADNELLCRNORTH3	SS1
DI19	CABLEBEACHMID	SS1
DI21	DENMKAYAKACCESS	SS1
DI82	DENM-NE2	SS1
DI38	ELLABAY3	SS1
DI90	ELLASBAY2	SS1
DI92	FILONGLEYCREEK	SS1
DI25	GRAVELBAYN2	SS1
DI26	GRAVELYBAYN1	SS1
DI27	GRAVELYBAYS1	SS1
DI28	LINDSEYDIXONMID	SS1
DI29	LITTLEBURNABYS1	SS1
DI99	BETTYSBEACH	SS1
DI100	REPULSEBAY2POSITIVE	SS1
DI108	HENRYBAYNORTH3	SS1
DI35	HENRYBAYNORTH7	SS1
DI36	LONGBEAKPNTNE1	SS1
DI37	LONGBEAKPNTNE2	SS1
DI109	LONGBEAKPNTNE3	SS1

Appendix E

Beach Type Classifications - Denman Island

Surf Smelt Type 2

Beach Number	Denman Island Beach Name	Beach Type
DI39	CHRISMANGLADSONESOUTH1	SS2
DI40	CHRISMANGLADSTONEMIDDLE1	SS2
DI43	METCALFEBAYN1	SS2
DI47	MILLARDRDS4.	SS2
DI56	DENMFERRYNORTH3	SS2
DI57	DENM-LONEPINEFARM3	SS2
DI61	HENRYBAY2	SS2
DI15	HINTONRDSOUTH3-REDO	SS2
DI69	MILLARDRDNORTH1	SS2
DI17	SCOTTRD1	SS2
DI71	SCOTTRDSOUTH3	SS2
DI72	DENMNE6	SS2
DI20	CABLEBEACHSOUTH1	SS2
DI79	DENMNE1	SS2
DI83	DENMNE3	SS2
DI84	DENMNE4	SS2
DI91	FILLONGLEY_KIOSK	SS2
DI24	GLENSHN2	SS2
DI96	GRAVELYBAYN3	SS2
DI101	REPULSEBAY 3P	SS2
DI33	REPULSEBAY1POSITIVE	SS2
DI106	DENMHENRYBAYNORTH1	SS2
DI107	HENRYBAYNORTH2	SS2
DI34	HENRYBAYNORTH5	SS2

Appendix E

Beach Type Classifications - Denman Island

Surf Smelt Type 3

Beach Number	Denman Island Beach Name	Beach Type
DI41	CHRISMANGLADSTONENORTH1	SS3
DI42	CHRISMANRDNORTH1	SS3
DI45	MILLARDRDS2	SS3
DI46	MIllARDRDS3	SS3
DI48	CHRISMANSCOTTRD3	SS3
DI49	CHRISMANSCOTTRD4	SS3
DI51	DENMANFERRYNORTH5	SS3
DI52	DENMANHINTONRDS1B	SS3
DI55	DENM-FERRYNORTH1	SS3
DI60	HENRYBAY1	SS3
DI63	HENRYBAYSOUTH5PATS	SS3
DI66	METCALFEBY2	SS3
DI67	MILLARDRDN2	SS3
DI68	MILLARDRDN3	SS3
DI70	MILLARDRDNORTH4	SS3
DI18	SCOTTRD3	SS3
DI73	BEADNELLCREEKN1	SS3
DI74	BEADNELLCREEKN5	SS3
DI75	BEADNELLCRN7	SS3
DI77	CABLEBESOUTH2	SS3
DI88	ELLABAYNORTH1	SS3
DI89	ELLABAYNORTH2NEGATIVE	SS3
DI93	FILONGLEYSOUTH1	SS3
DI94	FILONGLEYSOUTH2	SS3
DI95	FORSYTHBEACH	SS3
DI102	REPULSEBAY 4P	SS3
DI013	REPULSEBAY5P	SS3

Appendix E

Beach Type Classifications - Denman Island

Surf Smelt Type 4

Beach Number	Denman Island Beach Name	Beach Type
DI44	MILLARDRDS1	SS4
DI53	DENMANWESTCLIFFE1	SS4
DI54	DENMANWESTCLIFFENORTH2	SS4
DI58	DENMWESTCLIFFENORTH1	SS4
DI59	FERRYSOUTH3	SS4
DI64	HINTONRDN2	SS4
DI78	CRITCHLEYSOUTH1	SS4
DI80	DENMNE11	SS4
DI81	DENMNE12	SS4
DI85	DENMNE5	SS4
DI86	DENMNE8	SS4
DI87	DENMNE9	SS4
DI23	GLENSHN1	SS4
DI97	MORNINGBEACHN1	SS4
DI98	MORNINGBEACHSOUTH1	SS4
DI104	DENMANISLANDNORTH1	SS4
DI105	DENMANISLNORTH2	SS4

Surf Smelt Type 5

Beach Number	Denman Island Beach Name	Beach Type
DI14	HINTONRDNORTH3	SS5
DI22	EASTRDMID2	SS5
DI30	MCFARLENEBEACHN1	SS5
DI31	MCFARLENEBEACHNORTH2	SS5
DI32	McFarlenes Beach	SS5

Appendix E

Beach Type Classifications - Denman Island

Pacific sand lance Type 1		
Beach Number	Denman Island Beach Name	Beach Type
DI1	CHRISMANSCOTT1	PSL1
DI2	CHRISMANSCOTT2	PSL1
DI3	DENMSCOTTRDNORTH1	PSL1
DI4	HENRYBAYSOUTH4	PSL1
DI6	SCOTTRD5	PSL1
DI7	SCOTTRDNORTH2	PSL1

Pacific sand lance Type 3		
Beach Number	Denman Island Beach Name	Beach Type
DI8	ELLASBAY	PSL3
DI5	HINTONRDNORtH1	PSL3

Appendix F: Beach Type Grain-Size Curves Denman Island

Appendix F

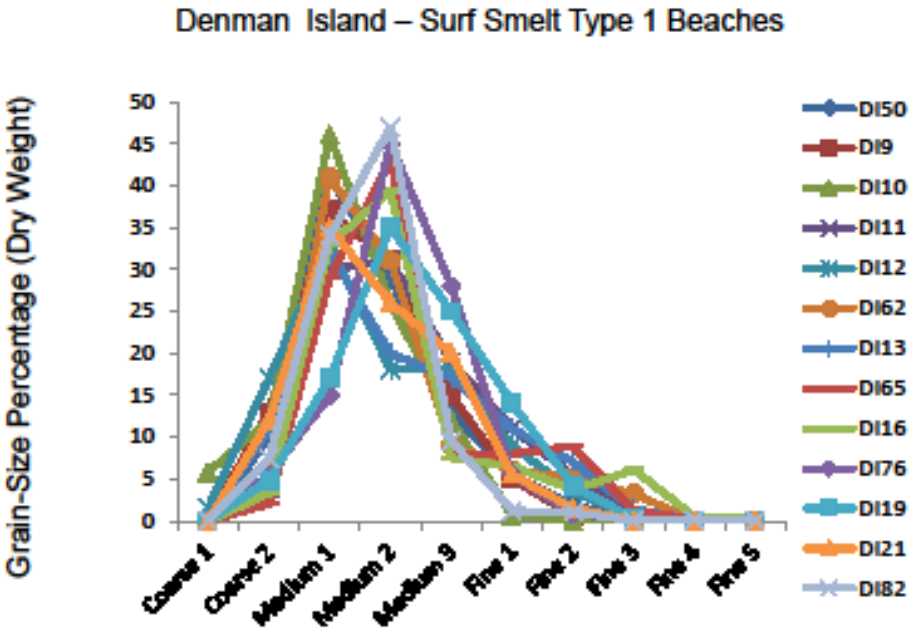


Figure 16: Denman Island – Surf Smelt Type 1 Beaches

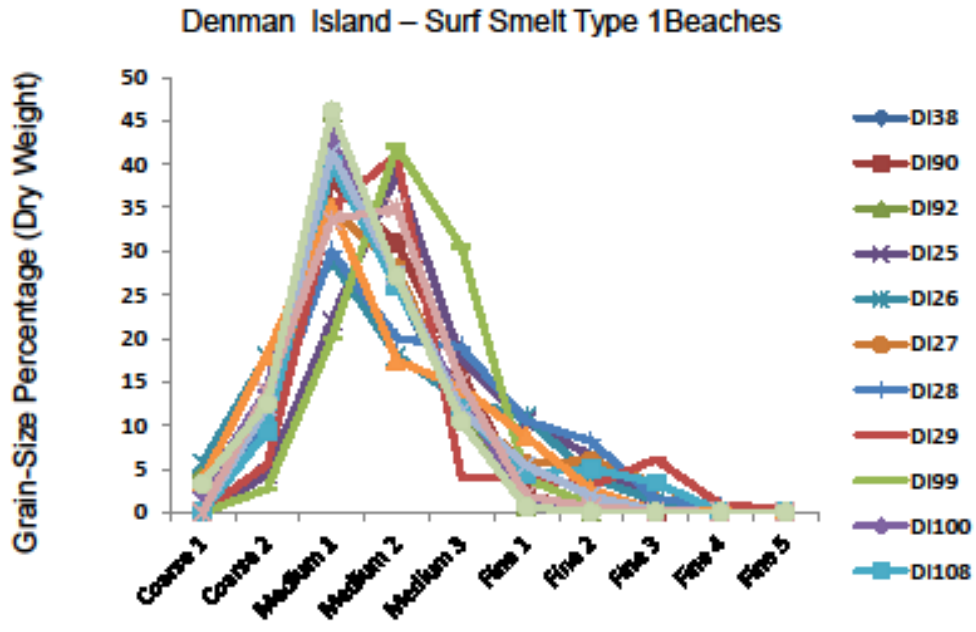


Figure 17: Denman Island – Surf Smelt Type 1 Beaches

Appendix F

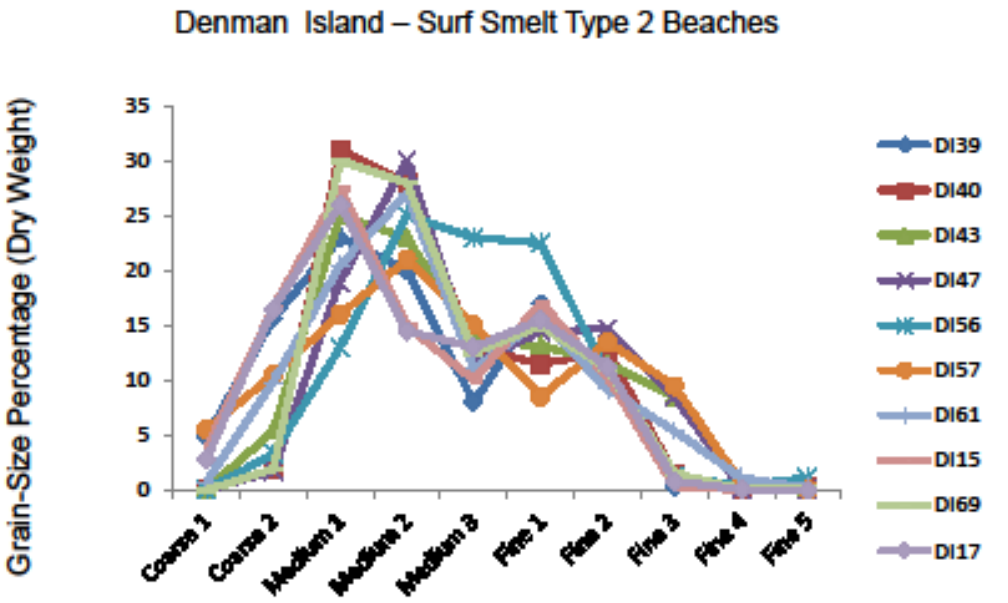


Figure 18 Denman Island – Surf Smelt Type 2 Beaches

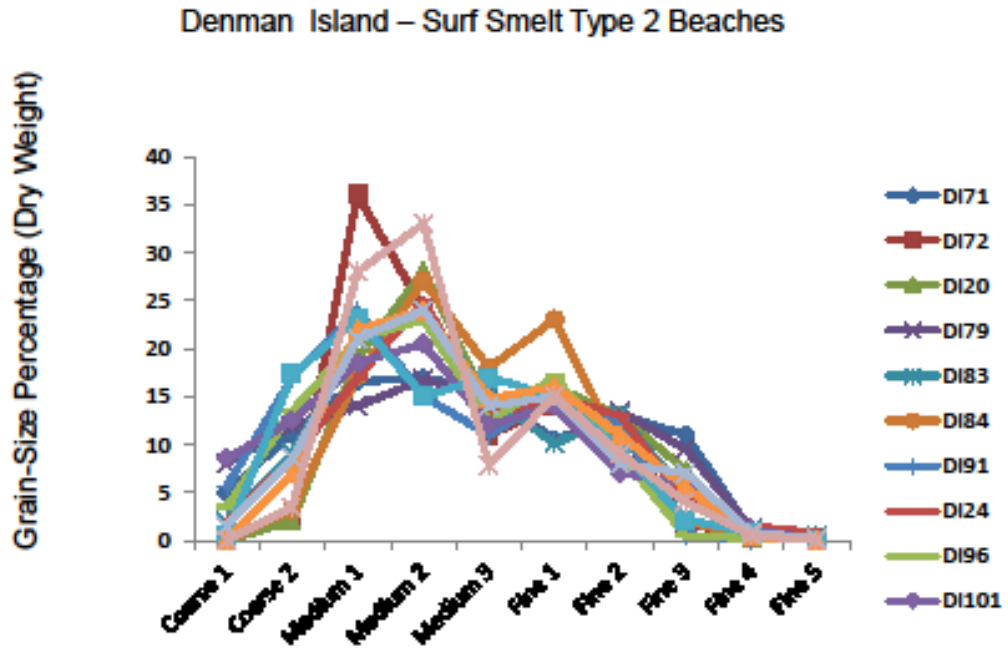


Figure 19 Denman Island – Surf Smelt Type 2 Beaches

Appendix F

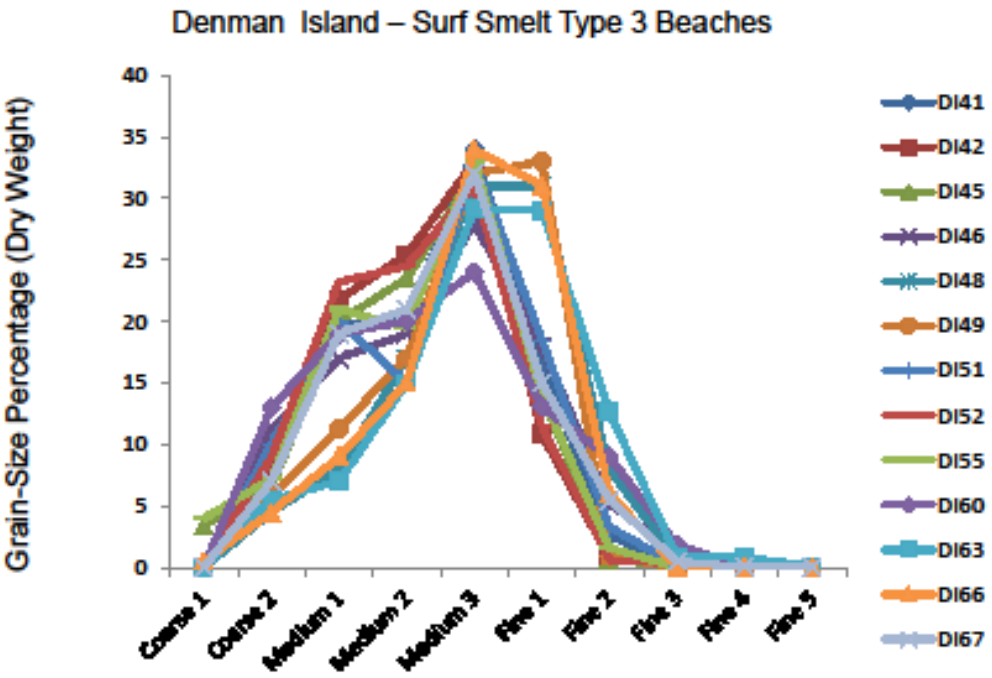


Figure 20 Denman Island – Surf Smelt Type 3 Beaches

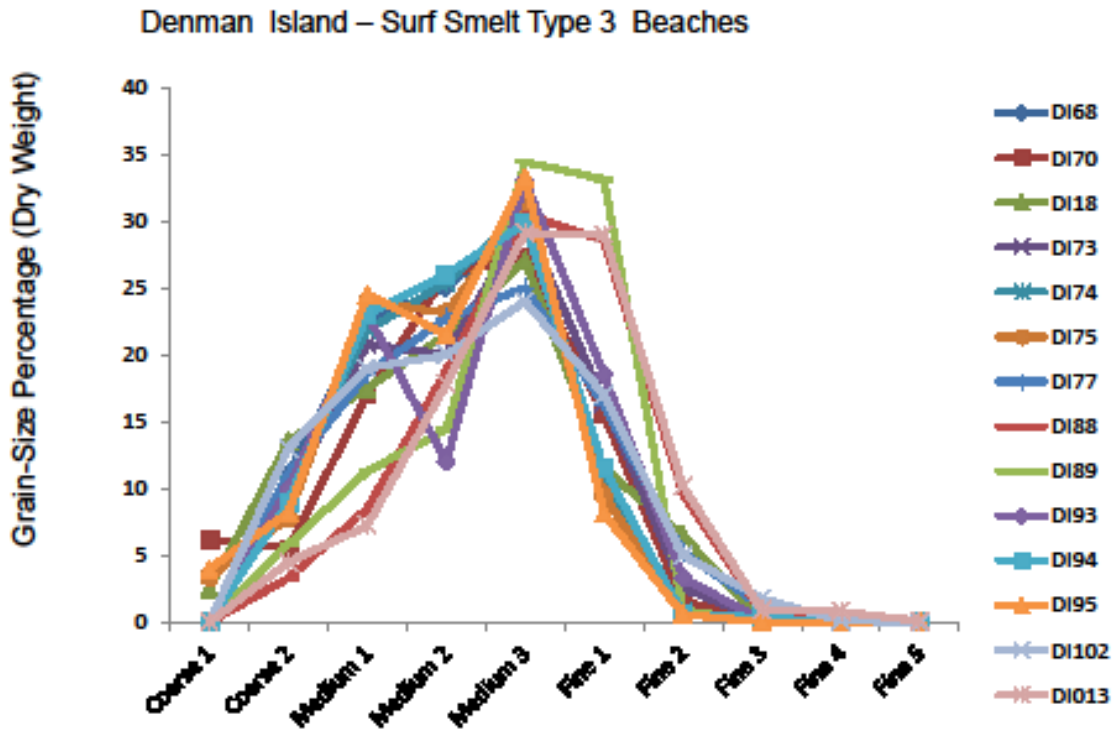


Figure 21 Denman Island – Surf Smelt Type 3 Beaches

Appendix F

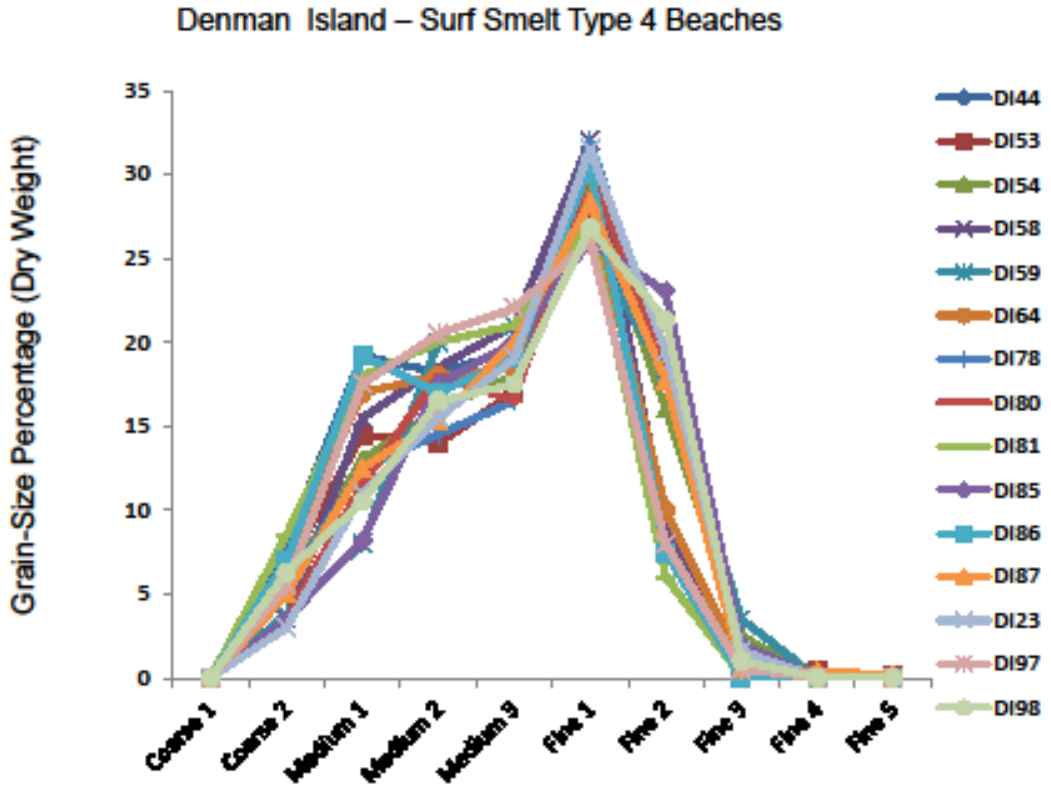


Figure 22 Denman Island – Surf Smelt Type 4 Beaches

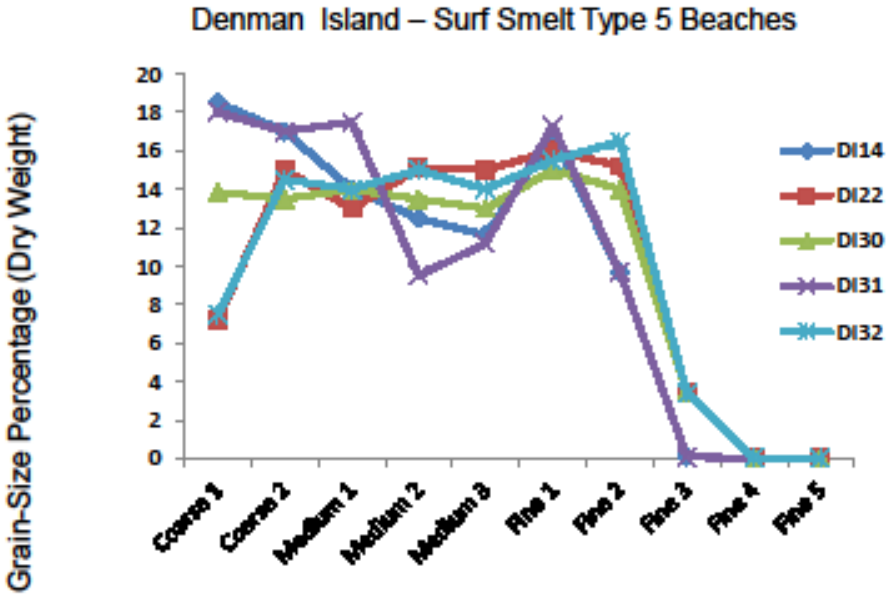


Figure 23 Denman Island – Surf Smelt Type 5 Beaches

Appendix F

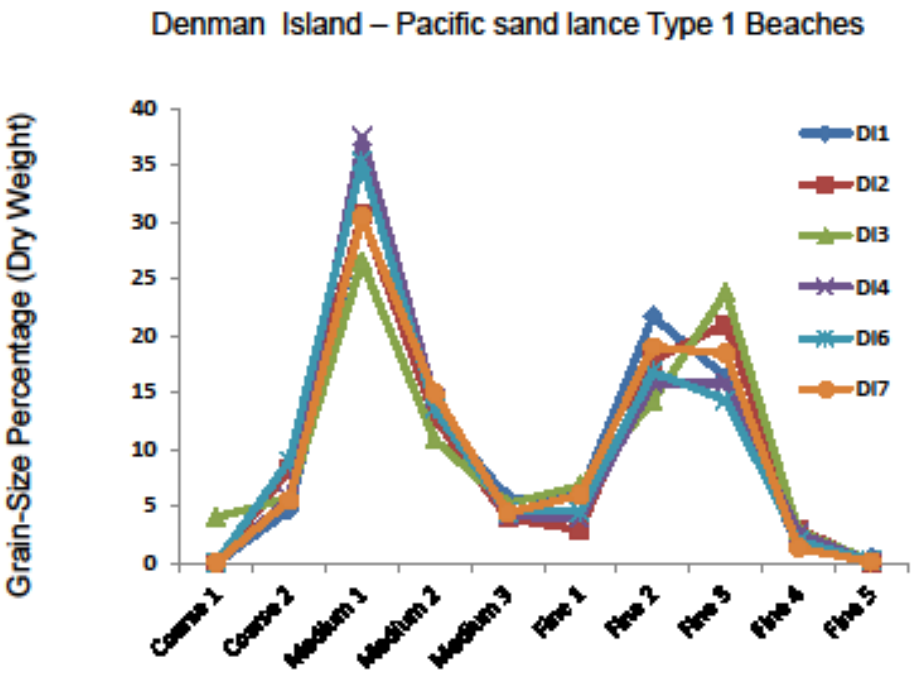


Figure 24 Denman Island – Pacific sand lance Type 1 Beaches

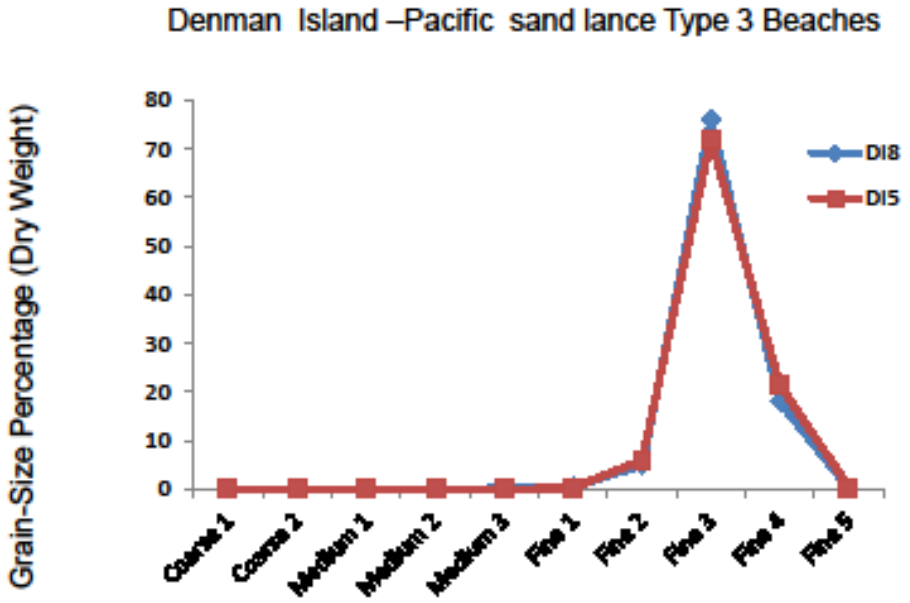


Figure 25 Denman Island – Pacific sand lance Type 3 Beaches

Appendix G: GPS/GIS Methodology

Global Positioning System Specifications

1. General Application

1.01

The target horizontal accuracy is 1 metre. The lowest acceptable horizontal accuracy is 5 metres, at the 95% confidence level. This applies to final map data after averaging (for point features), approximating (for line features), and any editing.

1.02

All GPS receiver systems must be approved for use in stream mapping by Islands Trust GIS staff. Only receiver models which have been tested and proven to be capable of meeting the above accuracy specification in field conditions will be approved.

1.03

At least one person, who is responsible for the quality of the data, must act as a supervisor and have completed GPS-specific training acceptable to Islands Trust GIS staff.

1.04

Field operators must be trained to the satisfaction of the supervisor, including GPS training and other training as required.

2. Field Parameters and Procedures

2.01

All positions fixes must use at least four satellites. No height constraints can be applied.

2.02

The minimum elevation angle to satellites is 15 degrees above the horizon.

2.03

The maximum Dilution of Precision (DoP) is:
HDOP 5 (preferred in most cases)
PDOP 8
GDOP 10
VDOP 5 (only if elevations are required)

2.04

For standard static point features, occupation time must be at least 60 seconds AND there must be at least 30 individual position fixes for each feature.

2.05

The maximum distance for point offsets is 25 metres. Directions must be accurate to 2 degrees and distances accurate to 1 metre. If the slope is over 10 percent and over 10 metres long, slope measurements (accurate to 5 percent or 3 degrees) must be made.

2.06

For all line (and polygon) features, all significant deflections and meanders of the feature must be mapped. Dynamic points recorded every 5 metres and static every 50 metres, or significant deflection.

2.07
For line (and polygon) features surveyed in dynamic mode, the majority of the individual position fixes must be no more than 5 metres apart. The maximum distance between successive position fixes is 10 metres.

2.08
The maximum distance for constant line offsets is 5 metres.

2.09
Supplementary traverses (using compass and chain) must begin (Point of Commencement) and end (Point of Termination) on static GPS point features or on survey control monuments of 1 metre or better accuracy.

2.10
Directions for supplementary traverses must be accurate to 2 degrees and distances accurate to 1 metre. If the slope is greater than 10 percent, slope measurements accurate to 5 percent or 2.5 degrees must be made. The maximum length of an individual traverse leg is 50 metres. There is no limit on the total length of a supplementary traverse.

2.11
Static features collected for start and end point of all sampling units. Static features will be meet collection and accuracy requirements as outlined in section 2.04.

2.12
Sampling unit feature descriptions refer to the centerline of B1 sediment component. Centerline changes of direction will be captured as static points every 50 meters or less. Centerline of features will be described between static points using dynamic mode. Dynamically collected transverses will not be required to meet static feature standards of accuracy.

3. Data Processing and Mapping

3.01
All position fixes must be differentially corrected in real-time or post-processed. If position corrections are used, the same set of satellites must be used at the reference station as at the field receiver.

3.02
Reference stations (real-time or post-processed) must be approved by Islands Trust GIS staff.

3.03
The maximum age of real-time corrections is 20 seconds from the time the observations are made at the reference station to the time the computed corrections are applied at the field receiver.

3.02
All directions from compass observations must be corrected for declination before offset or traverse computations. If applicable, correction for grid convergence must be made.

3.05
Supplemental traverses must close to better than 1 percent (1/100) of the total traverse distance plus 2.5 metres. Traverse misclosures over 2.5 metres total must be adjusted (“balanced”) using the standard compass rule method.

3.06
If true NAD 27 coordinates are required, NAD 83 coordinates must be converted using the Canadian National Transformation, version 2 (NT v2).

3.07
If elevations are required, they must be converted from ellipsoidal to orthometric using the CRD Geoid model HT 2.0.

3.08
If data in any other coordinate system (e.g. ground coordinates) are required, procedures acceptable to Islands Trust GIS staff and the owner of the mapping must be used.

3.09
Any discrepancies between the GPS survey and existing mapping used as base maps must be resolved to the satisfaction of Islands Trust GIS staff and the local agency(s) considered responsible for the mapping.

4. Deliverables and Archiving

4.01
The following digital files must be archived and delivered to Islands Trust GIS staff and other appropriate agency(s) in the following formats:

Deliverable	**Digital Format**
Uncorrected GPS data	GPS manufacturer's proprietary
Reference station data	downloaded format
Originally corrected GPS • Including complete metadata report for all dynamic and static point features, including but not limited to Max HDOP, Max PDOP, and Horizontal Precision	ESRI Shapfile
Final map	ESRI ArcGIS MXD

Appendix H: Digitizing Spatial Data and Map Production

Appendix H: Digitizing Spatial Data and Map Production

Mapping Procedure for Forage Fish Habitat Beach Segments using Static and Dynamic GPS Features

Pathfinder Office

Export GPS point features and positions-not-in-features as two separate shapefiles using Pathfinder Office.

ArcGIS 10.1

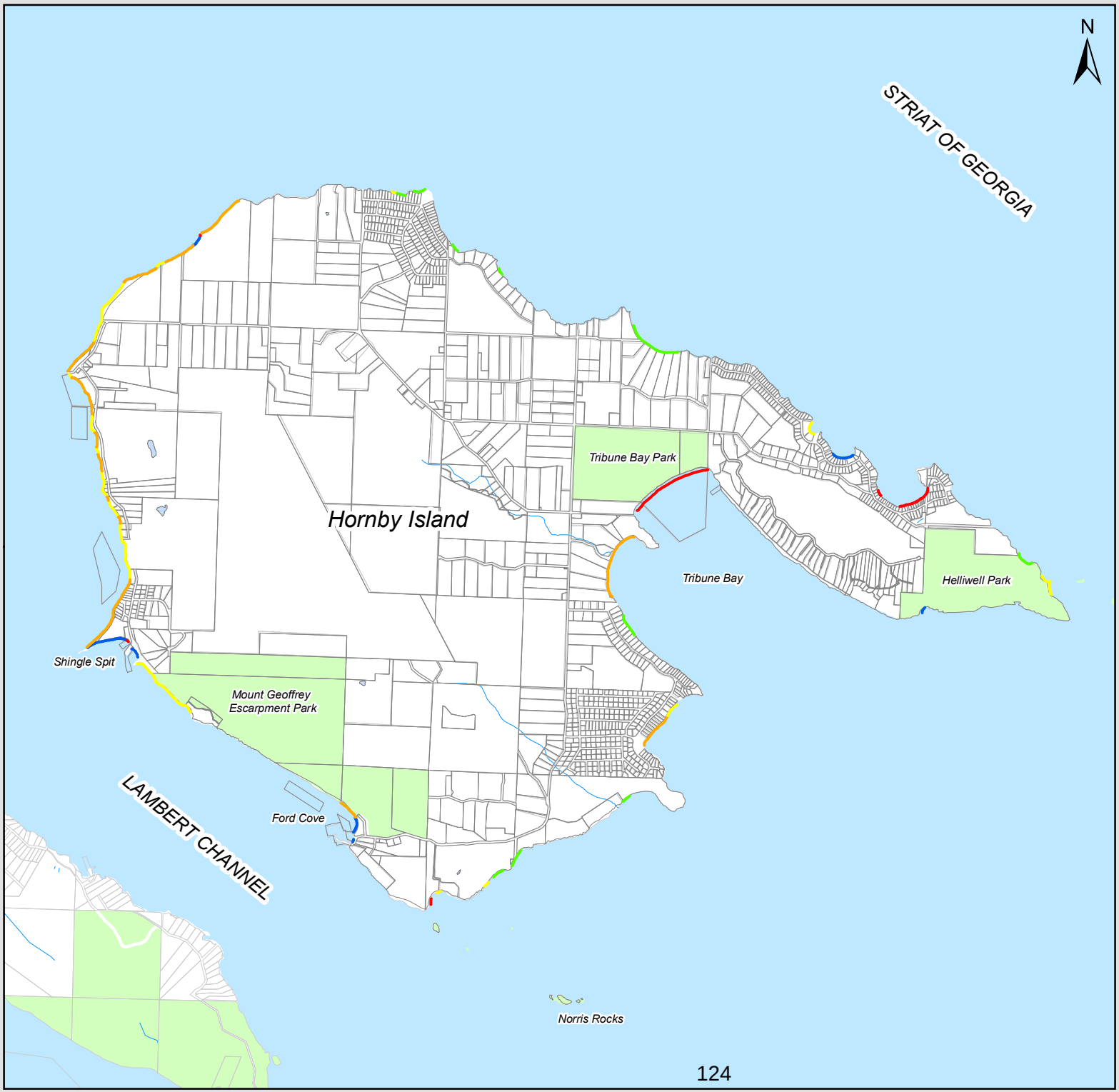
1. Project the two GPS data shapefiles to NAD83 UTM 10N projection..
2. Create an empty polyline shapefile with NAD83 UTM 10N projection for the Forage Fish Habitat beach segments.
3. Connect static GPS features based on the *Point_Type* field which describes whether the features is a start, mid or end point on a beach segment. Only start and end points with horizontal accuracy less than 5m are used.
4. Re-shape the centerline between static feature points by snapping to dynamic feature points.
5. Provide a preliminary *Habitat* designation (Yes/No) and *Species* classification based on the data sheet provided by Ramona.

Forage Fish Segments Attributes

FID – Unique identifier assigned to each segment by ArcGIS software.
Habitat – Declared Potential Habitat (Yes) or Not Habitat (No) while in the field. This is based on the observed shore type. For example, cobble shoreline is Not Habitat.
Species – Declared Surfsmelt (SS)/ Pacific Sandlance (PSL), Surf Smelt and Pacific Sandlance (SS/PSL) or Not Suitable Habitat (NSH)**.**
Length - Length of the segment.

Appendix I: Forage Fish Habitat Suitability Assessment Methods

Housed with the Islands Trust Fund and the author



Suitable Forage Fish Habitat

HORNBY ISLAND

Legend

- Cadastral Lot Boundaries

Suitable Forage Fish Habitat

- PSL
- SS
- SS/PSL
- Not Suitable Habitat
- Not Habitat

0 500 1,000 2,000 m

1:50,000

UTM 10N NAD 83

Forage Fish Habitat Suitability Assessments by:

BC Marine Conservation and Research Society

Funding Provided by:

PACIFIC SALMON FOUNDATION

Islands Trust

Emerald Sea Biological

Digital Mapping by: CHARTWELL Consultants Ltd.

Map Document: L:\GIS\Data\13-006\Hornby\Mapping\HORNBY_MAP.mxd
Mapping by: JW
Date: March 27, 2014