

Saturna Island Local Trust Committee

Regular Meeting Agenda

Date: February 19, 2015
Time: 12:30 pm
Location: Saturna Recreation and Cultural Centre
 104 Harris Road, Saturna Island, BC

Pages

1. CALL TO ORDER 12:30 PM - 1:00 PM
2. APPROVAL OF AGENDA
3. TOWN HALL AND QUESTIONS
4. COMMUNITY INFORMATION MEETING
none
5. PUBLIC HEARING
none
6. MINUTES 1:00 PM - 2:00 PM
 - 6.1 Local Trust Committee Adopted Minutes
Dated September 18, 2014 (for Information) 4 - 10
 - 6.2 Section 26 Resolutions-without-meeting Report
Dated February 2015 11 - 11
 - 6.3 Advisory Planning Commission Minutes
none
7. BUSINESS ARISING FROM THE MINUTES
 - 7.1 Follow-up Action List Dated February 2015 12 - 12
8. DELEGATIONS
none
9. CORRESPONDENCE
Correspondence received concerning current applications
or projects is posted to the LTC webpage
 - 9.1 Email Dated August 1, 2014 from Pat
Lapcevic (FLNR) re BLs No. 112, 113, 114 & 115 13 - 14

10. APPLICATIONS AND REFERRALS

- | | | |
|--------|--|---------|
| 10.1 | SA-DVP-2014.1 (Gilmore) - Staff Report | 15 - 28 |
| 10.1.1 | <u>Email Dated February 4, 2015 re Gilmore Property</u> | 29 - 29 |
| 10.1.2 | <u>Email Dated February 7, 2015 from F Ernst re Variance on Tumbo Channel Rd</u> | 30 - 30 |
| 10.2 | SA-DP-2015.1 (Farrow) - Staff Report | 31 - 55 |

11. LOCAL TRUST COMMITTEE PROJECTS

2:00 PM - 3:00 PM

- | | | |
|------|------------------------------------|---------|
| 11.1 | Work Program Review - Staff Report | 56 - 63 |
|------|------------------------------------|---------|

12. REPORTS

- | | | |
|--------|--|-----------|
| 12.1 | Work Program Reports - for information (attached) | |
| 12.1.1 | <u>Top Priorities Report Dated February 2015</u> | 64 - 64 |
| 12.1.2 | <u>Projects List Report Dated February 2015</u> | 65 - 65 |
| 12.2 | Applications Report Dated February 2015 (attached) | 66 - 67 |
| 12.3 | Trustee and Local Expense Report Dated January 2015 (attached) | 68 - 68 |
| 12.4 | Adopted Policies and Standing Resolutions (attached) | 69 - 70 |
| 12.5 | Local Trust Committee Webpage | |
| 12.6 | Chair's Report | |
| 12.7 | Trustee Report | |
| 12.8 | Electoral Area Director's Report | |
| 12.9 | Trust Fund Board Report (attached) | |
| 12.9.1 | <u>TFB Report to the TLC - January 2015</u> | 71 - 73 |
| 12.9.2 | <u>Eelgrass Mapping - Memo, Final Report & Map</u> | 74 - 160 |
| 12.10 | Bylaw Enforcement Report (attached) | 161 - 162 |

13. NEW BUSINESS

3:00 PM - 3:50 PM

- | | | |
|------|---|-----------|
| 13.1 | Advisory Planning Commission (APC) Membership - memo | 163 - 164 |
| 13.2 | Special Local Trust Committee Meetings re LTC Workplan - Discussion | |

14. UPCOMING MEETINGS

14.1 Next Regular Meeting Scheduled for April 23,
2015, 12:30 pm, at the Community Hall

15. TOWN HALL

16. CLOSED MEETING

none

17. ADJOURNMENT

3:50 PM - 3:50 PM

ADOPTED



Saturna Island Local Trust Committee Minutes of Regular Meeting

Date: September 18, 2014
Time: 12:30 pm
Location: Saturna Recreation and Cultural Centre
104 Harris Road, Saturna Island, BC

Members Present: Ken Hancock, Chair
Pam Janszen, Local Trustee
Paul Brent, Local Trustee

Staff Present: Gary Richardson, Island Planner
Bev Lowsley, Recording Secretary

Media and Others Present: 30 members of the public

1. CALL TO ORDER

Chair Hancock called the meeting to order at 12:35 p.m. stating appreciation and acknowledgement that today's meeting is taking place on the traditional territories of the Coast Salish people. Introductions were made and the meeting introduced. He requested that members of the public state their name prior to making a comment.

2. APPROVAL OF THE AGENDA

2.1 Additions/Deletions

The following additions to the agenda were presented for consideration:

8.1 Correspondence.

9.3 Mayne Island Local Trust Committee Bylaws No. 161 & 162 referral.

SA-2014-049

It was MOVED and SECONDED that the Saturna Island Local Trust Committee approve the agenda as amended.

CARRIED

3. COMMUNITY INFORMATION MEETING

3.1 Saturna Island Local Trust Committee Proposed Bylaws No. 112,113, 114, and 115

See separate September 18, 2014, Community Information Meeting Notes for the Saturna Island Local Trust Committee.

Planner Richardson briefly summarized proposed Bylaws No. 112, 113, 114, and 115.

Chair Hancock responded to questions regarding specific processes for making submissions at this meeting. A process to accommodate inclusion of written statements from others not in attendance was agreed upon. People were encouraged to submit a copy of their submission, either in person today and/or letter and email to the Islands Trust Office. As there were many individuals wishing to speak, five minutes was allocated for each presentation. Once all individuals had one chance to speak, those who had not completed their first statement could then continue.

Janet Land requested that the letter from Pat Lapcevic, a late submission at the August 8 meeting and not included as part of the late agenda package, should be included in the information binder.

Chair Hancock clarified the Islands Trust policy for the process of handling correspondence. Public Hearing submissions and referral documents are retained in a binder at the office but are not posted on the Islands Trust Website.

SA-2014-050

It was MOVED and SECONDED by the Saturna Island Local Trust Committee that the letter from Pat Lapcevic be noted as received and shall be included in the information package for the next Local Trust Committee meeting.

CARRIED

SA-2014-051

It was MOVED and SECONDED by the Saturna Island Local Trust Committee that proposed Bylaws No. 112, 113, 114, 115, and 116 be tabled and be considered further by the next Local Trust Committee and that the Community Amenity Density Reserve, Secondary Suites, and Short Term Vacation Rental projects remain on the work program priority list and that the Trails Map be added to the work program priority list.

CARRIED

4. PUBLIC HEARING

4.1 Saturna Island Local Trust Committee Proposed Bylaws No. 112, 113, 114, and 115

This item was tabled; see resolution SA-2014-051.

5. PREVIOUS MEETINGS

5.1 Local Trust Committee Minutes

5.1.1 Saturna Island Local Trust Committee Meeting Adopted Minutes of July 10, 2014

Provided for information.

5.1.2 Saturna Island Local Trust Committee Draft Meeting Minutes of August 6, 2014

SA-2014-052

It was MOVED and SECONDED that Saturna Island Local Trust Committee Meeting Minutes of August 6, 2014, be adopted.

CARRIED

5.2 Public Hearing Record and Community Information Meeting Notes

5.2.1 Saturna Island Local Trust Committee Draft Public Hearing Record of August 6, 2014

SA-2014-053

It was MOVED and SECONDED that the Saturna Island Local Trust Committee Record of a Public Hearing dated August 6, 2014, be adopted.

CARRIED

5.2.2 Saturna Island Local Trust Committee Draft Community Information Notes of August 6, 2014

The following amendments to the Community Information Meeting Notes were presented as follows:

page 6. spelling errors of Attilio Bertolami's and Joan Combes last names.

page 8. Andrew Money's question after *the island* insert *are*.

page 10. Dawn Wood reading Fire Chief's response, following the word *dangers*, insert *exist*.

By general consent, the Community Information Notes of August 6, 2014, were adopted as amended.

5.3 Section 26 Resolutions without Meeting

RWM Report dated July 10, 2014, to September 10, 2014, provided for information. Amendments were made related to first reading of the bylaws

5.4 Advisory Planning Commission

None

6. BUSINESS ARISING FROM THE MINUTES

6.1 Follow-up Action Report

All requested actions were done.

7. DELEGATIONS

None

8. CORRESPONDENCE

Items received today will be added to the Public Hearing correspondence and submissions.

9. APPLICATIONS, PERMITS, BYLAWS, AND REFERRALS

9.1 Post Public Hearing Process Re Bylaws No. 112, 113, 114, and 115

These bylaws were tabled in resolution SA-2014-051, see item 3.1.

9.2 Bylaw No. 116

SA-2014-054

It was **MOVED** and **SECONDED** that Saturna Island Local Trust Committee defer proposed Bylaw 116 at this time.

CARRIED

9.3 Mayne Island Local Trust Committee Bylaws No. 161 & 162

SA-2014-055

It was **MOVED** and **SECONDED** that the Saturna Island Trust Committee finds their interests unaffected by Mayne Island Bylaws No. 161 and 162.

CARRIED

10. LOCAL TRUST COMMITTEE PROJECTS

None

11. REPORTS

11.1 Work Program Reports

Provided for information.

11.2 Applications Report

Applications Report dated September 2014. Planner Richardson was not present to speak to the report. Local Trust Committee will forward any questions to be addressed at the next meeting.

11.3 Expense/Budget Reports

11.3.1 Trustee and Local Expenses

Expense Report dated August 2014 provided for information.

11.3.2 2015/16 Budget Requests

Chair Hancock reported that the Trust Council is working on the first round of planning the 2015/16 budget to begin April 1, 2015. The Local Trust Committee draft budget of \$6500.00 was presented.

SA-2014-056

It was MOVED and SECONDED that Saturna Island Local Trust Committee approve and forward the draft 2015-16 LTC Project Budget Request to the Financial Planning Committee as presented.

CARRIED

11.4 Bylaw Enforcement

None

11.5 Policies and Standing Resolutions Report

Non-enforcement policy relating to hydrophones and other instrumentation on the sea floor from previous meeting has been referred to Bylaw Enforcement. No response has yet been received.

11.6 Saturna Island LTC Web Page for Review

The Saturna Island Local Trust Committee Web page can be found at:
www.islandstrust.bc.ca/islands/local-trust-areas/saturna

11.7 Chair's Report

Chair Hancock reported the final Trust Council meeting for this term was on Keats and Gambier islands. It included an interesting presentation on glass sponges, found on local reefs, following which a resolution was put forward to extend the park boundaries to include protection of this area. Also, staff has been requested to advance the protocol with the new Ministry of Forest, Lands and Natural Resource Operations (FLNRO).

11.8 Trustee Report

Trustee Brent chairs the Trust Programs Committee. One idea put forward is to present the Community Stewardship Awards every two years rather than annually. Also the focus on BC Ferries issues is continuing and the committee has given direction to the next Trust Council to consider ferry advocacy as part of their focus.

Trustee Janszen reported that Trust Council Chair Sheila Malcolmson's term is ending. A recognition celebration was held in her honor. Elections are coming up in November. Trustee Janszen encouraged everyone to vote.

12. OTHER BUSINESS

12.1 Next Business Meeting

In view of the motion to table the proposed bylaws, it was questioned whether a meeting in October is necessary.

Chair Hancock suggested that any items needing to be addressed could be done by Resolution without Meeting.

SA-2014-057

It was MOVED and SECONDED that the Saturna Island Local Trust Committee meeting of October 23, 2014 be cancelled.

CARRIED

12.2 Experience the Southern Gulf Islands Cycling & Pedestrian Draft Trail Plan

SA-2014-058

It was MOVED and SECONDED that the Saturna Island Local Trust Committee request that staff provide comments from Regional Planning Manager Kojima's report concerning the draft Cycling and Pedestrian Trail Plan to the Capital Regional District.

CARRIED

13. TOWN HALL MEETING

John Money commented that he has a development application in process and found the fees to be overly high. He requested that the application not be held up due to cancellation of the October meeting.

Trustee Brent reported that a motion to Trust Council to raise the fees had been defeated.

John Money also thanked individuals who had commented positively on the process of developing the Official Community Plan. He also encouraged community members to come out and participate constructively in these public processes.

14. Adjournment

There being no further business, Chair Hancock adjourned the meeting at 4:20 pm.

Ken Hancock, Chair

CERTIFIED CORRECT

Bev Lowsley, Recorder

RWM From: September 18, 2014 To: February 12, 2015

Saturna Island

Resolution #	Action	Resolution Description	Resolution Date
2015-01	In Favour	THAT the Saturna Island Local Trust Committee schedule a Special Local Trust Committee Meeting on January 31, 2015, to hold a Community Information Meeting.	Jan 20, 2015
2014-08	In Favour	THAT the Saturna Island Local Trust Committee Proposed 2015 Annual Meeting Schedule be adopted, thereby holding their Regular Local Trust Committee meetings on the following dates: February 19, April 23, June 4, October 8, and December 3, 2015, all at 12:30 p.m.	Dec 16, 2014
2014-07	In Favour	THAT Saturna Island Local Trust Committee Business Meeting Minutes of September 18, 2014, be Adopted; and THAT Saturna Island Local Trust Committee Community Information Meeting Notes of September 18, 2014, be Received.	Oct 20, 2014
2014-06	In Favour	THAT Saturna Island Local Trust Committee's interests are unaffected by Mayne Island Local Trust Committee Bylaws No. 163 & 164.	Oct 16, 2014



Islands Trust

Print Date: Feb-12-2015

Follow Up Action Report w/ Target Date

Saturna Island Jul-10-2014

No.	Activity	Responsibility	Target Date	Status
1	SA-CL-2014.1 - further to the proposal in this application staff to prepare a non-enforcement policy for research instruments.	Miles Drew Gary Richardson		Done

Sep-18-2014

No.	Activity	Responsibility	Target Date	Status
2	LTC Meeting Minutes of August 6, 2014 adopted as amended.	Lori Foster		Done
3	Public Hearing record of August 6, 2014 received as drafted.	Lori Foster		Done
4	Community Information Meeting Notes of August 6, 2014 received as amended.	Lori Foster		Done
5	Proposed 2015-2016 project budget approved as presented. Advise RK (RPM).	Gary Richardson		Done
6	Mayne LTC Bylaws 161 and 162 - LTCs interests are unaffected.	Sharon Lloyd-deRosario		Done
7	Letter from Pat Lapcevic (FLNRO) to be placed on next LTC agenda.	Sharon Lloyd-deRosario		Done
8	Update status of proposed bylaws 112, 113, 114 115 and 116.	Gary Richardson		Done
9	Add Trails Map to work program.	Gary Richardson		Done
10	October 23, 2014 LTC meeting to be cancelled.	Lori Foster		Done
11	Draft CRD Cycling and Trail Plan - staff to provide comments to CRD as per RKs (RPM) report.	Robert Kojima		Done

Sharon Lloyd-deRosario

From: Lapcevic, Pat FLNR:EX <Pat.Lapcevic@gov.bc.ca>
Sent: Friday, August 01, 2014 9:41 AM
To: Gary Richardson
Cc: Sharon Lloyd-deRosario; Barroso, Sylvia L FLNR:EX
Subject: RE: Propoased Saturna LTC Bylaws 112, 113, 114 and 115

Hi Gary,

Thank you for sending me the proposed bylaws for review. Please call if you would like to discuss further.

My comments:

Bylaw 112:

- (1) Schedule 1 1b- & 1c. From an environmental perspective it is disappointing that the size of property which can accept increased density is being decreased. In some parts of Saturna Island there is inadequate water supply to support this subdivision.

Bylaw 113: no comments related to water

Bylaw 114:

- (1) 1. (5): See comments re. Bylaw 115. I'm concerned that a *secondary suite* in an area such as Eastpoint without adequate water supply (alternate to groundwater) places more stress on the freshwater aquifer and may contribute to saltwater intrusion.

Bylaw 115:

- (1) Both our studies and those of Dr. Allen at Simon Fraser University have shown that the Eastpoint region of Saturna Island has been impacted by the intrusion of saltwater into the freshwater aquifer. The primary reason for this is excessive pumping of groundwater in a region with inadequate recharge. Recharge on the peninsula is limited due to the low surface topography, narrow peninsula and proximity to the ocean. While some properties can no longer be sustained by fresh groundwater from a private well on the property, other wells still produce adequate fresh water to sustain private homes especially when water conservation is strictly observed. Clearly there is a delicate water balance on the point that can easily be disturbed by increased pumping in new or existing wells. The priority in this area should be to protect the aquifer for basic homeowner needs first. It is my opinion that "commercial vacation rentals" should not be permitted in the Eastpoint Water Management Area unless **adequate** water supply (alternate to groundwater) is demonstrated. A proposed cistern capacity of 21,820 litres (4,800 gals) is not adequate for primary supply for a vacation rental for the whole season (Victoria Day to Thanksgiving) assuming no significant rain during the dry season. The cistern capacity required should be based on the maximum number of persons and/or bathrooms, and the total length of the time that the commercial vacation rental applies to. Additionally, there should be a "back-up" requirement to the cistern supply (perhaps funds set aside for water delivery if necessary?)
- (2) Could H.1.1.11 be changed to include "cumulative impacts" as well as climate change impacts? In other words in relation to the water issue, perhaps there needs to be a limit to the number of permits granted each year in each area?
- (3) H.1.1.9- What about services (water and septic) for campsites?
- (4) H.1.1.12 f- "should demonstrate" should be changed to "must demonstrate"
- (5) H.1.1.12 c- Could something be added to suggest that this might include limiting the number of permits issued or denying a permit?

- (6) The by-law does not address existing short-term vacation rentals. Will these owners require a temporary use permit? Or will this by-law only apply to new uses? What happens to an existing vacation rental that is currently on groundwater (possibly already impacted by saltwater intrusion)?

Sincerely,

Pat

Pat Lapcevic, MSc., P.Geo.

Section Head, Water Protection (Hydrogeologist)

BC Ministry of Forests, Lands and Natural Resource Operations
2080A Labieux Rd, Nanaimo V9T 6J9

Tel: 250 751-3149 Fax: 250 751-3103

Email: Pat.Lapcevic@gov.bc.ca

Switch Board: 250-751-7220

http://www.env.gov.bc.ca/wsd/plan_protect_sustain/groundwater/

From: Gary Richardson [<mailto:grichardson@islandstrust.bc.ca>]

Sent: Wednesday, July 16, 2014 7:42 AM

To: Lapcevic, Pat FLNR:EX

Cc: Lloyd-de Rosario, Sharon ISLT:IN; Richardson, Gary ISLT:IN

Subject: Proposed Saturna LTC Bylaws 112, 113, 114 and 115

Hi Pat Im forwarding you the above referenced proposed bylaws for your review and comment. We have a public hearing for the bylaws scheduled for Aug 6, 2014 so if possible we would like your comments in the next 14 days.

Im out of the office until Monday but would like to call to explain the bylaws and answer any questions you might have.

Thanks, Gary

Gary Richardson

Island Planner

Islands Trust

200-1627 Fort Street

Victoria, BC V8R 1H8

Phone: 250-405-5157

Fax: 250-405-5155

grichardson@islandstrust.bc.ca

www.islandstrust.bc.ca

*Preserving **Island** communities, culture and environment*

February 12, 2015

File No.: SA-DVP-2014.1
(Gilmore)

To: Saturna Island Local Trust Committee
For the meeting of February 19, 2015

From: Phil Testemale, Planner 2 (Acting)

CC: Robert Kojima, Regional Planning Manager
Gary Richardson, Island Planner

Re: Development Variance Application

Owner: Darrin Gilmore

Applicant: Same

Location: Lot 4, Section 13, Saturna Island, Cowichan District, Plan 21418,
PID 001-287-460

THE PROPOSAL:

The purpose of the application is to vary Subsection 2.4.4 (1) of the Saturna Island Land Use Bylaw No. 78, 2002 which states that one storage building not exceeding 61 m² (656 ft²) in floor area may be constructed or placed on a lot prior to the construction of a principal residence or commencement of a principal residential use on the same lot, to allow for one storage building 70 m² (750 ft²) in floor area to be constructed.

BACKGROUND:

The proposal is for the construction of a 3 (three) – bay open carport structure. Construction will be braced post and beam with a sloping flat roof (metal) as shown in Figures Four and Five and Photos. The applicant has begun construction with the construction of concrete post supports and erecting the framework of the post and beam structure (See: Photos – below).

SITE CONTEXT:

The subject property is a vacant 0.25 hc. (0.6 ac.) property located at 608 Tumbo Channel Road facing north toward Cabbage Island and the Georgia Straight. (See: Figure Two: Orthophoto). The property has numerous mature trees with open areas including the area of the proposed carport. There is also a small pond located approximately in Figure Three. The area of construction has been cleared and levelled with an unsurfaced driveway access.

The size and rural residential use of properties in the surrounding area are all similar to the subject property. The property directly to the west has a small dwelling that looks directly at the proposed garage (See: Photos – below). The First Nations Reserve is four properties to the west.

Figure One: Subject Property

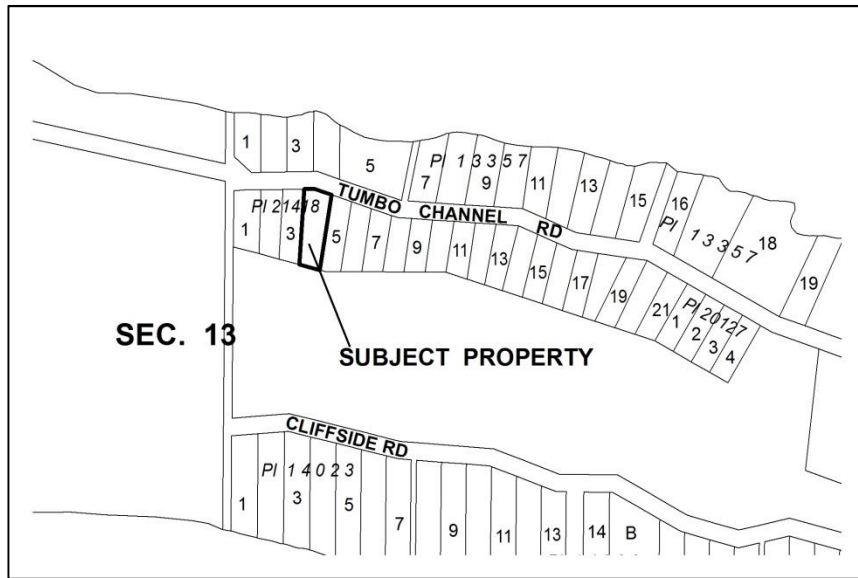


Figure Two: Orthophoto of Site with Zoning



Figure Three: Site Plan

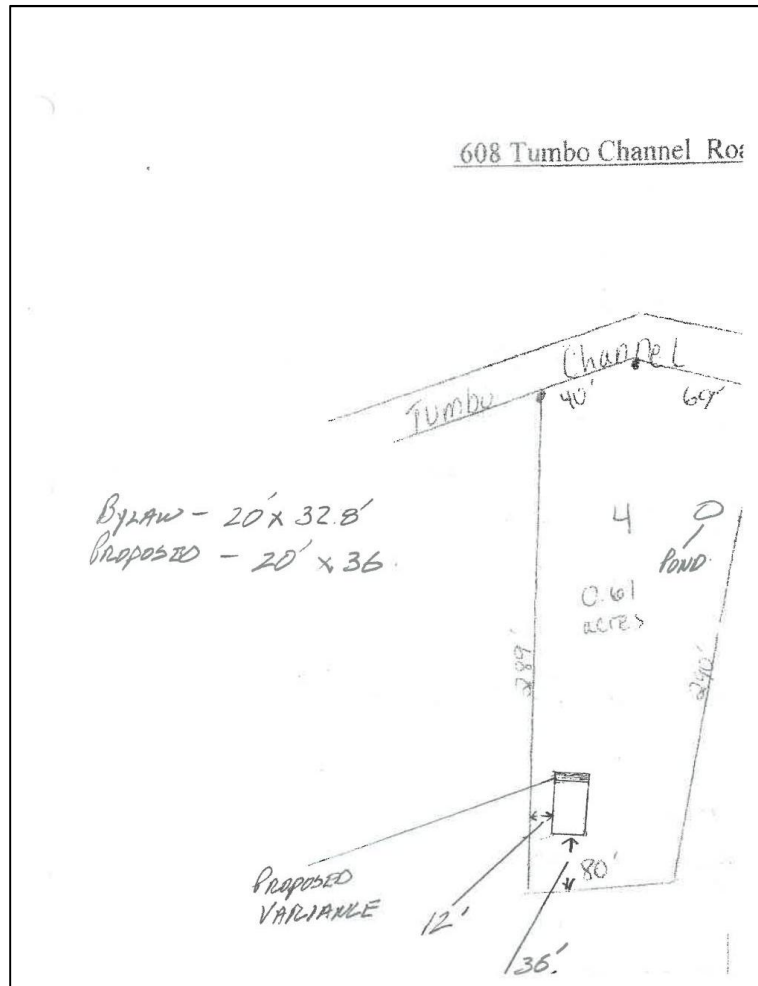


Figure Four: Front Elevation

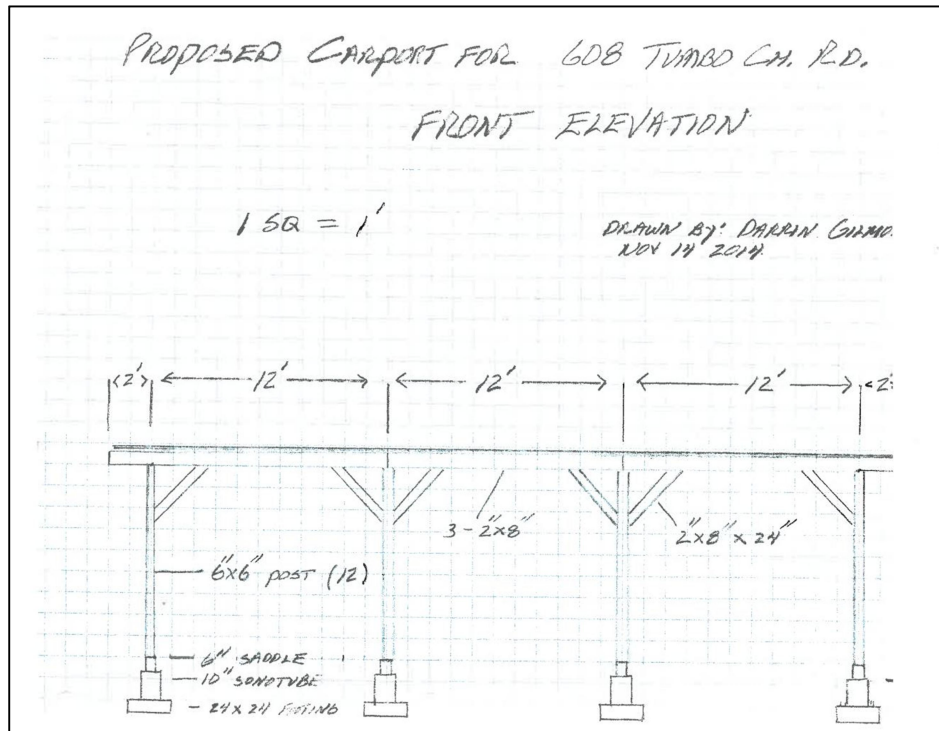
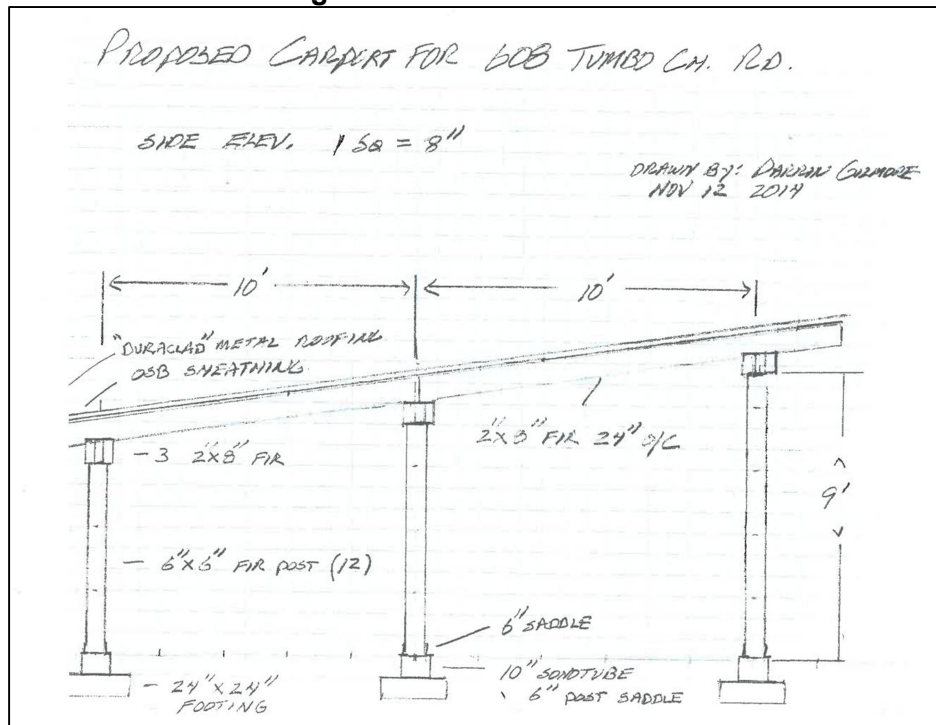


Figure Five: Side Elevation



Photos



CURRENT PLANNING STATUS OF SUBJECT LANDS:

Islands Trust Policy Statement:

There are no directive policies relevant to this application.

Official Community Plan

The subject property is designated as **Settlement Residential (SR)** in the Saturna Island Official Community Plan Bylaw No.70, 2000. Relevant OCP policies include:

The subject property is not in a development permit area.

Land Use Bylaw

The subject property is zoned as **Rural General (RG)** in the Saturna Island Land Use Bylaw No. 28, 2002.

Subsection 2.4.4 (1) of the LUB states that one storage building not exceeding 61 m² (656 ft²) in floor area may be constructed or placed on a lot prior to the construction of a principal residence or commencement of a principal residential use on the same lot. The proposal is to vary this to permit a 70 m² (750 ft²) storage building (carport)

Islands Trust Fund:

There are no Trust Fund Board covenants on the property or in proximity to the property.

Regional Conservation Plan:

The application has no impact on the goals and objectives of the Islands Trust Fund regional conservation plan.

Sensitive Ecosystems and Hazard Areas:

There are no sensitive ecosystems identified on the subject property or in proximity to the property.

Archaeological Sites:

There are no archaeological sites identified in the Provincial Remote Access to Archaeological Data (RAAD) system.

Covenants:

There are no Covenants registered on the title of the property. The large parcel to the south of the subject property has a covenant to limits future subdivision to three parcels.

Bylaw Enforcement:

There are no bylaw enforcement issues on this property.

Climate Change Mitigation and Adaptation

The size and nature of the proposed carport structure could be assumed to have a negligible impact on GHG emissions. The upland location of the property would also determine that it would be largely immune to climate induced hazards.

Figure Six: Steep Slope Hazard Mapping with 2 m Contours



Steep Slope Hazard:

The property has some occurrences of low hazard slopes of (15 to 22.5 degrees) as shown in Figure Six – above. The development does appear to have a small (upland) portion within the low hazard area. This is provided for information of the applicant.

COMMUNITY INFORMATION MEETING(S):N/A

RESULTS OF CIRCULATION:

Notices were circulated to surrounding property owners and residents. The notification period will end at 4:30 p.m. on February 18, 2015. At the writing of this report, there has been two (2) written submissions (attached) received. One states an objection based on a lack of extraordinary circumstances noting that the regulations are the result of long term resident input.

The second states an objection based on non-residential uses and activities on the site. A verbal objection from another neighbour has also been received citing similar reasons to the first submission. Any additional public submissions will be forwarded to the LTC and presented at the Saturna Island Local Trust Committee meeting on February 19, 2015.

ISSUES SUMMARY:

Applicant's stated rationale for the proposed variance.

The applicant's stated rationale for the variance is that the size of 3 - 12 foot (3.6 metre) wide garage bays is required for the items that need to be stored. Further detail was requested and staff received the following from the applicant:

The size of the carport was chosen to allow reasonable room for storage of a small excavator, bobcat and boat. The width I needed was for 3 - 12 foot bays to allow adequate room around the machines and for additional storage for parts and tools. I would like to store these items inside and out of view for both my neighbours benefit and security and avoid having to expand the size of the building at a later date.

The overall intent of the regulation being varied.

The overall purpose of size regulations of storage buildings constructed prior to construction of a principal residence or commencement of a principal residential use on the same lot can be summarized as follows:

- Allowing for a limited size accessory building to be constructed on a property prior to a principal residence for the purposes of storage. The regulation contemplates a modest size building for the storage of tools and supplies.
- Through size restrictions, limiting the visual impact of such development on adjacent properties and the public roadway.
- Minimizing impacts on adjacent properties related to shading, aesthetic, and privacy concerns.
- Maintaining a rural character.

Potential impacts of granting a variance.

Granting a variance can potentially create an expectation in the community with regard to future applications. As variances consider the unique circumstances for a particular situation that may warrant relaxation of specific zoning regulations, each application is evaluated on its own merits.

STAFF COMMENTS:

The proposal is for a variance in the size of an allowable accessory building constructed prior to a principal residence. Although not a large variance, it is nonetheless contrary to the intent of the regulation cited above. This regulation was established after consultation with the community and one that contemplated a reasonable size for such a use.

Variances are typically contemplated for circumstances such that a particular situation makes it difficult or onerous to meet the regulation. The rationale that has been provided by the applicant is to provide a sufficient size for the storage of equipment, machinery and a boat. Although the reasoning of storing machinery (bobcat and excavator) out of sight of neighbours addresses the visual impact objectives of the regulation, storage of such machinery is not typically contemplated on a small rural property such as the subject property. The rationale reflects a situation of convenience versus hardship.

Furthermore, the applicant has stated that he has no immediate plans for a dwelling. If such was the case, the variance might be regarded as more temporary as the size of the proposed building would conform if a principal dwelling was built.

The results of circulation and verbal submission to the planner have indicated an objection to the variance based on fairness and a lack any established need, in addition to concerns about the non-residential uses being undertaken on the site.

Lastly the straightforward design of the building and the early stage of construction would make reducing the size of the building to conform to the bylaw a reasonably straightforward process.

Given the above, staff is recommending that the variance not be approved.

RECOMMENDATIONS:

THAT Development Variance Permit SA-DVP-2014.1 (Gilmore) NOT BE APPROVED.

Prepared and Submitted by:



February 12, 2015

Date

Concurred in by:


Robert Kojima
Regional Planning Manager

February 12, 2015

Date

Attachments: Proposed Permit SA-DVP-2014.1 (Gilmore)
Notice for SA-DVP-2014.1 (Gilmore)
Written submissions (attached under separate heading)



Islands Trust

SATURNA ISLAND LOCAL TRUST COMMITTEE

DEVELOPMENT VARIANCE PERMIT

SA-DVP-2014.1

To: Darrin Gilmore

1. This Development Variance Permit applies to the land described below

Lot 4, Section 13, Saturna Island, Cowichan District, Plan 21418.
PID: 001-287-460

2. Saturna Island Land Use Bylaw No. 78, 2002 is varied as follows to allow for the construction of a single storey storage building:

- a) Subsection 2.4.4 (1) is varied to increase the floor area of storage building placed on a lot prior to the construction of a principal residence or commencement of a principal residential use on the same lot from 61 m² (656 ft²) to 70 m² (750 ft²).

The storage building's location and construction shall be consistent with Schedules "A," "B" and "C" attached to and form part of this permit.

3. This permit is not a building permit and does not remove any obligation on the part of the permittee to comply with all other requirements of "Saturna Island Land Use Bylaw No. 78, 2002" and to obtain other approvals necessary for completion of the proposed development, including approval of the Ministry of Transportation and Infrastructure.

**AUTHORIZING RESOLUTION PASSED BY THE SATURNA PENDER LOCAL TRUST COMMITTEE
THIS ##th DAY OF Month, 2015.**

Deputy Secretary, Islands Trust

Date of Issuance

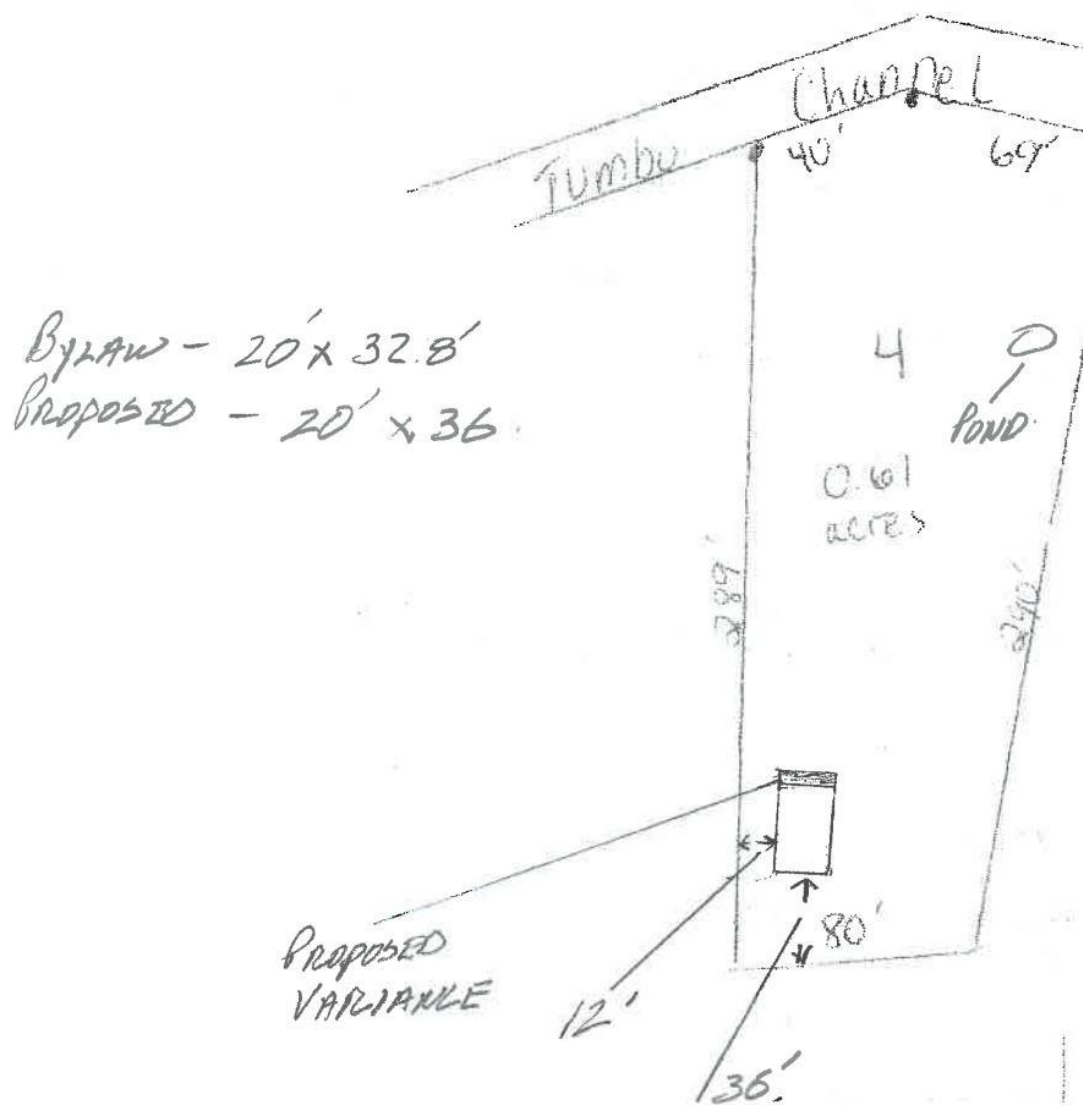
**IF THE DEVELOPMENT DESCRIBED HEREIN IS NOT COMMENCED BY THE ##th DAY OF Month,
Year THIS PERMIT AUTOMATICALLY LAPSES.**

SATURNA ISLAND LOCAL TRUST COMMITTEE

SA-DVP-2014.1

SCHEDULE 'A'

608 Tumbo Channel Road



SATURNA ISLAND LOCAL TRUST COMMITTEE

SA-DVP-2014.1

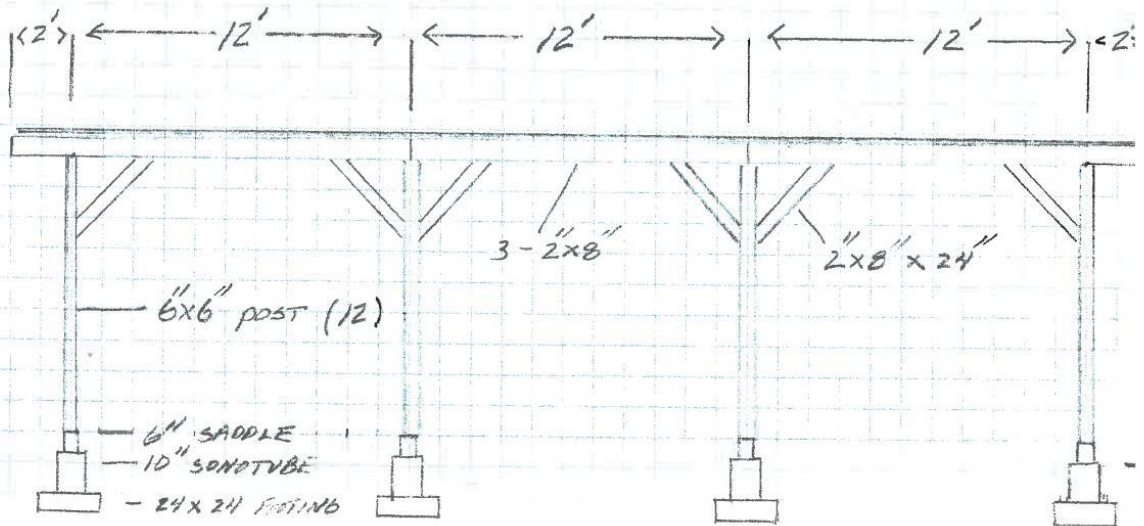
SCHEDULE 'B'

PROPOSED CARPORT FOR 608 TUMBO CH. RD.

FRONT ELEVATION

1 SQ = 1'

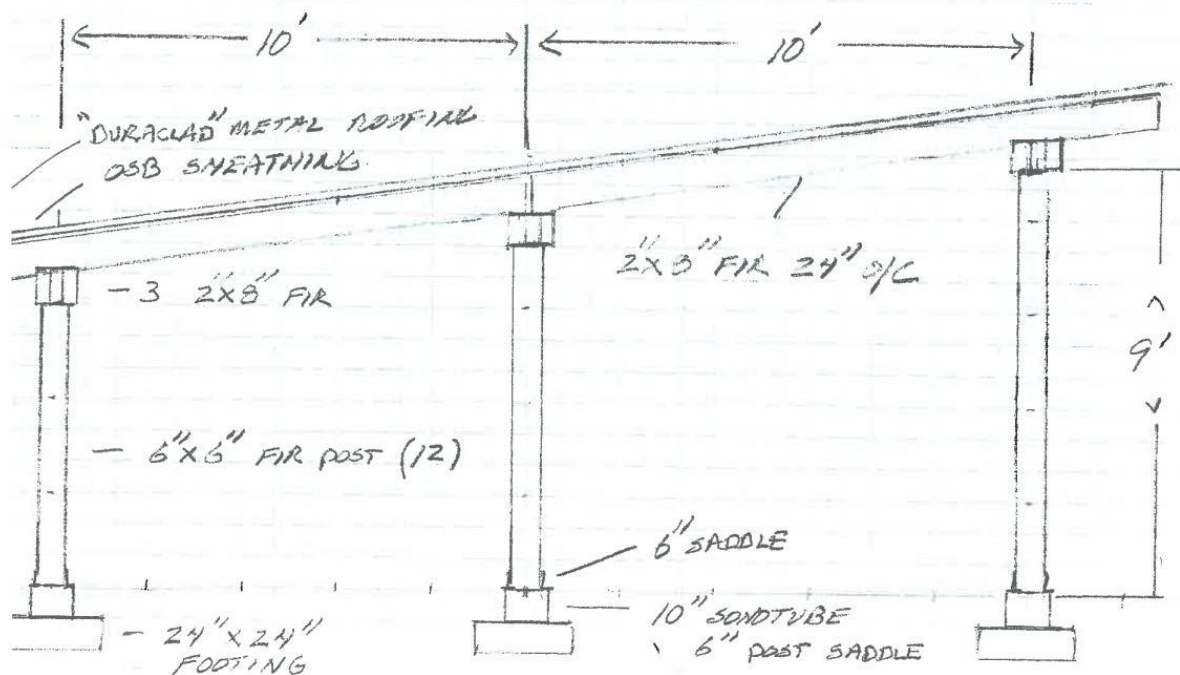
DRAWN BY: DARRIN CHAMBERLAIN
NOV 14 2014



SCHEDULE 'C'

SIDE ELEV. 1 SQ = 8"

DRAWN BY: DAVID GILMORE
NOV 12 2014



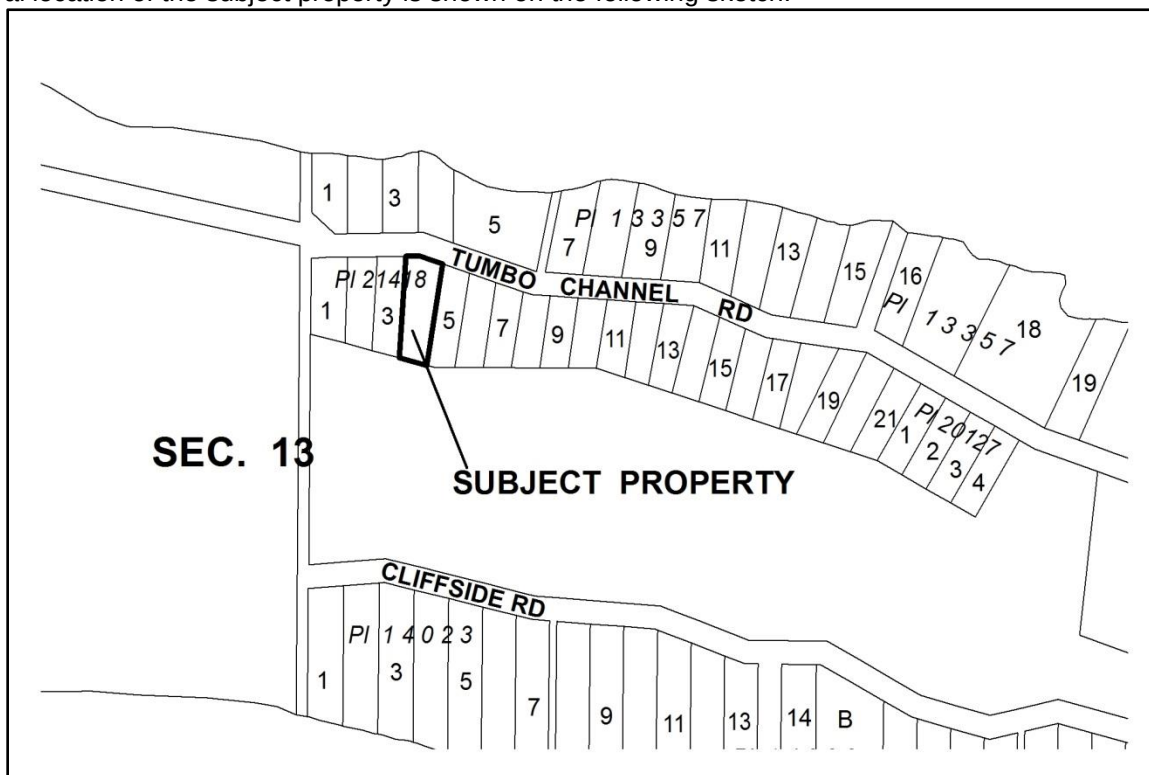
NOTICE
SA-DVP-2014.1
SATURNA ISLAND LOCAL TRUST COMMITTEE

NOTICE is hereby given that the Saturna Island Local Trust Committee will be considering a resolution allowing for the issuance of a Development Variance Permit, pursuant to Section 922 of the *Local Government Act*.

The purpose of the permit is to vary Subsection 2.4.4 (1) of the Saturna Island Land Use Bylaw 78, 2002 to increase the floor area of a storage building placed on a lot prior to the construction of a principal residence or commencement of a principal residential use on the same lot from 61 m² (656 ft²) to 70 m² (750 ft²).

The property is located at 608 Tumbo Channel Road and is legally described as Lot 4, Section 13, Saturna, Cowichan District, Plan 21418.
 PID: 001-287-460

The general location of the subject property is shown on the following sketch.



A copy of the proposed permit may be inspected at the Islands Trust Office, 200 - 1627 Fort Street, Victoria, B.C. V8R 1H8 between the hours of 8:30 a.m. to 4:30 p.m. Monday to Friday inclusive, excluding statutory holidays, commencing **February 6, 2015**, and continuing up to and including **February 18, 2015**.

For the convenience of the public only, and not to satisfy Section 922(5) (c) of the *Local Government Act*, additional copies of the Proposed Permit may be inspected at various Notice Boards on Pender Island, B.C., commencing **February 6, 2015**. Also, attached for your convenience is a copy of the proposed permit.

Enquiries or comments should be directed to Planner Gary Richardson at (250) 405-5157, for Toll Free Access, request a transfer via Enquiry BC: In Vancouver 660-2421 and elsewhere in BC 1-800-663-7867; or by fax (250) 405-5155; or by email to: information@islandstrust.bc.ca before for 4:30 pm, **February 18, 2015**.

The Saturna Island Local Trust Committee may consider a resolution allowing for the issuance of the permit during the regular business meeting starting at 12:30 p.m., February 19, 2015, at the Saturna Island Recreation & Cultural Centre, 104 Harris Road, Saturna Island, B.C.

All applications are available for review by the public. Written comments made in response to this notice will also be available for public review.

-----Original Message-----

From: Joan Combes [REDACTED]

Sent: Wednesday, February 04, 2015 5:03 PM

To: Gary Richardson

Subject: Gilmore property, Saturna Island

Gary:

Excuse us for not knowing the exact property address, but we are travelling. This is a response to a notice for neighbor input on the variance requested by the Gilmores on their west-most property on Tumbo Channel Road.

The request is for a variance to increase the size of the out-building in process from the allowable 656 sq ft to 750 sq ft.

Bylaws are in place for a reason and have evolved over decades from significant resident input. We see no reason to allow exceptions to rules we all have followed, unless there are extraordinary circumstances associated. We are not aware of any reasons why the out-building size limit should be violated in this case and therefore do not support such a variance.

Thanks for requesting our input.

John and Joan Combes
[REDACTED]

From: Felix Ernst [REDACTED]
Sent: Saturday, February 07, 2015 3:13 PM
To: Gary Richardson
Cc: Lee Middleton; Paul Brent; felix ernst
Subject: application for variance permit at 608 Tumbo Channel Road

Hello Mr Richardson:

I am opposed to an approval to permit the variance on the size of an outbuilding on this property.

I live directly across from this property at 607 Tumbo Channel Road. The activity at this site and the neighbouring site at 612 Tumbo Channel Road has been loud for over a year. I do believe that the small lots (.5 acres) on both sides of Tumbo Channel Road are zoned as rural -residential - this does not permit running a business (such as a sawmill or heavy machinery continuously).

I do not know what this outbuilding is for but its construction without a building permit and its excessive size makes this an application that should be denied.

I registered a complaint about a year ago regarding the release of sewage into pipes into the ground from a trailer that was parked at this same property. There was no permit for a septic tank and someone from the CRD came out and eventually the pipe was disconnected.

I request that you deny this application.

Thanks for your attention.

[REDACTED]

STAFF REPORT

February 11, 2015

File No.: SA-DP-2015.1

To: Saturna Island Local Trust Committee

From: Gary Richardson, Island Planner

CC: Robert Kojima, RPM

For the LTC Meeting on February 19, 2015

Re: Proposed Driveway construction within Bluffs Development Permit Area

Owner: Old Point Farm LTD.

Applicant: James Farrow

Description: Fractional Section 7, Saturna Island, Cowichan District, Except That Part In Plan 11380

PID: 003-634-485

Civic Address: 153 Old Point Road

FINAL REPORT

THE PROPOSAL:

The owner of Allotment 1 which is 1 of several allotments within the property known as Old Point Farm is proposing to construct a new driveway to access an existing dwelling. A portion of the new driveway access falls within the bluffs development permit area. The new driveway is being proposed in order to replace an existing driveway that is very steep.

BACKGROUND:

A development permit application was made January 2015 to construct a driveway within an area identified on Schedule E of the Saturna Island Official Community Plan, Bylaw No. 70, 2000 (OCP) as being within the Bluffs Development Permit Area.

The large parent parcel is owned by Old Point Farms Ltd. and has been divided up into allotments. The allotment subject to this application is allotment 1 owned by James

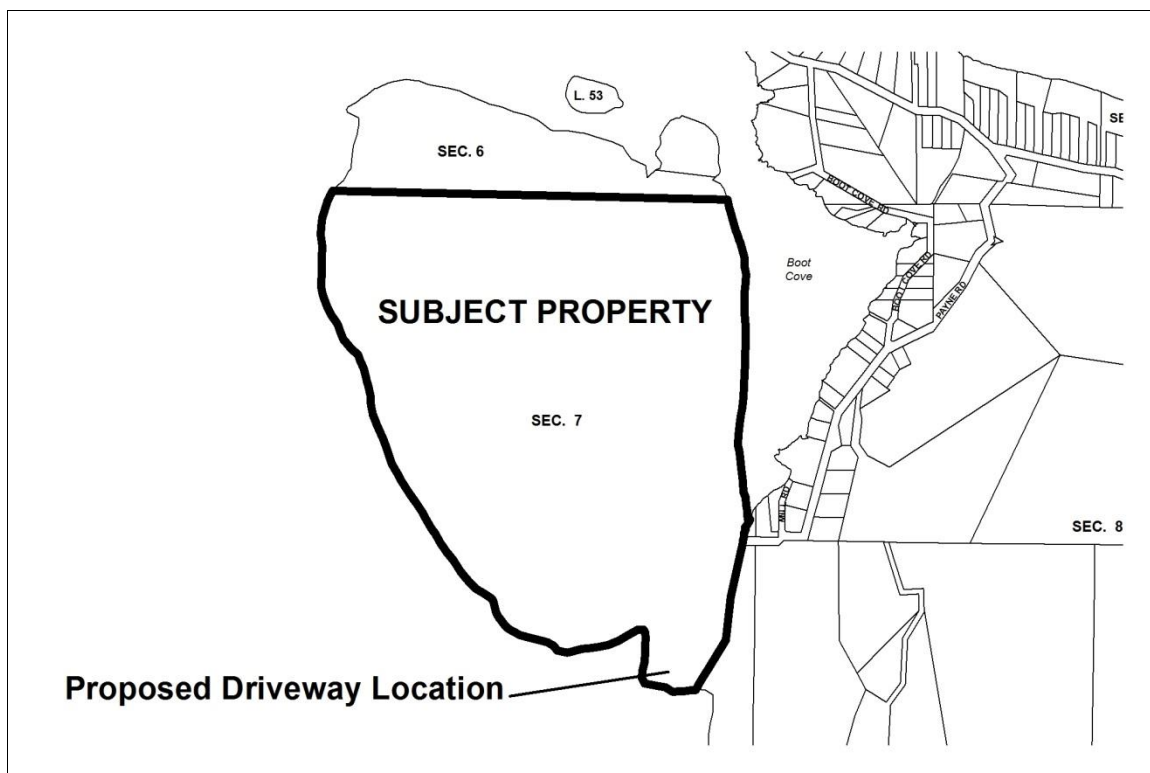
Farrow. Plan No. 1 shows the entire Old Point Farm property. Plan No. 2 shows allotment 1, the location of the existing dwelling and the location of the proposed driveway.

The dwelling is serviced by a very steep driveway which terminates at the ocean near the dwelling. The new driveway has been partially constructed and is intended to replace the existing driveway and provide an improved safer access to the dwelling.

Staff advised the applicant to contract the services of qualified biologist to review the proposed development in relation to the Bluff DPA guidelines and to provide a report. The applicant obtained a report from Michelle Masselink of Masselink Environmental Design. The report is attached for reference.

SITE CONTEXT:

Allotment 1 is a property with a south/south west-facing slope fronting Plumper Sound. The existing driveway goes straight down the slope giving access to the dwelling which is located on the waterfront. The Bluff DPA has been designated on a waterfront portion of the allotment. Map 3 shows the location of the bluff DPA. The biologist report contains photos of both the existing driveway and the site of the proposed driveway.

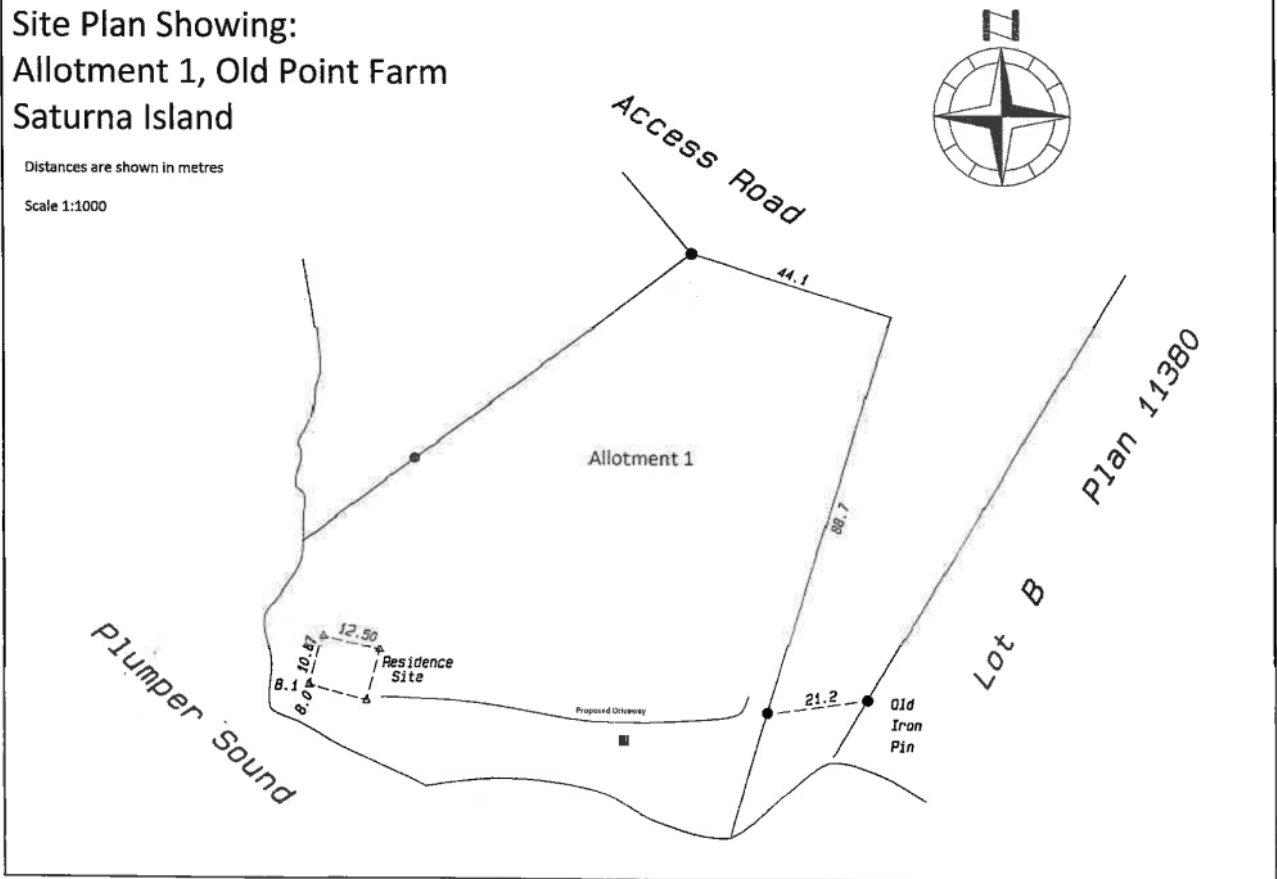


Map 1 – showing the Old Point Farm property and proposed driveway location.

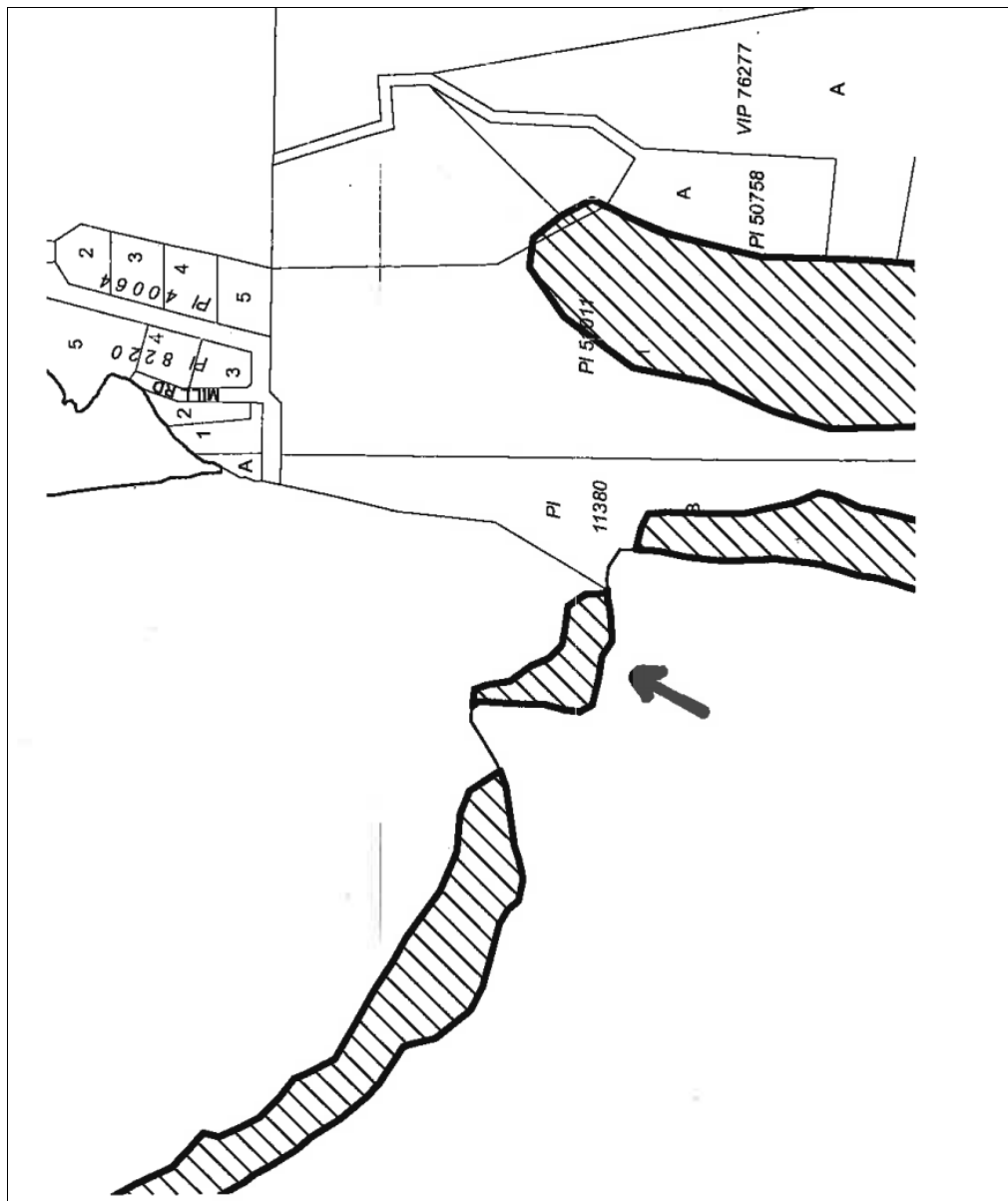
Site Plan Showing:
Allotment 1, Old Point Farm
Saturna Island

Distances are shown in metres

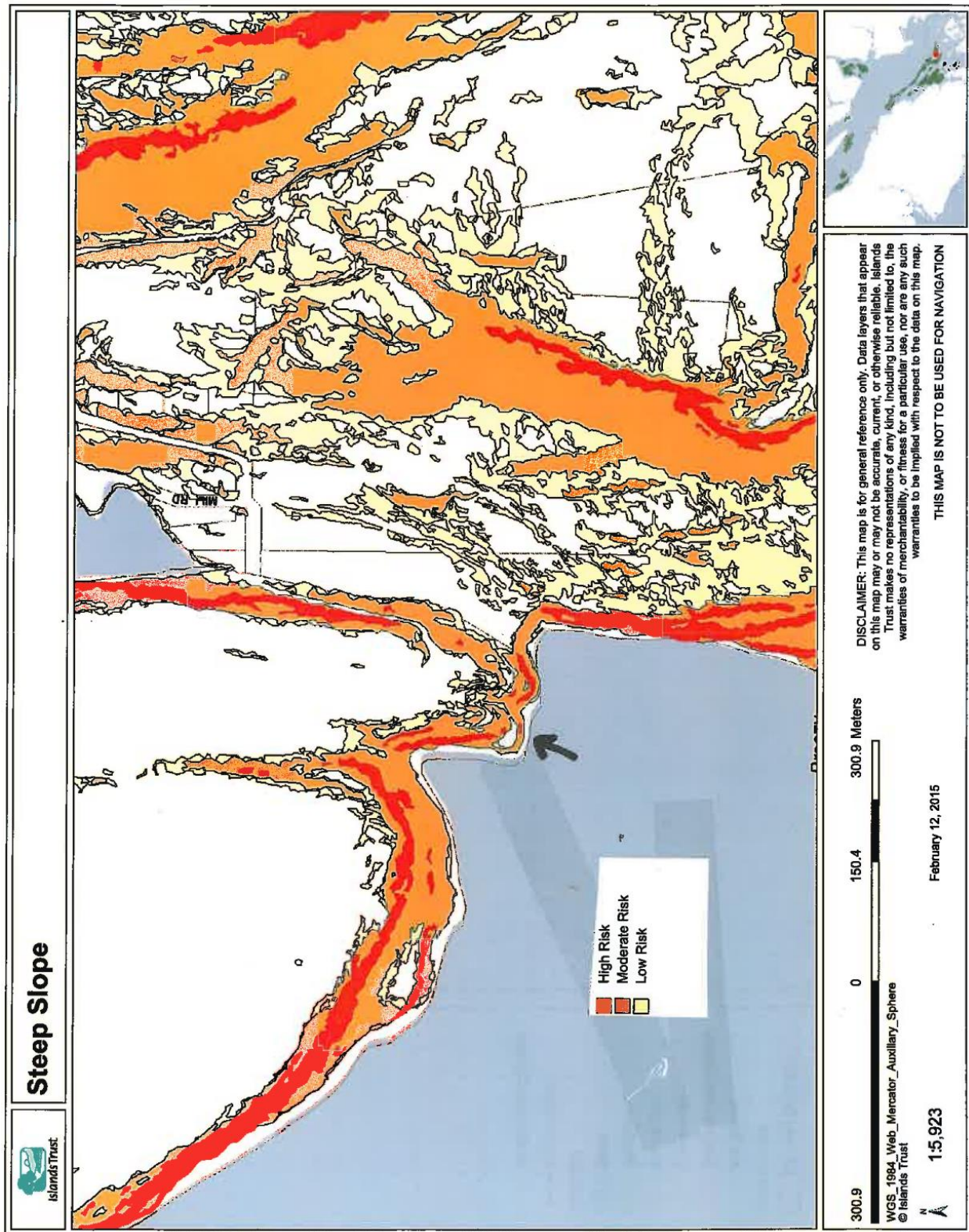
Scale 1:1000



Map 2 - showing allotment 1, the location of the dwelling and proposed driveway



Map 3 – showing Bluff DP area



Map 4- Steep Slope Map

CURRENT PLANNING STATUS OF SUBJECT LANDS:

Islands Trust Policy Statement:

Directive Policies

- 3.1.3 Local trust committees and island municipalities shall, in their official community plans and regulatory bylaws, address the identification and protection of the environmentally sensitive areas and significant natural sites, features and landforms in their planning area.
- 5.1.3 Local trust committees and island municipalities shall, in their official community plans and regulatory bylaws, address the protection of views, scenic areas and distinctive features contributing to the overall visual quality and scenic value of the Trust Area.

Official Community Plan

The proposed driveway falls within the Bluffs Development Permit Area as shown on OCP Schedule E.

Reasons for Bluffs Development Permit Areas

- G.2.3** Bluffs have at least a 30% slope and frequently reach vertical and overhanging positions. The sites are dry and exposed with variable aspect and shallow soil veneers. They provide unique sites for rare plants and nesting sites inhospitable to predators.
- G.2.4** The bluffs are a distinctive feature of the visual landscape of Saturna Island and provide high scenic qualities to the area.
- G.2.5** The Bluffs Development Permit Area contains habitat important to many different species and is particularly susceptible to disturbance. It also contains plants and wildlife that have been placed on the red or blue list of rare and endangered species by the Ministry of Environment, Lands and Parks. Development could lead to the disturbance or loss of a disproportionately large number of different native plant and animal species.

Objectives of the Bluffs Development Permit Area

- G.2.6** To protect the highly visible scenic qualities of the fragile natural features of vegetation and habitat of the bluffs.
- G.2.7** To maintain a treed buffer along the top and bottom of rock bluffs to reduce disturbance of breeding birds and to provide perch sites for raptors.

- G.2.8** To protect all rock bluff and cliff habitats as nesting areas for birds and red and blue listed species of plants and animals found in these ecosystem units.

Guidelines for the Bluffs Development Permit Area

- G.2.9** The habitat should be left undisturbed.
- G.2.10** Any proposed development must not provide predators access to nesting and roosting areas nor disturb fragile root systems for the stunted tree growth, shrubs, grasses, lichens and mosses.
- G.2.11** If development is permitted, it should be undertaken only under the supervision of a qualified or recognized professional biologist or botanist, with advice from the Ministry of Environment, Lands and Parks, the Department of Fisheries and Oceans, or Environment Canada. The report should indicate the type of conditions that should be incorporated into the development permit to achieve the objectives and comply with the guidelines of this development permit area.

Land Use Bylaw

The Zoning of allotment 1 is Rural Comprehensive Development (RCD)

A maximum of 28 residences are permitted on the Old Point Farm property.

Islands Trust Fund

There is an Island Trust Fund conservation covenant on a portion of the Old Point Farm property. The covenant does not apply to allotment 1.

Sensitive Ecosystems and Hazard Areas

The DPA area that is identified on allotment 1 is a Bluff DPA. Bluffs have a least a 30% slope and frequently reach vertical and overhanging positions. The sites are dry and exposed with variable aspect and shallow soil veneers. They provide unique sites for rare plants and nesting sites inhospitable to predators.

The area subject to the proposed driveway is identified as a woodland ecosystem on SEM mapping.

The extent of the Bluff DPA is shown on the following plan.

Archaeological Sites

There are no sites shown on archaeological mapping obtained from the Archaeology Branch.

Notwithstanding the foregoing, and by copy of this report, the owners are advised that the unearthing of any archaeological resource should be reported to the Archaeology Branch

Covenants

M54488 – BC Hydro right of way. Not applicable to proposal.

P46333 – Easement to Lot 1 Plan 11378. Not applicable to proposal.

EW98881 – Capital Regional District. Applies to geotechnical study required for building on Allotment 2. Not applicable to proposal.

EW13868 – Trust Fund Board Conservation Covenant applies to portion of Old Point Farm property. Covenant does not apply to area subject to this application. Not applicable to proposal.

EW19972 – Saturna Island Local Trust Committee Covenant restricting the Old Point Farm Property to 28 residences. Not applicable to proposal.

EX19074 – Covenant between Old Point Farm (grantor) and Saturna Free School Community Projects Ltd. (grantee). Restricts construction on portion of Old Point Farm property. Covenant does not apply to area subject to this application. Not applicable to proposal.

Bylaw Enforcement:

A bylaw enforcement file was recently opened regarding possible development (driveway) within the Bluff development permit area. It was determined that the route of the proposed driveway is in the Bluff DPA and a DP application was requested. This application is a result of that request.

Climate Change Mitigation and Adaptation

This application and the proposed development do not appear to impact climate change in any measurable way.

Shoreline

The shoreline is identified as a 'sea cliff' shoreline type. The shoreline is mostly rock and not easily erodible.

COMMUNITY INFORMATION MEETING(S):

Community information meetings are not recommended for development permit applications as a development permit is evaluated based on how it meets the objectives and guidelines in the OCP.

RESULTS OF CIRCULATION:

The *Local Government Act* does not require notification as part of the process required to issue a development permit as guidelines contained in an OCP were adopted through a public process. If the development complies with the guidelines and objectives of the DPA the permit is issued.

STAFF COMMENTS:

British Columbia's *Local Government Act* (LGA) enables communities to designate parts of their planning area as Development Permit Areas (DPA) so they can set objectives and guidelines for development within those areas. No building construction, demolition, land alteration, or subdivision of land may occur in a Development Permit Area without a Development Permit unless addressed through specific exemptions. Development Permits are a planning tool for sites, buildings and structures in specific areas that warrant special protection or development control. These are different from zoning in that zoning outlines the land use (i.e. single family residential, etc.) whereas a development permit may be used to guide a specific development within that special area (development permit area) in that zone. The Development Permit Areas guidelines and maps are found in the Saturna Island Official Community Plan (OCP) Bylaw No. 70. There are two (2) development permit areas designated in the OCP.

A development permit application is evaluated based on how it meets the objectives and guidelines in the OCP. The decision to grant a development permit is nondiscretionary providing it meets the Development Permit Area objectives and guidelines and is based on fact. Once issued, notice of the development permit is registered on title of the property.

The property owner contracted the services of biologist to assess the potential effects of the proposed development on the sensitive ecosystem contained within the Bluff DPA. The biologist recommended actions that if implemented would minimize damage to the ecosystem. The biologists report is attached.

The recommended mitigation strategies are (in part) as follows:

1. Blasting to take place prior to the breeding season for most birds (by mid-march).
2. Use of rock that originates from property.
3. Install measures that gently distribute rainwater draining off the driveway.
4. Ensure boulders do not tumble downslope during construction.
5. Reclamation of old driveway.
6. Continue to remove invasive species.
7. Limit access to rocky knolls and cliff areas.
8. Careful use of automotive ice-removal agents or materials.

The biologists report states that the long term impacts of the proposed development to the bluff ecosystem will be minimal. The report also states that there will be no net loss of bluff habitat because the landowner intends to implement reclamation measures of the existing driveway.

The following are the guidelines for the Bluffs Development Permit Area with staff comments in italics.

1. The habitat should be left undisturbed.

The owner of allotment 1 is trying to establish a safe all weather access to his residence. The existing access is very steep (greater than 20 % grade), can be slippery in certain weather conditions and terminates at the ocean.

The applicant has advised that the route for the proposed new driveway is the only suitable location for a safe driveway.

The biologist has stated that the long term impacts of the proposed development will be minimal and that there will be no net loss of bluff habitat.

Staff is supporting this proposal as even though the habitat will be disturbed by the construction of this new driveway there will be no net loss of habitat and it will provide for a safer access to the dwelling.

2. Any proposed development must not provide predators access to nesting and roosting areas nor disturb fragile root systems for the stunted tree growth, shrubs, grasses, lichens and mosses.

The biologist has provided mitigation strategies to address the above guideline. The mitigation measures have been incorporated into a draft development permit for the LTC to consider. The biologist's report states that the long term impacts of the proposed development will be minimal and that if the recommended mitigation measures are adhered to there will be no net loss of bluff habitat.

3. If development is permitted, it should be undertaken only under the supervision of a qualified or recognized professional biologist or botanist, with advice from the Ministry of Environment, Lands and Parks, the Department of Fisheries and Oceans, or Environment Canada. The report should indicate the type of conditions that should be incorporated into the development permit to achieve the objectives and comply with the guidelines of this development permit area.

The government agencies listed above do not carry out site reviews for developments of this scale; however islands trust staff will visit the site from time to time both during construction and post construction to ensure mitigation measures have been adhered to.

The biologists report listed the conditions that should be incorporated into the permit to protect and improve the property's habitat value and ecosystem integrity.

Based on the biologists report it is staff's opinion that the objectives and guidelines that apply to the bluff DPA can be complied if the mitigation measures contained in the draft development permit attached to this report are adhered to.

Due to the lack of an alternative site for a safe driveway access and because the report from the biologist states that the long term impacts of the proposed development will be minimal, staff is recommending approval of the attached development permit.

RECOMMENDATIONS:

1. **THAT** the Saturna Island Local Trust Committee Issue Development Permit SA-DP-2015.1 (Farrow) as drafted.

Prepared and Submitted by:

Gary Richardson

February 12, 2015

Date

Concurred in by:

Robert Kojima

February 12, 2015

Date

Attachments:

Draft Development Permit
Report Prepared by Masselink Environmental Design



Saturna ISLAND LOCAL TRUST COMMITTEE

DEVELOPMENT PERMIT SA-DP-2015.1

To: Old Point Farm Ltd.

1. This Development Permit Amendment applies to the lands described below:

Fractional Section 7, Saturna Island, Cowichan District, Except That Part In Plan 11380

2. This Development Permit authorizes the construction of a driveway subject to the following conditions:

- a) The siting of the driveway shall be substantially consistent with Schedule A attached to and forming part of this permit.
- b) The driveway shall not exceed a width of 4 metres.
- c) The existing driveway used to access the dwelling on allotment 1 shall be returned to a natural state for its entire length. Cement blocks are to be removed. Native tree species such as Douglas fir, Garry oak and arbutus are to be established on the reclaimed site.
- d) Any blasting must take place prior to March 15, the breeding season for most birds.
- e) Rock and fill that originates from the property must be used in the construction of the new driveway. No fill or rock from outside the immediate area is permitted to be used in the construction of the new driveway.
- f) Measures that gently distribute any captured rainwater draining off the driveway must be installed to divert water from driveway.
- g) Measures shall be taken to ensure boulders do not tumble downslope during construction.
- h) The owner shall continue to remove invasive species from the area on an annual basis.
- i) Access to rocky knolls and cliff area should be limited and no trails are to be constructed in the DPA.
- j) Careful use of automotive or ice removal agents or materials should be adhered to.

3. This permit is not a building permit and does not remove any obligation on the part of the permittee to comply with all other requirements of Saturna Island Land Use Bylaw No. 78, 2002 and to obtain other approvals necessary for completion of the proposed development.

AUTHORIZING RESOLUTION PASSED BY THE SATURNA ISLAND LOCAL TRUST COMMITTEE THIS DAY OF , 201

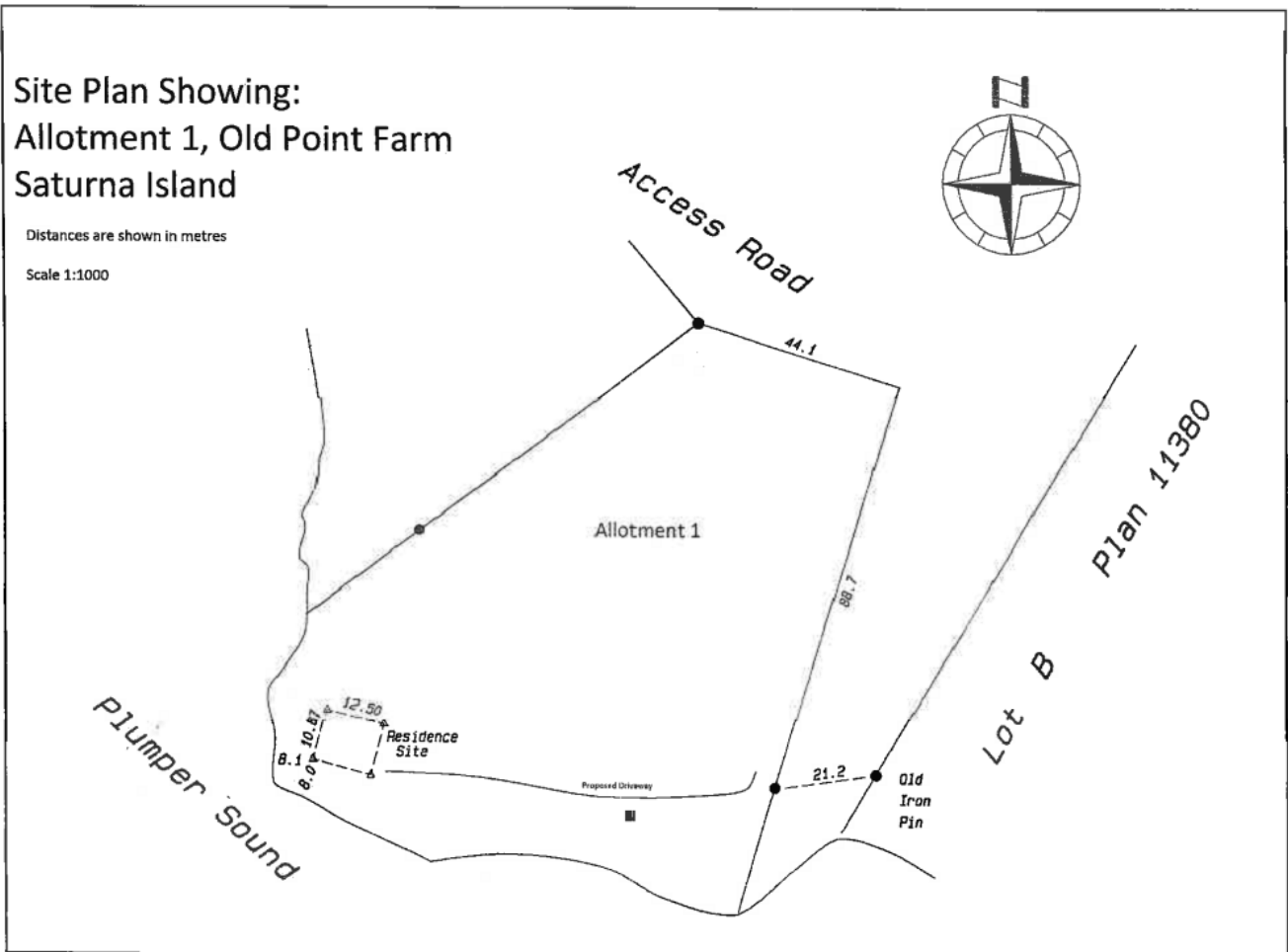
Deputy Secretary, Islands Trust

Date Issued

IF THE DEVELOPMENT HEREIN IS NOT COMMENCED BY THE DAY OF , THIS PERMIT AUTOMATICALLY LAPSES.

DRAFT

SATURNA ISLAND LOCAL TRUST COMMITTEE
DEVELOPMENT PERMIT SA-DP-2015.1
Schedule A





Sensitive Ecosystem Report – Allotment 1, Old Point Farm, Saturna Island

Prepared by Michelle Masselink, Masselink Environmental Design
January 22, 2015

Project Overview

The owner of Allotment 1, Old Point Farm is proposing to re-route the driveway. The existing driveway has a very steep incline. The Saturna Island Official Community Plan acknowledges two Development Permit Areas: DPA 1, Lyall Creek; and DPA 2, Coastal Bluff. Mapping indicates that the southern portion of the property is designated as Coastal Bluff ecosystem (Figures 1 and 2).

The purpose of this report is to assess the potential effects of the proposed development on the sensitive ecosystem that exists on the property and to recommend alternative actions or strategies that will minimize damage. In the preparation of this report I have reviewed the proposed plans, met with the property owner, and viewed the property and proposed development area (January 10, 2015).

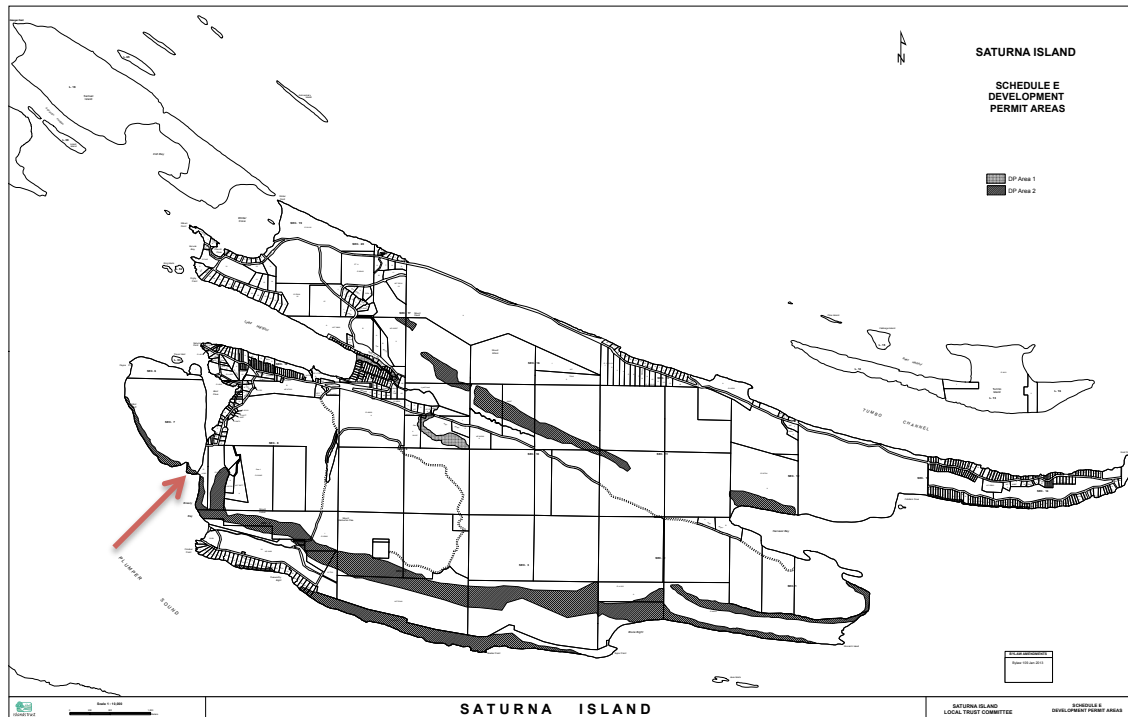


Figure 1. Development Permit Areas on Saturna Island. Arrow indicates location of DPA 2.



Figure 2. Aerial photograph indicating the extent of the Coastal Bluff ecosystem (DPA 2) on Allotment 1, Old Point Farm.

Site Analysis

The property is pie-shaped and situated on a steep south/southwest-facing slope. The house is located on the southwest corner of the property (Figure 3). The existing driveway enters the property at the northern most point. The driveway follows the fall line almost directly south to the house (Figure 2). It is long, narrow and very steep, with a grade of greater than 20%. Poured concrete slabs provide traction and prevent erosion but litter-fall and duff must be continuously removed or the driveway becomes 'slippery' (Figure 4). "Drainage breaks" catch run-off and divert it off the road surface. The lower portion of the driveway as it turns toward the house has been built up with large boulders that form a wall (Figure 5). The narrowness and steepness of the driveway presents a serious challenge to visitors as well as emergency responders trying to access the home.

The land between the southeast border of Allotment 1 and Lot B is part of a large non-development covenant area that runs almost the entire length of Old Point Farm and includes the eastern shore of Boat Cove.

Site Plan Showing:

Allotment 1, Old Point Farm
Saturna Island

Distances are shown in metres

Scale 1:1000

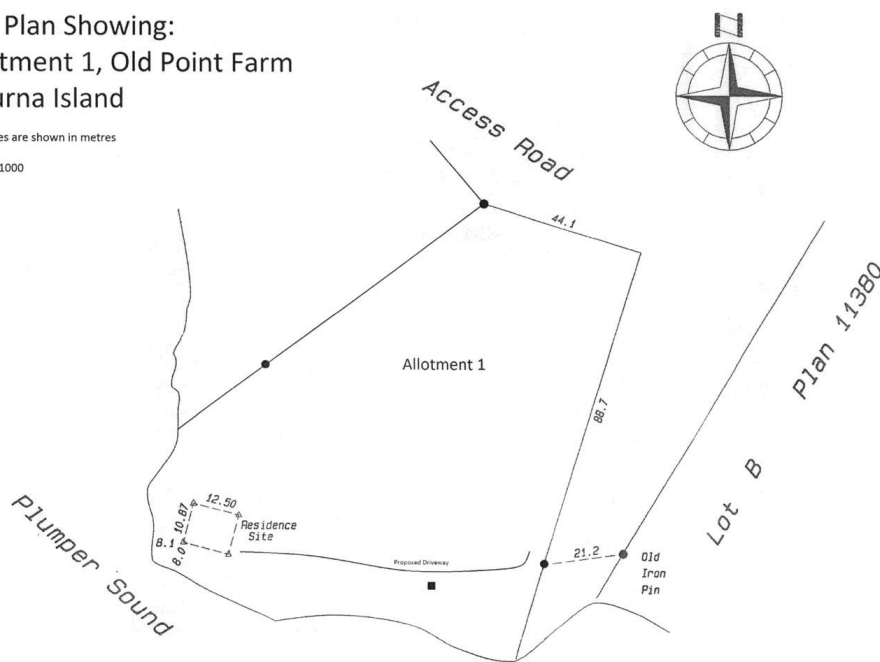


Figure 3. Configuration of Allotment 1, house and portion of proposed driveway through the DPA 2 area.



Figure 4. Existing driveway. Photo taken, January 10, 2015.



Figure 5. Rock/boulder wall near terminus of existing driveway. Photo taken, January 10, 2015.

Coastal Bluff

The lower one third of Allotment 1, Old Point Farm is designated as Coastal Bluff ecosystem as indicated on the 2013 Saturna Island DPA map (Figure 1) and air photo (Figure 2). Coastal bluffs are characterized by steep slopes (30% or more) and are often comprised of exposed rock and overhanging cliff faces. These areas provide important sheltering and nesting sites for birds, bats, snakes and lizards. Because of thin soils, vegetation is often limited. This property also can be characterized as having woodland ecosystem. Coastal bluffs are often found in combination with woodland habitat on the Southern Gulf Islands. Woodland ecosystems are dry, open forests characterized by a mix of deciduous and coniferous tree species. They are found on south facing slopes

and consist of shallow soils. Sizeable Arbutus (*Arbutus menziesii*) and Douglas-fir (*Pseudotsuga menziesii*) were found throughout the property and into the DPA area down to the vegetation edge above the high tide line. Garry oak (*Quercus garryana*) and seaside juniper (*Juniperus maritima* – blue listed) were observed only in the DPA area. Several Arbutus trees were dead or had dead limbs indicative of canker or fungal infection. The herbaceous layer was sparse but consisted of species such as broad-leaved stone crop (*Sedum spathulifolium*), hairy honeysuckle (*Lonicera ciliosa*), Pacific sanicle (*Sanicula crassicaulis*) and a variety of mosses including Wallace's selaginella (*Selaginella wallacei*). The above plant assemblage is indicative of biogeoclimatic zone CDFmm/02 and CDFmm/00. As the woodland continues to mature it will be representative of two red-listed ecological communities: Douglas-fir/Arbutus and Garry Oak/Arbutus.

Flowering species usually associated with woodland and bluff ecosystems were not evident at the time of the site visit. Scotch Broom (*Cytisus scoparius*) is being managed with some success on the property but Oxeye Daisy (*Leucanthemum vulgare*) is abundant along the existing driveway.

There was no evidence of raptor nests or cavity nests in the vicinity of the proposed driveway. Raccoons may be using cavities amongst the rock wall for day beds.

Proposed Development

The proposed plan reroutes the driveway so that it traverses the property in two legs to reduce the grade to 14%. The second leg or lower section of the driveway (~95 m) traverses east west through the DPA area along a narrow slope break (Figure 2: Points 117; and 120 – 122. Figure 3, Figure 6 and Figure 7). Removal of a 4 m x 4 m section of rock (near Point 117) at the upper end of the second leg (at the DPA boundary) is required (Figure 8). This rock will be used down slope in the construction of the road base. The driveway will require a large amount of rock and fill. The boulder/rock wall will have to be somewhat dismantled and rebuilt where the new driveway joins the old driveway near its terminus. The driveway will be 4 m wide.



Figure 6. Photograph taken on January 10, 2015, looking west northwest from approximate midpoint of proposed driveway, showing the nature of the Bluff DPA on landowner's property. Proposed driveway will follow a narrow slope break around cliff face (center right) to join existing drive at rock wall (upper right). Boulders in foreground will form road base. The arbutus in background will be removed.



Figure 7. The first leg of new driveway. Photograph taken, January 10, 2015.



Figure 8. Section of rock to be removed. Located near Point 117 (Figure 2).

Assessment

Overall, the habitat values of this property are quite high. Aside from the driveway and house site the bulk of the property is undeveloped. The adjacent non-development covenant adds to the habitat values. The Coastal Bluff ecosystem will be impacted mostly during the construction phase of the proposed development due to the amount of rock/boulders that need to be moved and the amount of fill required. Only rock and fill originating on the property will be used. The original contractor, who appears to be quite skilled in projects of this magnitude, will be completing the work. As the proposed driveway follows a slope break, upslope and down slope cliff faces should not be impacted by the construction activities. Slope stability may be an issue during the construction phase of the wall near the terminus of the driveway and care should be taken to prevent boulders from tumbling down slope to the shoreline. The boulder wall will alter the topography somewhat in this area as well, but with proper measures impacts to the drainage/hydrology of the surrounding area should be minimal and only during storm events. In total nine trees will be removed: 4 Douglas-fir trees ranging in size from 8 m - 18 m in height; and five arbutus trees ranging in size from 4 m - 14 m in height.

Long-term impacts of the proposed development to the bluff ecosystem will be minimal. There will be no net loss of bluff habitat because the landowner intends to implement reclamation measures of the existing driveway. I propose the following mitigation strategies to help protect and improve the property's habitat value and ecosystem integrity.

Recommended Mitigation Strategies

During construction:

- Any blasting should take place prior to the breeding season for most birds - preferably by mid-March;
- Use rock and fill that originates from the property so as not to introduce invasive species (landowner apparently has stockpiled fill from previous construction);
- Install measures that gently distribute any captured rainwater draining off of the driveway in a manner that does not impact the thin soils and plant communities downslope; and
- Ensure boulders do not tumble downslope during construction of rock wall.

Post construction:

- Reclamation of the old driveway; this would include removal of cement slabs and re-establishing native tree species such as Douglas-fir, Gary oak and arbutus (This may be accomplished through the planting of seedlings or by setting up deer/goat-exclosure plots that allow native flora to re-establish naturally);
- Continuation of the owner's program of invasive species removal, including the removal of Oxeye Daisy;
- Limit access to rocky knolls and cliff areas so as not to disturb fragile mosses and plants; and the
- Careful use of automotive or ice-removal agents or materials (oils, cleaners, salt, etc.) that could impact or compromise the health of the adjacent sensitive ecosystems.



Figure 9. View of the upper portion of existing driveway (upper section of new driveway is seen in upper left corner of photo. During reclamation cement slabs should be removed and native tree species re-established along its entire length. A deer/goat exclosure plot would work well here. Photo taken, January 10, 2015.

Conclusion

The scale of the proposed design is sensitive to the Bluff ecosystem on this property and with reclamation of the existing driveway there will be no net loss of bluff habitat. Given this coupled with the safety and access issues with the current driveway configuration I believe that proposed development is reasonable.

Date: February 3, 2015

File No.: 6500-20-Work
Program Review

To: Saturna Island Local Trust Committee
For the meeting of February 19, 2015

From: Gary Richardson, Island Planner

CC: Robert Kojima

Re: Local Trust Committee Work Program Review 2015

The purpose of this report is to provide the Local Trust Committee (LTC) with an overview of top priorities, projects, budgets and follow up action items at the start of the new term of office. The start of a new term is an opportunity for the LTC to establish their work program.

LTC Top Priorities

The Top Priorities list defines the LTC's work program. An LTC can identify up to three top priorities at any given time, however given limited resources it is unlikely that three significant projects can be managed and delivered simultaneously. It is often more effective for an LTC to focus on one or two projects. When proposing new Top Priorities the LTC must consider available resources, including budget and staff, and relevance of the project. Resources may not be available for all projects, budget requests are submitted in the fall and the annual budget is adopted by Trust Council in March for the fiscal year beginning April 1st. Once a project is proposed as a Top Priority, direction should be given to staff to draft a project charter. The draft project charter must be endorsed by the LTC and Regional Planning Manager prior to the project proceeding.

The following are the current top priorities from the previous term:

Table 1: Saturna Island Local Trust Committee Top Priorities

Description	Activity	Staff Comments
1. Community Amenity Density Reserve Review	Proposed Bylaw 112 has been read a 1 st time	Bylaw 112 was tabled in October 2014 due to upcoming LTC elections.

2. Short Term Vacation Rental Review	Proposed Bylaws 115 and 116 have been read a 1 st time	Bylaws 115 and 116 were tabled in October 2014 due to upcoming LTC elections.
3. Secondary Suite Review	Proposed Bylaws 113 and 114 have been read a 1 st time	Bylaws 113 and 114 were tabled in October 2014 due to upcoming LTC elections.

The current status of these projects is as follows:

1. Community Amenity Density Reserve Review (CADR)

The objective of the project is to amend the Saturna Official Community Plan policies regarding the Community Amenity Density Reserve (CADR). The amendments are intended to place density in the reserve so that the reserve can function as intended.

The CADR is a notional bank that can hold density from properties that have had their density removed through changes in zoning (downzoning) since the OCP was adopted in 2001. The density can be redistributed to other properties by an owner making a rezoning application to the LTC. An appropriate amenity acceptable to the LTC must be provided. The CADR has not been added to or drawn from since it was established in 2001.

This issue was identified as a Work Program Priority by the LTC in September 2013. During the summer of 2013, the LTC conducted community consultation in order to identify priorities relating to general density issues and amendments to the CADR. This consultation took the form of an on-line and mailed questionnaire, a community information meeting, and deliberations at several LTC meetings.

The CADR needs to be provided with residential density and subdivision density for it to function. The removal of density through downzoning of private lands does not often take place and it's only through this type downzoning that the CADR can be provided with density.

Several staff reports have been prepared and can be reviewed on the LTC webpage:

<http://www.islandstrust.bc.ca/islands/local-trust-areas/saturna/projects-initiatives/review-of-community-amenity-density-reserve.aspx>

Proposed Bylaw 112 that was prepared to implement changes to the CADR was tabled at the end of the previous LTC term due to LTC elections.

2. Short Term Vacation Rental Review (Proposed Bylaw 115)

The objective of the project is to establish temporary use permit guidelines for the evaluation of Short Term Vacation Rental applications. This includes specific STVR guidelines in the OCP that will provide greater certainty for applicants and future LTCs. The LTC also identified an amendment to the fees bylaw to reduce the application fee for such TUP applications as an option the LTC would like to consider.

STVR is a term commonly used to describe the commercial rental of dwellings to paying guests for a period of time generally less than a month. Currently, the Land Use Bylaw defines STVRs as a permitted home occupation use in cottages in residential zones. The more commonly used term applies to the use of any residence (not just a cottage) as a vacation rental. If the LTC were to amend the OCP to include guidelines for Temporary Use Permits for vacation rentals in other residences, the current home occupation option would remain as an outright permitted use. In order to provide certainty with respect to the existing cottage option, staff drafted the proposed TUP guidelines to use a different terminology - "commercial vacation rental". The definition of commercial vacation rental would be included in the TUP guidelines.

Temporary Use Permits are a mechanism by which a local government can permit a use that is not otherwise permitted in a zone by issuing a permit for up to three years, renewable for an additional three years. The OCP currently designates Rural, Forest, Farmland and Harbours land use designations as areas where a TUP may be issued and a property could apply for a TUP for the commercial vacation rental currently. However, the LTC identified that specific guidelines relating to issuance of TUPs for vacation rentals should be drafted for inclusion in the OCP. This would provide guidance and certainty for applicants, and guidance for planning staff and the LTC in assessing applications.

During the summer of 2013, the LTC conducted community consultation in order to identify priorities relating to overall accommodation and housing issues. This consultation took the form of an on-line and mailed questionnaire, a community information meeting, and deliberations at several LTC meetings. Consideration of permitting Short Term Vacation Rentals (STVR) through the mechanism of Temporary Use Permits (TUP) was identified as a priority project at the September 26th 2013 LTC meeting.

Several staff reports have been prepared and can be reviewed at the following link:

<http://www.islandstrust.bc.ca/islands/local-trust-areas/saturna/projects-initiatives/short-term-vacation-rental-review.aspx>

This project and proposed bylaw 115 were tabled at the end of the previous LTC term in order to allow LTC elections to be held.

3. Secondary Suite Review

The objective of the project is to amend the Saturna Official Community Plan policies and Land Use Bylaw regulations to establish secondary suites as a permitted use.

Secondary suites are intended to provide affordable, ground oriented and market based rental housing. Given that single family residences dominate the housing type on Saturna Island, and its aging population, the ability to provide legal secondary suites could assist the community in providing for increased housing diversity and affordable housing rental options in appropriate locations. The November 2013 staff report provided detailed analysis of the options and issues associated with secondary suites generally and in relation to the Saturna bylaws.

This issue was identified as a Work Program Priority by the LTC in September 2013. During the summer of 2013, the LTC conducted community consultation in order to

identify priorities. This consultation took the form of an on-line and mailed questionnaire, a community information meeting, and deliberations at several LTC meetings.

Several staff reports have been prepared and can be reviewed at the following link:

<http://www.islandstrust.bc.ca/islands/local-trust-areas/saturna/projects-initiatives/secondary-suite-review.aspx>

This project and proposed bylaws 114 and 115 were tabled at the end of the previous LTC term in order to allow LTC elections to be held.

Projects List

The purpose of the Projects List is to keep a record of topics raised for future work by the LTC. The Projects list also provides a basis for budget requests for the next fiscal year. Before any work beyond basic scoping or preliminary discussion begins, the item should be moved to the Top Priorities list to ensure that staff resources are not diverted from other top priorities. An LTC can have any number of projects on a projects list; however staff recommends this list be reviewed periodically to ensure the projects are still relevant and can be feasibly initiated in the term. The following project list was endorsed by the LTC in the previous term:

Table 2: Saturna Island Local Trust Committee Projects List

Description	Activity	Staff Comments
1. Land Use Bylaw Review – targeted (Ben Bylaw)		This project was identified as a result of the BEN bylaw being introduced.
2. Sensitive Ecosystem Mapping and DPA review	Complete Sensitive Ecosystem Mapping Consider options for implementing sensitive ecosystem protection, Including DPA	As a result of the recent DP application in the Bluff DP area it is evident that DP areas should be reviewed and updated.
3. Geological Hazard Mapping		Accurate steep slope hazard mapping is available that could be incorporated into the OCP either as an information schedule or as the basis for a DPA.
4. Raptor Nest Mapping		Raptor nest mapping was undertaken several years ago.
5. Agricultural Building Watercourse Setbacks		These are joint recommendations of the Ministry of Agriculture and FLNRO for the protection of streams
6. National Park Lands OCP and		This would identify the parkland on Saturna as National Park on the OCP

LUB amendments	and LUB Schedules.
7. Campground Policy Review	This would consider options for permitting campgrounds or establish policies and guidelines reviewing applications
8. Bed and Breakfast Policy Review	To review the longstanding policies and regulations and consider updates
9. Seniors and Affordable Housing policy review	This would consider options for new policies or regulations
10. Review Trails Map	To consider adding as OCP schedule

Budget

There are sufficient funds remaining in the 2014-15 project budgets to maintain the LTC work program until March 31, 2015.

The following are LTC Project budgets requests submitted for the 2015-16 fiscal year (beginning April 1, 2015):

1. OCP and LUB Amendments	\$2500.00	(Completion of current projects)
2. OCP Amendments	\$2000.00	
3. LUB Technical Review	\$2000.00	

Total Projects	\$6500.00	

The balances are subject to approval, consisting of Financial Planning Committee review and adoption of the budget by Trust Council. Each of these items have an amount sufficient to support a limited consultation process and public hearing associated with a project.

Project Charter(s)

The project charters for projects that were active in 2014 are posted on the webpage; these would be updated or new charters drafted, and brought back to the LTC once the Top Priorities are identified.

Next Steps

The top three priorities need to be reviewed and amended to reflect the work priorities the LTC wants to pursue in the coming year(s).

The present three priorities were arrived at through a consultation process which included an on-line and mailed questionnaire, a community information meeting, and deliberations at several LTC meetings. The three priorities were all advanced through the use of project charters with limited scope, budgets, timelines and deliverables. Any future priority will be advanced with an agreed upon project charter and include similar project parameters.

The continued review of the CADR has merit as the CADR has been in place as a density reserve since the OCP was adopted in 2001 but has not been utilized as the removal of residential density through rezoning has not taken place. As it stands, the CADR would not provide density for any application or proposal, no matter how supportable. The LTC could continue with the project to amend the CADR as was proposed (to contain a minimal amount of density in order to allow the LTC to consider applications that provide community amenities). Alternately, the LTC could re-consider all the options, including replacing the CADR with alternate amenity zoning guidelines, removing the CADR entirely or leaving the policy as is. If the LTC chooses not to proceed with this project, the current CADR policies would remain in the OCP.

The continued review of implementing Temporary Use Permit (TUP) guidelines for commercial vacation rental guidelines also has merit as the existing TUP guidelines allow for the issuance of TUPs for vacation rentals in most zones; however there are no specific guidelines to provide guidance and certainty for applicants, and guidance for planning staff and the LTC in assessing applications. A well-established list of guidelines has been drafted and has been implemented by other LTCs when considering issuing TUPs for STVRs.

The continued review of implementing secondary suites could assist the community in providing for increased housing diversity and affordable housing rental options in appropriate locations.

Even though staff has suggested that the existing three priorities have merit, the LTC can place any projects or initiatives it deems appropriate on the priorities list, subject to approval of budget and resources. There may be other priorities that the LTC wants to use staff and financial resources to review.

Other projects that staff consider pertinent that the LTC may want to consider are:

1. Climate Change Adaptation – Consider regulatory and regulatory changes to adapt to sea level rise. The province is in the process of reviewing guidelines for local governments for sea level rise and the CRD is also undertaking mapping for the region to identify areas potentially impacted by sea level rise.
2. LUB Review – there are some areas of the LUB that require updating and or amending for clarity. These would largely involve technical amendments and minor regulatory changes.
3. Policies and zoning for Waste Transfer Facilities – the CRD is currently updating its Solid Waste Management Plan for the whole region, that plan could establish the authority for the CRD to license private waste transfer operators, subject to locations being appropriately zoned. A review of current operations and potential locations would allow the community and LTC to proactively plan for the locating and regulation of waste transfer sites and operations.

As mentioned an LTC can identify up to three top priorities at any given time, however given limited resources it is unlikely that three significant projects can be managed and delivered simultaneously. It is also a challenge for LTCs and community members to grapple with several

significant projects at the same time. In the previous term there were challenges in proceeding with the top three priorities simultaneously. Presenting three projects and obtaining community input within a regularly scheduled LTC meeting also proved to be difficult.

It is suggested, depending on the priorities advanced and the level of consultation to be undertaken, that only one priority be discussed and considered in detail at any given LTC meeting. Alternately, special meetings should be scheduled, both in order to provide sufficient time for LTC deliberations and to provide opportunities for the public to attend outside of regular business hours.

Project charters are prepared for all LTC initiated projects. Project charters address the following:

- scope of the project
- project deliverables
- planning team resources
- budget
- timeline

An example of a project charter can be found at:

<http://www.islandstrust.bc.ca/media/240979/Project%20Charter%20-CADR%20review.pdf>

Project charters ensure that the project's objectives and deliverables are clearly established at the beginning of the process, available resources are not exceeded and that projects are completed on time.

Planning team resources are addressed in a charter. Planning team resources available to the Saturna LTC consist primarily of the island planner assigned to the LTC area, the administrative staff of the southern planning team and the regional planning manager who provides overall guidance.

The project budget for all Saturna LTC initiated projects in 2015/16 is 6500.00; although these funds have been requested they may be reduced as a result of the budget review process. The funds can be transferred from one project to another under certain circumstances with approval of the director of local planning.

The amount of community consultation is established in a project charter. The goal is to achieve effective public participation within the budget and time constraints that staff and LTCs work within. Some of the community consultation techniques that can be considered include: charrettes; world cafes; open space meeting; study circles; deliberative forums; focus groups; and advisory groups.

If specific priority projects cannot be identified at the February 19, 2015 LTC meeting the LTC could as an alternative direct staff to prepare a project charter to advance a project to obtain public input on land use issues and priorities important to the community. The LTC could then use this information to guide its decision on its top priorities for the term.

RECOMMENDATIONS:

THAT the Saturna Island Local Trust Committee determine its top work program priority(ies) for the coming term and amend its top priority list accordingly.

Prepared and Submitted by:

Gary Richardson

Gary Richardson, Island Planner

February 5, 2015

Date

Concurred in by:



Robert Kojima
Regional Planning Manager

February 10, 2015

Date



Islands Trust

Print Date: Feb-12-2015

Top Priorities

Saturna Island

No.	Description	Activity	Received/Initiated	Responsibility	Target Date	Status
1	Community Amenity Density Reserve Review	tabled	Sep-26-2013	Gary Richardson	Jan-01-2015	On Going
2	Short Term Vacation Rental Review	tabled	Sep-26-2013	Gary Richardson	Jan-01-2015	On Going
3	Secondary Suite Review	tabled	Sep-26-2013	Gary Richardson	Jan-01-2015	On Going

Projects

Saturna Island

No.	Description	Activity	Received/Initiated	Status
1	Land Use Bylaw Review - targeted (Ben Bylaw)		Sep-26-2012	On Going
2	Sensitive Ecosystem Mapping and DPA review	1. Complete Sensitive Ecosystem Mapping 2. Consider options for implementing sensitive ecosystem protection, including DPA	Feb-25-2009	On Going
3	Geological Hazard Mapping		Feb-25-2009	On Going
4	Raptor Nest Mapping		Feb-25-2009	On Going
5	Agricultural Building Watercourse Setbacks		Sep-30-2011	On Going
6	National Park Lands OCP and LUB amendments		Feb-09-2012	On Going
7	Campground Policy Review		Sep-26-2013	On Going
8	Bed and Breakfast Policy Review		Sep-26-2013	On Going
9	Seniors and Affordable housing policy review.		Sep-26-2013	On Going
10	Review Trails Map		Sep-18-2014	On Going



Applications w/ Status - Saturna Island Status: Open

Applications

Development Permit

File Number	Applicant Name	Date Received	Purpose
SA-DP-2015.1	James Farrow	Jan-19-2015	153 OLD POINT ROAD Construction of driveway.

Planner: Gary Richardson

Planning Status

Status Date: Feb-11-2015

Staff report and draft permit on February 19, 2015 LTC agenda for LTC consideration.

Status Date: Jan-19-2015

opened file, gave to Planner, processed fees

Development Variance Permit

File Number	Applicant Name	Date Received	Purpose
SA-DVP-2014.1	Darrin Gilmore	Dec-23-2014	608 TUMBO CHANNEL RD Obtain a variance on proposed 3 bay garage.

Planner: Phil Testemale

Planning Status

Status Date: Feb-11-2015

Draft Permit on February 19, 2015 LTC agenda for LTC consideration.

Status Date: Jan-21-2015

Notice and Draft Permit finalized and submitted for mailout PT

Status Date: Dec-23-2014

opened file, processed fee, gave to Planner

Rezoning

File Number	Applicant Name	Date Received	Purpose
SA-RZ-2012.1	Jonathan Yardley Architect Inc Planner: Gary Richardson	Jan-26-2012	Rezone to allow subdivision

Planning Status

Status Date: Oct-22-2014

Requested status from applicant to determine if/how they would like to proceed.

Status Date: May-28-2014

Staff to contact applicant prior to June 5 mtg to determine if they want to proceed.

Status Date: Feb-03-2014

Applicant to advise how they want to proceed.

Subdivision

File Number	Applicant Name	Date Received	Purpose
SA-SUB-2014.1	Wolfe-Milner Land Surveying Planner: Phil Testemale	Aug-21-2014	187 EAST POINT ROAD A subdivision of one parcel & one remaining.

Planning Status

Status Date: Feb-11-2015

waiting for PLA from MoTI

Status Date: Sep-17-2014

Response e-mailed to MoTI

Status Date: Sep-10-2014

fee/application received, gave file to planner, notified LTC

Islands Trust

LTC EXP SUMMARY REPORT F2015

Invoices posted to Month ending January 2015

660 Saturna	Invoices posted to Month ending January 2015	<u>Budget</u>	<u>Spent</u>	<u>Balance</u>
65000-660	LTC "Trustee Expenses"	700.00	0.00	700.00
LTC Local				
65200-660	LTC - Local Exp - LTC Meeting Expenses	1,000.00	1,071.08	-71.08
65210-660	LTC - Local Exp - APC Meeting Expenses	500.00	0.00	500.00
65220-660	LTC - Local Exp - Communications	300.00	0.00	300.00
65230-660	LTC - Local Exp - Special Projects	750.00	0.00	750.00
TOTAL LTC Local Expense		<u>2,550.00</u>	<u>1,071.08</u>	<u>1,478.92</u>
Projects				
73001-660-4017	Saturna Density Review	1,500.00	839.41	660.59
73001-660-4031	Saturna Short Term Vacation Rental (STVR) Review	1,500.00	659.41	840.59
73001-660-4032	Saturna Secondary Suite Review	1,500.00	659.41	840.59
TOTAL Project Expenses		<u>4,500.00</u>	<u>2,158.23</u>	<u>2,341.77</u>

Saturna Island Local Trust Committee

POLICIES AND STANDING RESOLUTIONS

No	Meeting Date	Resolution No.	Issue	Policy
1.	May 16/07	SA-LTC-16-07	Travel Trailer or Camper	It was Moved and Seconded that staff be directed to not take enforcement action against property owners when a travel trailer or camper is located on a lot when: The travel trailer or camper is being used for recreational purposes by the owners of the lot and; The travel trailer or camper is being used intermittently and for short periods not exceeding two months. Not withstanding this direction, staff is to take action to prevent the recreational use of travel trailers or campers on inappropriately zoned land if: The travel trailer or camper is being used as a second residence or; The trailer or camper is situated within the setbacks for a structure or; There are serious safety issues, unsightliness, noise, or health problems related to the use or; A complaint based on the above three items is received from a person who owns neighboring property. Nothing in this direction should be interpreted by a property owner as giving permission to violate the Land Use Bylaw and the Saturna Island Trust Committee may change this policy at any time and may give direction to enforce the Bylaw at any time.
2.	August 20/08	SA-LTC-43-08	Bylaw Enforcement: Short Term Vacation Rentals	It was Moved and Seconded THAT given finite resources available for enforcement activities and in order to ensure the most effective results for enforcement activities, STVRs not permitted by Section 2.16.10 of the Saturna Island Land Use Bylaw No. 78 that have one or more of the following characteristics will be subject to enforcement: 1. They are advertised on the internet, newspapers or other media; 2. They are not managed by the property owner; - More than one STVR per constructed residence on the lot is simultaneously made available for STVR; 4. While the property is rented persons are also staying in tents, trailers, or RV's; 5. There are issues related to health and safety; 6. There is a written complaint by owners or residents about bona fide nuisance issues such as noise or parking congestion related to the STVR;

				7. The owner of the property uses more than one property on Saturna Island as an unpermitted STVR. And THAT nothing in this enforcement policy should be interpreted as giving permission to violate the Land Use Bylaw and the Saturna Island Local Trust Committee may change this policy at any time and may give direction to expand enforcement activities at any time.
3.	February 25/09	SA-LTC-09-09	Adopt LTC Minutes by RWM	It was Moved and Seconded that the Saturna Island Local Trust Committee draft minutes be adopted by Resolution without meeting within 30 days of the meeting and posted to the website.
4.	June 22/11	SA-LTC-	Adopting In Camera Minutes	It was Moved and Seconded that the Saturna Island Local Trust Committee adopt a Standing Resolution to direct staff to place the in camera minutes on the agenda when there is a need to close the meeting or at least once a year.
5.	February 9/12	SA-LTC-11-12	Adopt SOL policy	It was Moved and Seconded that where a Liquor Control and Licensing Branch Special Occasion Licence referral relates to a property where Saturna Island Land Use Bylaw No. 78, 2002 permits public assembly uses, such as halls, recreation facilities or restaurants, and where there have been no issues related to parking or past complaints for the preceding three years, planning staff may approve the Special Occasion License without referral to the Local Trust Committee. All other Special Occasion License referrals are to be referred to the Local Trust Committee for consideration

Trust Fund Board Report to Local Trust Committees and BIM – January 2015

Chair and FPC representative

At its first meeting of the term, the Trust Fund Board (TFB) re-elected Tony Law as chair and appointed Dereck Atha as TFB's representative on the Financial Planning Committee.

Regional Conservation Plan extended

The Board voted to extend our 2011-15 Regional Conservation Plan (RCP) to 2017. The RCP contains strategic goals and objectives which guide our work. Rather than preparing a new plan, the extension will allow us to focus resources on other priorities, including completing some outstanding actions in the RCP. The Board also felt that it would be more efficient and effective to develop a revised RCP alongside preparing our 2017-22 Five Year Plan, which is required by legislation.

Conservation Strategy for Coastal Douglas-fir and Associated Ecosystems

Islands Trust Fund (ITF) staff are participating in the multi-agency Coastal Douglas-fir and Associated Ecosystem Conservation Partnership (CDFCP) which is in the process of developing a Conservation Strategy. TFB has asked staff to look at integrating the completed strategy into our Regional Conservation Plan and report back to the board.

Eelgrass Mapping Complete

We are excited that our Eelgrass Mapping Project –covering the whole Trust Area – is now complete. This addresses one of the goals in our Regional Conservation Plan: to work with partners to conserve marine environments and habitat. Eelgrass is a critical near-shore habitat for numerous birds, mammals, invertebrates and commercial and non-commercial fish. Eelgrass beds are also an important carbon sink.

The mapping of eelgrass beds will help local trust committees, the Trust Fund Board and others to make science-based decisions around land use and conservation to prevent further habitat loss. We understand that the Ministry of Forests, Lands and Natural Resource Operations is welcoming this mapping as a tool to help assess dock and other shoreline applications. The report accompanying the mapping includes recommendations for restoring eelgrass habitat. The full report is available on ITF's website. The mapped data is also available on *MapIT [Shorelines](#)*. If your local trust committee would like to post the maps and recommendations relevant to your local trust area on your web page, please direct your planner to do so.

Eelgrass mapping was done by boat with the aid of a towed underwater camera. The Islands Trust area was mapped over three years through a partnership with SeaChange Marine Conservation Society. The Islands Trust contributed just over half of the total budget of this project with the remainder of the funds being secured by our project partner.

Conservation Planning and Official Community Plans

One of our Regional Conservation Plan goals is to work with the Islands Trust Council, local trust committees and island municipalities to implement conservation goals in Official Community Plans (OCPs). As your local trust committee strategizes your priorities for the term, you may want to consider how to advance conservation provisions in your OCPs, including using sensitive and nearshore

ecosystem mapping. One focus of attention might be Council's policy to establish protected area networks.

From the Policy Statement:

3.1.2 It is Trust Council's policy to work towards the establishment of a network of protected areas that preserves representative ecosystems in their natural state and in sufficient size and distribution to sustain their ecological¹⁴ integrity

3.1.3 Local trust committees and island municipalities shall, in their official community plans and regulatory bylaws, address the identification and protection of the environmentally sensitive areas and significant natural sites, features and landforms in their planning area.

3.1.4 Local trust committees and island municipalities shall, in their official community plans and regulatory bylaws, address the planning, establishment, and maintenance of a network of protected areas that preserve the representative ecosystems of their planning area and maintain their ecological integrity.

Updates Specific to Local Trust Areas

Hornby

ITF's Ecosystem Protection Specialist, Kate Emmings, continues to work with Hornby Island property owner Karin Fischer and Conservancy Hornby Island to establish a conservation covenant to protect Garry oak and Douglas-fir ecosystems on her property.

Denman

ITF's manager, Jennifer Eliason, is contacting Ministry of Environment staff to pursue an inter-agency meeting to address the disposition of Crown land with conservation values on Denman Island. ITF's Property Management Specialist, Nuala Murphy, is working with Denman Conservancy Association to address management issues on Denman's nature reserves, including rerouting of a trail at Morrison Marsh Nature Reserve in coordination communication with BC Parks , and planning a restoration project at Lindsay Dickson Nature Reserve.

Gabriola

ITF's Property Management Specialist, Nuala Murphy, is reviewing workable options to address safety issues on the Coats Millstone Nature Reserve.

Lasqueti

TFB has signed a covenant with Lasqueti Island Nature Conservancy and Nanaimo and Area Land Trust Society to ensure the continued protection of ecological values on the John Osland Nature Reserve.

TFB received a request to consider placement of a 911 relay installation on Mount Trematon. The Board has noted that such a request cannot be considered under existing land use regulations. TFB would also need to consult with the donors, and seek the approval of the covenant holders and Environment Canada because of their roles in protecting the values of this nature reserve.

Gambier

The board formally established the Gambier Island Acquisition Fund, created with funds from a significant bequest received in 2011. Restoration continues at Long Bay Wetlands Nature Reserve with work to protect naturally regenerating conifers by caging them from browsing deer.

Staff are currently working to develop a new nature reserve on Keats island, after the TFB approved a conservation proposal from the Convention of Baptist Churches in November.

Thetis

A special Thetis Island Acquisition Fund has been established following a significant donation provided to support land acquisition on Thetis Island.

Salt Spring

In November 2014, TFB approved a conservation proposal on Salt Spring Island and has directed staff to negotiate a conservation covenant on private land in the Reginald Hill area.

North Pender

Staff continue to work on two conservation covenants on North Pender Island, one for Wallace Point and one for the Clam Bay Farm property.

South Pender

ITF's Ecosystem Specialist, Kate Emmings, continues to work with partners to secure a new covenant over Brooks Point Regional Park, to include the recent acquisition. The covenant will be co-held with Habitat Acquisition Trust.

Mayne

A revised management plan for Horton Bayviary has begun which will involve public consultation for the property.

Galiano

TFB approved a new conservation covenant on Galiano Island and directed staff to negotiate a conservation covenant. ITF had provided a contribution from the "Opportunity Fund" to assist the Galiano Conservancy Association with appraisal costs associated with the acquisition of this property and approved funds to cover some necessary survey costs. Staff have also indicated a willingness to accept a conservation covenant for the Crystal Mountain property should the local trust committee choose to proceed with the Crystal Mountain rezoning application.

Bowen

Bowen Island Municipal Council have renewed discussions about the expansion of the NAPTEP program onto Bowen Island. Staff are providing information as requested to support decision making.

Ongoing property management activities, carried out in partnership with the Bowen Island Conservancy, include installing additional signage at the David Otter Nature Reserve, upgrading trails, removing invasive plant species, and planting and caging trees to protect them from browsing at Singing Woods Nature Reserve and continuing to monitor and work with the Ministry of Forests, Lands and Natural Resource Operations to address off-road vehicle use at Fairy Fen Nature Reserve.



Memorandum

200 1627 Fort Street, BC V8R 1H8

Telephone 250. 405.5186 FAX: 250. 405.5151

Toll Free via Enquiry BC in Vancouver 604-660-2421.

Elsewhere in BC 1.800.663.7867

itfmail@islandstrust.bc.ca

www.islandstrust.bc.ca

www.islandstrustfund.bc.ca

Date: February 4, 2015
To: Saturna Island Local Trust Committee
From: Islands Trust Fund
Re: Islands Trust/Islands Trust Fund Eelgrass Mapping

Eelgrass Mapping in the Saturna Island Local Trust Area

Eelgrass Mapping for the Saturna Island Local Trust Area was completed in December, 2014 by SeaChange Marine Conservation Society under contract with the Islands Trust (see attached report). To reduce costs, surveys excluded the Parks Canada shorelines, but eelgrass mapping from Parks Canada has been incorporated into the Eelgrass Mapping Report and is shown on the eelgrass maps for the Saturna Island Local Trust Area (see attached). Fieldwork was completed in July 2014 and surveys for the Saturna Island Local Trust Area found that:

- Eelgrass is found along 18.5% of shorelines (excluding the Parks Canada shorelines), other islands in the Islands Trust area range between 8% and 33% shoreline coverage.
- Most eelgrass is found on the eastern shorelines where there is protection from northwesterly winds and waves
- Human-caused impacts to eelgrass were primarily from mooring buoys (scouring from mooring buoy chains), docks (shading) and shoreline modifications that removed shoreline vegetation.
- One potential eelgrass restoration site was noted in Boot Cove.¹

About Eelgrass

Eelgrass is a critical nearshore habitat for birds, mammals, invertebrates and commercial and non commercial fish. Eelgrass beds are also an important carbon sink. Contaminants, shading from docks and overwater structures, increased sedimentation, marine traffic and development pressures from shoreline land use threaten eelgrass ecosystems and the species they support.

Report Recommendations

The 2012-2014 Nearshore Eelgrass Inventory Report contains several recommendations. Some of the relevant recommendations for local trust committees are:

- Create setbacks from the shoreline in regulatory bylaws.

¹ Note that the Islands Trust and Islands Trust Fund do not have a mandate to restore marine ecosystems and the information about potential restoration sites is provided for potential community use.

- Prevent construction of docks in eelgrass beds. Where dock construction cannot be avoided, ensure that docks are built to allow light to pass through to eelgrass beds below and that they are constructed from materials that have a minimum impact on water quality.
- Require removal of illegal shoreline modifications and habitat restoration where appropriate.
- Support education of the boating community and shoreline landowners regarding the importance of eelgrass beds and natural shorelines.
- Encourage the boating community not to locate mooring buoys in eelgrass beds and not to anchor in eelgrass beds. Where mooring buoys are located in eelgrass beds, encourage the use of line floats to keep chains and lines off of the sea floor where they can drag and scour the bottom, removing eelgrass habitat and killing species.
- Encourage dock owners to replace dock materials with light penetrable materials.

Next Steps

The Islands Trust Fund has placed the eelgrass mapping and the associated report on its website at <http://www.islandstrustfund.bc.ca/initiatives/marineconservation/eelgrass-mapping.aspx> and has added eelgrass mapping to the MapIT public mapping site at <http://www.islandstrust.bc.ca/maps/mapit.aspx> (Shorelines Application). Local trust committees are encouraged to provide links to the mapping on their websites and consider actions within their local trust areas to include eelgrass protection in their official community plans and regulatory bylaws as per the Islands Trust Policy Statement, section 3.4.4 (see background below).

Local trust committees may wish to direct staff to highlight maps and recommendations specific to their local trust area on their own webpage.

Attachment Report: 2012-2014 Nearshore Eelgrass Inventory
 Map 15: Eelgrass Presence, Saturna Island Local Trust Area

Background

The Islands Trust Policy Statement, section 3.4.4, states:

Local trust committees and island municipalities shall, in their official community plans and regulatory bylaws, address the protection of sensitive coastal areas.

The 2013 Audit of Biodiversity in B.C. (Office of the Auditor General of B.C., www.bcauditor.com/pubs/2013/report10/audit-biodiversity-bc-assessing-effectiveness-key-tools) highlighted the importance of collecting sufficient and reliable information on species distribution in order to make well-informed decisions about conserving biodiversity. With sensitive ecosystem mapping completed in the Islands Trust Area (2008-2010), the Bowen Island Municipality (BIM) and local trust committees have access to ecosystem data for terrestrial species. The Islands Trust and Islands Trust Fund are now working to acquire mapping of sensitive coastal areas to help island governments meet the requirements of the Islands Trust Policy Statement.

In 2012, the Islands Trust and Islands Trust Fund launched a project to map eelgrass as a partnership with the Seagrass Conservation Working Group and SeaChange Marine Conservation Society. The arrangement between the partners resulted in shared funding of the program between the Islands Trust, the Islands Trust Fund and the Seagrass Conservation Working Group (through grants acquired by its member group, SeaChange Marine Conservation Society).

Eelgrass mapping is intended to assist BIM, local trust committees and the Trust Fund Board in making science-based decisions about land use and conservation to preserve coastal ecosystems in the Islands Trust Area. Eelgrass mapping will serve as a baseline inventory to monitor the effects of conservation activities, such as Marine Protected Areas, as well as human impacts, such as potential increased tanker traffic, marine

industrial activities (e.g. log dumping and booms) and foreshore use (e.g. wharves and docks). It will also enable marine conservation groups to identify areas ideal for eelgrass restoration.

Mapping Partnership:

Mapping was completed by SeaChange Marine Conservation Society through a partnership with the Seagrass Conservation Working Group and the Islands Trust Fund. The Mayne Island Conservation Society provided eelgrass mapping for Mayne Island free of charge. The total project budget was \$155,610 (over three years) and the Islands Trust/Islands Trust Fund, contributed 54% of the total amount.

Mapping is now complete for the entire Islands Trust Area. Islands were mapped over three years as follows:

2012:

- Gambier Island
- Lasqueti Island
- Mayne Island Local Trust Area (information courtesy of Mayne Island Conservation Society)
- North Pender Island
- South Pender Island
- Thetis Island Local Trust Area (excluding Valdes)

2013:

- Ballenas-Winchelsea (Executive Islands) Local Trust Area
- Bowen Municipality
- Denman Island Local Trust Area
- Gabriola Island Local Trust Area
- Galiano Island Local Trust Area
- Hornby Island Local Trust Area
- Gambier Associated Islands except those off of the Sunshine Coast (e.g. the Thormanbys)
- Valdes Island
- Cufra Inlet (Thetis Island)

2014:

- North Pender Associated Islands
- Islands off the Sunshine Coast (e.g. the Thormanby Islands)
- Lasqueti Associated Islands
- Saturna Island Local Trust Area
- Salt Spring Island Local Trust Area

Resources for local trust committees

The following are some resources for local trust committees. Please see references in the attached report for a more complete list.

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2012 - 2014

Final Report Nearshore Eelgrass Inventory



**Prepared for the Islands Trust and
Islands Trust Fund by:**

Nikki Wright, BA Executive Director
SeaChange Marine Conservation Society

Leanna Boyer, BSc. MA
Mayne Island Conservancy Society

Keith Erikson, R.P. Bio.
Galiano Conservancy Association

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1 Introduction

Land use developments within watersheds have led to a loss of natural estuarine and nearshore marine habitats in British Columbia - the receiving waters of land based activities. Agriculture, forestry, and dredging for commercial and residential development have all contributed to the loss (Durance, 2002). The pressure to modify natural marine features and habitat for the development of commercial facilities and residential units within coastal areas is intensifying. To prepare for the increase in populations on the BC coast and concurrent shoreline developments, it is necessary to identify and quantify nearshore habitats to protect and maintain these valuable nearshore environments.

As part of a conservation strategy to protect and conserve critical nearshore areas, the Islands Trust and the Islands Trust Fund initiated an inventory of the presence of native eelgrass (*Zostera marina*) surrounding islands within the Islands Trust Area. The 2012-2014 Nearshore Eelgrass Inventory Report provides background information for future eelgrass inventories and adds value to the Islands Trust Shoreline Mapping Project. The goal is to support sound decisions that will affect the natural ecological health of the marine nearshores within the Islands Trust Area. The Islands Trust and Islands Trust Fund have limited jurisdiction over marine areas; however, they can have an impact on long term development and protection of the shoreline. This report and the mapping information that forms its basis are designed to assist Islands Trust and Islands Trust Fund planners and elected officials to make science-based decisions when planning for nearshore areas.

ShoreZone maps of coastal habitats within the Islands Trust Area were created over the past decade. ShoreZone is a mapping and classification system that produces an inventory of geomorphic and biological features of the intertidal and nearshore zones from low altitude aerial images of the coastal environment (Harper 2011). These maps provided the groundwork for identifying suitable physical components for eelgrass on the islands mapped during 2012-2014. Eelgrass biobands are not shown for First Nations Reserves on the maps.

The presence/absence of *Zostera marina* was determined according to the methodology of Cynthia Durance, R.P. Bio., Precision Identification (Appendix A). A more detailed description of the methods used can be found in Section 6.

2 Importance of Eelgrass

Seagrasses are rooted aquatic plants that grow in estuaries and along low wave energy shorelines throughout the world. They have important influences on biogeochemical cycling, sediment stability, and food web support (McGlathery et al. 2007; Orth et al., 2006). Seagrasses can form extensive meadows supporting high biodiversity. The global species diversity of

seagrasses is low (~60 species). Across the globe, however, seagrass meadows cover about 177,000 square kilometers of coastal waters – larger than the combined area of the Maritime Provinces. (Short et al, 2007) British Columbia has about 400 km² of saltmarsh and eelgrass habitats (Campbell 2010).

2.1 Biodiversity

The complex and intricate food webs of an eelgrass (*Zostera marina*) meadow provide food and shelter for numerous fish and invertebrates. Meadows also serve as a nursery habitat and as a refuge from predation for juvenile fishes (Orth et al., 1984; Bostrom and Bonsdorff 2000; Duarte 2000). The productivity of native seagrasses rivals the world's richest farmlands and tropical rainforests. From an unstructured muddy/sandy bottom grows a myriad pattern of leaves that supply nutrients to salmonids and other fish, shellfish, waterfowl and about 124 species of faunal invertebrates. The plants offer surface area for over 350 species of macroalgae and 91 species of epiphytic microalgae – the basis of the food web for juvenile salmon in marine waters (Phillips 1994). Often referred to as “salmon highways”, nearshore marine environments containing eelgrass beds (*Zostera marina*) are home to over 80% of commercially important fish and shellfish species, including all species of salmon, at some point in their life histories (Durance 2002).

2.2 Blue Carbon

Like terrestrial forests, eelgrass habitats capture and store large amounts of carbon but at much more efficient rates - up to ninety times the uptake provided by equivalent areas of forest. This “Blue Carbon” is stored in sediments where it is stable for thousands of years. In B.C., roughly 400 km² of salt marsh and seagrass meadows sequester as much carbon as B.C.'s portion of the boreal forest, and the equivalent of the emissions of some 200,000 passenger cars (Campbell 2010).

When eelgrass beds are restored, the rate of carbon sequestration appears to be rapid over the first few years and up to 40 years following restoration. The natural transport of eelgrass by currents and wave action to deeper waters in estuaries and the coastal ocean may further sequester more carbon (Thom 2011).

As ocean waters warm as a result of climate change (up to 5 C° during the spring), greater flowering as well as faster growth of eelgrass shoots has been observed. Both of these changes result in greater biomass. Like marshes, much of the eelgrass biomass is under the substrate, indicating that a warming environment may result in greater carbon accumulation rates (Thom 2011).

2.3 Ecosystem Services

Ecosystem services are the benefits provided by the land, air, water and subsurface materials of the earth (Molnar et al 2012). Eelgrass habitats within the lower reaches of the Salish Sea provide

carbon sequestration and storage, habitat refugia and nursery and nutrient cycling benefits to an approximated natural capital cost of \$80,929 per hectare per year (Molnar et al., 2012). Within the Islands Trust Area, eelgrass habitats also provide revenue for commercial fisheries, recreational fishery, and revenue from tourism.

Another ecosystem service eelgrass habitats provide is shoreline stability. Established eelgrass beds reduce currents, leading to increased sediment and organic detritus deposition (Durance 2002). Continuous dense eelgrass beds provide a buffer for incoming wave energy. The more the bed is fragmented by physical structures (e.g. boats, wharves, docks and overwater play structures), the less eelgrass beds function as an erosion buffer. Where shorelines are constrained by development or structures to prevent erosion (e.g. rip rap, sea walls), natural coastal features will be squeezed out and maintaining shoreline infrastructure and development will require increasingly expensive engineering measures (Mumford 2007). Pre-emptive planning for these changing conditions is necessary to protect settlement areas and shore features recognized for their natural and ecosystem services.

Protecting and conserving, and in some instances restoring these critical habitats is a recommendation of the Islands Trust Fund's Regional Conservation Plan. Mapping eelgrass is identified as a priority to meet the goal of conserving marine ecosystems and habitats. As well, accounting for these benefits in economic dollars and cents and factoring them into decision making policies would emphasize the economic, cultural and ecological values of nearshore habitats.

3 Eelgrass Habitat Characteristics

Eelgrass meadows are found in most of the world's coastal temperate regions except at extremely high latitudes. Physical and chemical factors affecting *Zostera marina* include temperature, light attenuation, elevation, substratum, wave action, salinity and pH. Worldwide, the plants survive under a wide range of water temperatures, from 0° to greater than 30°C. The optimum temperature for growth lies between 10° - 20° C in most areas (Phillips 1984). Eelgrass grows best within the Salish Sea in salinity ranges of 20 ppt - 32 ppt. Eelgrass can tolerate periods of freshwater inundation on a seasonal or daily basis (Durance 2002).

Of all the above factors, light availability and elevation may be the most crucial. Light availability seems to be the primary factor limiting depth, distribution, density, and productivity of eelgrass meadows within their salinity and temperature ranges. For example, when the Coal Port was expanded in 1982-1983 in Roberts Bank, the range of both native eelgrass (*Z. marina*) and introduced eelgrass (*Z. japonica*) expanded. The construction of causeways across a broad intertidal zone directed the turbid Fraser River water offshore, improving the light regime and initiating higher productivity in the eelgrass beds (Harrison and Dunn 1999).

3.1 Wildlife Corridors

Seagrasses are in decline throughout much of the world, with rates of loss accelerating from a median of 0.9% per year before 1940 to 7% per year since 1990 (Waycott et al., 2009). It has been estimated that 18% of coastal marine and nearshore wildlife habitat, including eelgrass habitats, in the Salish Sea has been destroyed (British Columbia/Washington Marine Science Panel 1994). A large percentage of this decline is attributed to human impacts, including filling of shallow waters, dredging, and eutrophication (Short and Wyllie-Echeverria 1996).

Often referred to as “salmon highways”, nearshore marine environments containing *Z. marina* beds are home to more than 80% of commercially important fish and shellfish species, including all species of salmon, at some point in their life histories (Durance 2002). *Zostera marina* beds are highways for Chinook, Coho, Pink, Chum, and Sockeye salmonid stocks (Thompson 1994). Great Blue Herons have been observed to feed in eelgrass beds within 3 km of their nesting colonies. Other important bird species using these habitats include Brant geese, Rhinoceros Auklets, cormorants and Western Grebes.

E.O. Wilson proposed the importance of habitat corridors in the 1960s (MacArthur and Wilson 1967). Habitat reduction and fragmentation at a variety of spatial scales has been widely acknowledged as a primary cause of the decline of many species worldwide (Thompson 1994). Habitat fragmentation generally leads to smaller and more isolated animal populations. Smaller populations are more vulnerable to local extinction. To reduce the isolation of habitat fragments, many conservation biologists have recommended maintaining landscape “connectivity” - preserving habitat for movement of species between remaining fragments (BC/Washington Marine Science Panel 1994).

Many nearshore environments on the islands inventoried in 2012 and 2013 indicated continuous fringing eelgrass beds. These beds are the connectivity for salmon and other marine wildlife for shelter, food and refugia. Although they may contain less biomass than continuous flat beds of eelgrass plants, they serve an important function and should be protected.

4 Impacts from Human Activities

The majority of the earth’s population now lives within 10% of land defined as “coastal”. One of the results of this increased pressure on coastal shorelines has been the destruction of approximately 215,000,000 acres of estuarine habitat worldwide (BC/Washington Marine Science Panel 1994). With the population of the Georgia Basin/Puget Sound forecasted to exceed nine million people by 2020, nearshore critical habitat loss is likely to increase.

The following is a description of some of the major impacts human coastal settlements have on eelgrass habitats and their functions.

4.1 Removal and Burial

Dredging and filling associated with the construction of harbors and ports have been the major cause of the decline in eelgrass beds (Levings and Thom 1994). The plants themselves are removed and then the physical, chemical and biological composition of the system is altered. Sediments raised by dredging can also bury plants growing nearby and alter eelgrass density by affecting water clarity. The reduction in plant density can further increase silt load because it reduces the capacity of eelgrass beds to trap sediments. It can also increase the erosion of bottom sediments because of the reduced root mass available to hold sediments together. The ultimate result is the reversal of the entire nutrient-flow mechanics of the ecosystem. Dredging activities include hydraulic clam harvesting, bay scallop raking, oyster harvesting and maintenance dredging of harbors. Filling in shallow wetland areas with the debris from wood processing (e.g. log dumps and log booms), sediment runoff from agricultural land and logging severely impact eelgrass habitats as well (Phillips 1984).

4.2 Pollution and Changes to Freshwater Input

Since estuaries are extremely vulnerable to changes in salinity and temperature, human activities affecting freshwater flows from streams heavily affect eelgrass meadows. Pristine watersheds surrounding estuaries provide steady supplies of fresh water and clean sediments to seagrass communities in the estuary. The opposite holds true as well: unhealthy watersheds increase the problems for seagrass distribution and productivity. Activities that cause increased nutrient loads in streams and rivers can result in overgrowth of algae that then die and deplete the oxygen from the bottom of poorly flushed bays. Chemical contaminants, such as fertilizers, pesticides and household hazardous wastes, runoff from streets and roads and runoff from industrial activities also add to the toxic composition of muddy bottoms of eelgrass meadows (BC /Washington Science Panel 1994).

Quiescent waters are more susceptible to chronic contamination than areas with high energy water flows (Harrison and Dunn 1999). In the Salish Sea, more than 540 sq. kilometers of intertidal gravel, sand and mud habitat are closed for shellfish harvesting because of bacterial contamination. More than 730 sq. kilometers of shallow water habitat are unusable for crab and shrimp because of dioxin contamination from pulp mills. More than 32% of classified commercial shellfish growing areas in Puget Sound and Juan de Fuca Strait are either restricted or prohibited for harvesting due to water quality issues (Levings and Thom 1994). The same activities that impact shellfish, crab and shrimp harvesting also impact the health of eelgrass meadows.

Most toxic chemicals that accumulate in sediments in an inland sea such as the Salish Sea reside there for long periods of time unless they are physically removed. There is evidence that the roots of eelgrass take up a significant amount of heavy metals for long periods of time (e.g. lead, cadmium, zinc and chromium), thereby making up a large pool of heavy metals in coastal systems (Lyngby and Brix 1989). The consequences of toxic chemicals may have long term effects on eelgrass consumers, especially waterfowl and marine invertebrates.

4.3 Forestry Activities

Logging may cause scouring of stream channels and thereby increase sedimentation in estuaries, limiting the light available for photosynthesis. Bark chips from log booms smother eelgrass beds and form a blanket on the substrate, which leads to anaerobic sediment devoid of life (BC/Washington Marine Science Panel 1994).

4.4 Oil Spills

Oil spills pose serious threats to eelgrass communities growing in sheltered bays that are poorly flushed. These areas will tend to retain oil for long periods of time, becoming chronically contaminated. If spills happen in late summer or winter when leaf sloughing is at its peak, mats of drift blades will tend to catch and retain oil for later decomposition in the intertidal zone. Seed production and viability could be affected if a spill occurs in the spring (Beak Consultants 1975).

4.5 Shading by Overwater Structures

Increase in demand for overwater structures in the islands can have deleterious and cumulative impacts on the nearshore system. Shading, disruption of nearshore marine water movement, damage to the shore and subtidal habitat and operational pollution from boats can be some of the impacts (Van der Slagt et al., 2003).

4.6 Effects of Boating

Boat propeller cuts disturb eelgrass beds in shallow waters, both when boats are travelling through shallow areas and when they are approaching the shore to debark passengers, moor or anchor. The impacts from boating activities in eelgrass beds may be affecting waterfowl such as Black Brant, direct grazers on eelgrass. The Brant have been steadily decreasing in the Pacific Northwest since the 1940's (Phillips 1994).

Conserving eelgrass habitats enhances the amount of high quality rearing habitat as well as increases the ecological services for human communities, including erosion control, sediment settling and food production (shellfish and fish). With the population of the Georgia Basin/Puget Sound forecasted to exceed nine million people by 2020, nearshore critical habitat loss is likely to increase.

5 Eelgrass and Rising Sea Levels

Sea level rise and increased frequency and intensity of extreme weather are two expected and observed effects of climate change (IPCC, 2007, IPCC 2012). The Intergovernmental Panel on Climate Change warns that on small islands in particular, sea level rise is expected to exacerbate coastal hazards such as storm surges, floods and erosion (IPCC 2007).

Impacts of rising sea level on the coastline of the Salish Sea will be more complicated than the inundation of low-lying areas. The effects will differ significantly between different shoreline features. Inland movement of sea water (Titus and Strange 2008), as well as erosion and re-deposition of sediment will reshape the coastal landscape where there is room for the shoreline to shift and sufficient sediment is available (Mumford 2007). Increasing sea levels are expected to shift the zone in which sunlight is available to eelgrass beds. As a result, eelgrass beds are expected to shift inland unless barriers impede this shift (Titus and Strange 2008).

6 Mapping Methodology

Identifying and monitoring the distribution of native eelgrass habitats supplies much needed information for regional planning. Maps and associated outreach activities may also lead to improvements in land use practices from increased knowledge and awareness about the habitat. Locating areas suitable for eelgrass restoration will lead to rehabilitation of eelgrass meadows as funding opportunities become available.

The eelgrass inventory for this project entailed determining the presence or absence of *Zostera marina* with an underwater towed camera and a boat, except in the Cufra Inlet (Thetis Island) where mapping was done by kayak without a towed camera due to shallow tides. GPS hand held units were used to record waypoints at approximately 10 m intervals in 2012. Accuracy of the GPS readings was on average ± 2.4 metres. In 2013, a Trimble Pathfinder ProXR GPS was used, except in the Cufra Inlet where a handheld GPS unit was used. A detailed description of the methods used to map eelgrass habitats can be found in Appendix A.

The terms used to map eelgrass habitats are described below.

6.1 Distribution

The distribution of eelgrass within the bed is described for this inventory as either patchy or continuous. Patchy beds are those that contain isolated groups or patches of plants. Beds which are not patchy are classified as continuous; a bed that contains bare patches surrounded by eelgrass is classified as continuous. The boundary of a bed is determined by a shoot density of less than 1 shoot per square meter (Durance, 2002).

6.2 Form

There are two basic forms of eelgrass beds in the Pacific Northwest: fringing beds that occur as relatively narrow bands usually on gentle slopes, and more expansive beds that cover large areas such as tidal flats known as “flat” beds (Durance, 2002). Inter-annual variation within a bed is not well known, but appears to be less than ten percent (Dowty et al, 2005). Fringing beds are generally linear. Flat beds are areas of large eelgrass beds in embayments that extend deeper than fringing and more linear beds found along shorelines (Dowty et al. 2005). Distribution is

often, but not solely, determined by aspect to dominant winds. Eelgrass distribution across a bathymetric gradient is limited at the upper boundary by the degree of exposure at low tide (desiccation) and by light limitations at the lower boundary.

6.3 Sediment Types

When possible, field observers rated the primary, secondary and tertiary occurrence of substrate types: sand, mud, pebble and cobble. A subtidal environment dominated by cobble might indicate a habitat more suitable for large kelps, which would shade any eelgrass shoots growing between the cobble during the summer months. A predominately sandy muddy bottom would support continuous eelgrass meadows in most cases, unless other factors are present, such as exposure to strong waves or the interruption of habitat by boat mooring buoys. In some cases substrate characteristics change with increasing depth (e.g. cobble to sand or mud to cobble).

6.4 Percent of Cover

Percent cover was estimated in broad categories to increase accuracy of observation (<25%, 26-75%, >75%). The coverage of an eelgrass meadow reflects both the substrate and the flow of water through it. A calm environment with a sandy mud substrate generally supports a dense, continuous eelgrass bed with virtually 100% cover. The cover of eelgrass in areas subjected to strong currents is typically patchy. Areas with heterogeneous substrate (mixture of fine and coarse) also tend to be patchy (Durance 2002). The percent of cover data collected from this inventory is based on subjective approximations as observed through the lens of an underwater camera. The approximate percent of cover does give important information on the density and productivity of a bed.

6.5 Tidal Fluctuations

It was important to note whether the tide was running or slack at the time of the inventory. Eelgrass shoots will tend to bend towards the substrate during running tides; the accuracy of percent of cover is then very approximate.

6.6 Presence of Other Vegetation

Other types of algae were documented as broad or tuft. Broad algae, such as kelps, sea lettuce and *Sargassum muticum* can blanket the ocean floor and make it difficult to characterize substrate. They can also shade eelgrass in mixed substrates as they anchor to hard surfaces. Tuft algae, such as brown and red algae do not shade eelgrass but indicate presence of hard surfaces for attachment. The presence of kelps, predominately large brown kelps, was noted, as was the presence of other types of smaller algae and *Sargassum muticum*. *Sargassum* is an exotic species of algae that can overshadow eelgrass if the substrate is a mix of sand and cobble. The presence of *Sargassum* was noted especially off the shores of Thetis and North and South Pender Islands.

6.7 Visibility

Visibility was a subjective observation and was rated low, medium and high. The amount of visibility could impact in some instances the accuracy of the observations, namely characterization of substrate. For example, Gambier Island often had low visibility. This can be caused by winds, sediment flows from the lower reaches of watersheds, inputs from nearby streams and tidal/current movements. Low tide periods make for the best visibility.

7 Survey Limitations

The range of accuracy for all the islands surveyed in 2012 was within ± 2.4 metres. Visibility at times was poor, due to tidal influences, sedimentation in the water column from stream outflows, summer plankton blooms and wind. During the last day of mapping Gambier Island in August, 2012 the wind was too high to continue the inventory. The survey team returned to complete the inventory in September 2012. During the 2013 survey of islands within Howe Sound, the winds were often a factor in scheduling the inventories. The average horizontal precision for the GPS unit used for the 2013 and 2014 eelgrass inventories was ± 0.814 metres.

Shorelines within the Gulf Islands National Park Reserve were not included as part of this survey. However, eelgrass that occurs along shorelines within the Gulf Islands National Park Reserve are represented by BC Shorezone eelgrass biobands on maps included with this report.

Percent of cover of eelgrass shoots is difficult to assess accurately with an underwater camera but was deemed important to characterize. Areas of particular interest (e.g., impact of shoreline modifications, restoration potential) should be surveyed by SCUBA divers. Overall, this inventory is an indication of the presence or absence of eelgrass habitat and does not represent maps of the outer or shoreward edges of each bed, with the exception of Bowen, Passage and Bowyer Islands. Polygons were mapped for these islands where possible in 2013.

8 2012 Inventory Findings

Eelgrass inventories were conducted using ShoreZone inventory maps which include presence of eelgrass where available and the ShoreZone shoreline classification types (available for all islands) as a reference.

The Islands Trust eelgrass inventory is important, particularly on islands such as Gambier and Lasqueti, as the ShoreZone data was based on Orthophoto images alone. Valdes, Cufra Inlet (Thetis Island), Passage and Bowyer Islands were mapped in 2013, but are included in the 2012 inventory, as they are within the Thetis and Gambier Island Local Trust Areas which were

surveyed in 2012. Similarly, the Associated Islands of Lasqueti Island and North Pender Islands were mapped in 2014 and are included here.

8.1 Gambier Island Local Trust Area

Gambier Island was surveyed on August 21st-23rd and September 11th, 2012. This island has rugged shorelines, with steep slopes leading to the subtidal zone. Eelgrass habitat comprises approximately 8.3% of the island's linear subtidal shoreline. The majority of the eelgrass beds are fringing, the significance of which has been described earlier in this report as important to wildlife corridors.

Gambier Island has been highly impacted by historical log storage practices. Eight sites were identified as possible restoration areas starting with small eelgrass test plots (approximately 800 to 1000 shoots). Larger eelgrass restoration might occur if these test plots increase in shoot density and coverage and as funding opportunities arise. In some of these sites, backshore lands have been placed on the real estate market, which may impact future restoration efforts if docks and wharves are permitted as additions to upland development.

Boat mooring buoys and recreational equipment on the water over eelgrass beds as well as derelict log booming cables and booms were observed. There were numerous docks and wharves within eelgrass habitats. Several large shoreline modifications were also noted. These changes to the shore can have long term impacts on nearshore environments, including wave scouring, shading and interruptions to sediment transport. With the presence of active and retired log leases, the island would greatly benefit from an eelgrass restoration strategy plan to increase value for both biological diversity and ecological services.

Bowyer Island was surveyed on October 11-12th, 2013 using the polygon mapping methodology. The west, north and east coasts of Bowyer Island are largely steep and rocky. The south shore is characterized by several coves, varying in substrate. Eelgrass was estimated to extend along 11.35% of the Bowyer Island shoreline, observed only in particular coves along the southern portion of the island. The area of polygons containing eelgrass was observed to total 3690 m² and the length of mapped line features was observed to total 70 m. In addition to continuous beds, 4 individual patches of eelgrass were recorded, noted on the map as points. Eelgrass around Bowyer Island was similar in appearance and percent cover to that surrounding Bowen Island, i.e. patchy and sparse. Percent cover within the polygons was less than 25%.

Docks were located in eelgrass depth in the bay on the central southern shore of Bowyer Island, within zone W2/W1a. Eelgrass beds in that bay were observed to extend as far as the docks. Several chains were located on the ocean floor in zone W2 on the southeast shore of the island, and a large dock is within or adjacent to the eelgrass bed.

Large schools of small fish were frequently observed while circumnavigating Bowyer Island, particularly on the west, north and east coasts. Also observed were large numbers of pile perch (*Rhacochilus vacca*) and rockfish. Harbour seals were observed in several locations.

Passage Island was surveyed on October 5th, 2103 using the polygon methodology. One of the most exposed islands of Howe Sound, this island is a good example of how people and eelgrass tend to occur within similar, sheltered environments. Most of the island is characterized by rocky cliffs, with a few beaches. Eelgrass was observed in sections of the east coast of the island, along 15.7% of the total shoreline of the island. The area of polygons containing eelgrass was observed to total 3718 m² and the length of mapped line features was observed to total 40 m. Percent cover within the polygons was less than 25%. Ropes were observed on the sea floor in eelgrass depth in an area of the southeast coast of the island in the presence of patchy eelgrass. In this area was also located a floating dock within eelgrass depth and approximately 12 moorings in the eastern part of the area, where the eelgrass was very sparse and patchy. A floating dock and mooring was located at the south end of the more northerly eelgrass polygon on the east coast of the island.

The islands west of Bowen Island were inventoried between August 4th - 6th, 2013. The linear shoreline extent of eelgrass habitat surrounding the associated islands within the Gambier Island Local Trust Area totals approximately 13.3%.

Most of **Keats Island** contains flat or fringing beds of continuous eelgrass habitat on sandy/mud substrates, especially on the north and west facing shores. Patchy eelgrass beds were observed on the southeast shores, most likely due to exposure to predominant winds.

A high preponderance of single eelgrass patches lie on the southern tip of Keats Island, which may be caused by exposure to southerly winds, but also to the multiple locations of docks, especially on the southwestern shore.

There is potential for eelgrass restoration on the northern end of the island at the eastern point of a log booming area if the log lease is retired in the future. This area has a rocky/cobble foreshore, forested backshore and water park with overwater floats. There are also many docks on the southwestern portion of the island, which may cause fragmentation of eelgrass beds. Where there were low rock/cobble substrates, no eelgrass was present.

Anthropogenic Impacts include the construction of docks, presence of moored boats in eelgrass beds, removal of native backshore vegetation and recreational use of the nearshore (water park overwater play structures).

Continuous flat eelgrass habitat was observed in the southeast and western shores of **Shelter Island** directly west of Keats Island. No eelgrass was found near **Home Island** south west of Keats Island. **Preston Island** south of Keats Island contains a small continuous eelgrass bed on the southeast shore. The backshore is forested. **Ragged Islets** contain mostly patchy eelgrass beds throughout most of the subtidal areas, except for the west facing side of the islets. Mooring buoys and docks were observed on the eastern shore and a float on the northern side of the islets. Most of the islets are forested and contain rocky substrate. The small islet to the northeast contains a fringing continuous eelgrass bed.

The majority of eelgrass surrounding **Pasley Island** south of Ragged Islets is flat and continuous in

sandy/shell hash substrate. Vegetation along the foreshore has been cleared near many residences. Retaining walls, docks and mooring buoy chains interrupt eelgrass continuity along the south and southeastern facing shores. There is potential for eelgrass restoration on the southeastern facing shore almost at the midpoint of the island where there is a gap in an otherwise flat continuous eelgrass bed. On the northeastern shore of Pasley there is a dense eelgrass bed that could serve as a possible harvesting site for restoration of lost or damaged eelgrass habitat.

No eelgrass was noted off of **Worlcombe Island** southeast of Pasley Island.

Mickey Island northeast of Pasley Island is surrounded on its western, southern and northern shores by mostly fringing patchy beds of eelgrass in sandy/shell substrate. Eelgrass is mostly likely limited on the eastern shores by low rock/boulder substrates. The rocky shores are surrounded by natural forests. Minimal anthropogenic impacts were observed.

To the west lies **Hermit Island**. The majority of eelgrass habitat is flat and continuous in sandy/shell hash substrates. Most of the habitat is located on the east facing shoreline, though the foreshore is cobble or low rock. The majority of the backshore is forested. In some areas, dock construction interrupts eelgrass beds. Harlequin ducks were observed within an eelgrass area on the southwestern side of the island.

Little Popham Island south of Hermit Island has mostly continuous flat beds of eelgrass to the southwest and northeast next to rocky shores and forested backshores. It is very likely eelgrass is limited by the subtidal low rock/boulder substrate surrounding the remaining areas of the island. Most of the eelgrass around **Popham Island** lives on the northeastern portion of the island in sandy/shell substrate and consists mostly of continuous and flat beds along steep rocky shores.

Grace Island southwest of Gambier Island contains mostly fringing continuous eelgrass habitats in shell/sand substrates next to steep rocky foreshores and forested backshores. A large school of fish was observed. **Woolridge Island** to the northwest of Gambier Island contains mostly flat continuous beds of eelgrass on its north facing shores. The beds are very robust, with a possible harvesting site on the east shore if restoration is undertaken in this area. There is woody debris noted near a breakwater on the north western facing shore of the island.

The majority of eelgrass habitat surrounding **Anvil Island** northeast of Gambier Island lives on the southeastern shores and is characterized as fringing. Most of the island is classified as cliff or low rock/boulder which is limiting for eelgrass growth. The presence of numerous mooring buoys and retaining walls impact the habitat. One potential restoration site was identified on the eastern shore.

Near the Sunshine Coast, the shorelines of **North Thormanby Island** are composed of sediment accreted from nearby large sandy bluffs, as compared with the shores of **South Thormanby Island**, which are dominated by sea cliffs, low rock boulders and exposure to wind and strong wave forces from the south and northwest. Eelgrass composes 19.6% of the combined linear shorelines of both North and South Thormanby Islands.

Eelgrass distribution on North Thormanby Island reflects this predominately sandy sediment, as most of the eelgrass surveyed was continuous flat habitats completely surrounding the island, broken only by a change in sediment from sand to gravel. Rockfish, perch, seastars and Dungeness crabs were observed in the continuous flat eelgrass habitats.

Fringing continuous beds in **Buccaneer Bay** are the exception to the flat eelgrass habitats on the southwestern side of North Thormanby, where a steep drop off in depth prevents a flat contour for eelgrass growth. The eastern shore of Buccaneer Bay on South Thormanby Island had a paucity of eelgrass, but an abundance of sea urchins was noted.

No eelgrass habitat was noted off of **Surrey Island**. Very small eelgrass patches and two small continuous beds were located on the eastern shores of South Thormanby Island, most likely due to their exposure to high wave energy. No eelgrass was noted on **Bertha** and **Merry Islands** on the south end of South Thormanby Island. The furthest eastern island of the **Trail Islands** group contained patchy continuous eelgrass on its northwestern shoreline and continuous eelgrass flats on northeastern facing shores. An active log booming business operates on the north side of the island. An abundance of fish populations were observed in the waters on the eastern side of this island. Patchy eelgrass was also surveyed on the western-most island on the west side.

Turnagain, Echo and **Tikki Islands** contained very small patches of eelgrass. Within **Secret Cove**, on the northeast side of Turnagain Island log booming debris showed evidence of a former log storage site

8.2 Lasqueti Island Local Trust Area

Lasqueti Island was surveyed from July 17th to July 19th 2012. This island's shoreline is composed of substrate formed from shallow stony deposits over bedrock. Shallow sandy/muddy benches extend into the subtidal zones. Eelgrass comprises approximately 13.8% of the island's linear intertidal and subtidal shoreline. The majority of the eelgrass habitat is flat, dense and continuous. Most of the backshore lands were naturalized with little development.

Possible impacts that could be occurring would be from boat mooring buoys anchored within eelgrass habitats, grazing by Canada geese, historical damage from log booming practices, hardened shoreline modifications and site locations of some aquaculture enterprises. False Bay could benefit from more detailed eelgrass mapping, as the multiple mooring buoys might be impacting eelgrass habitats.

Lasqueti Associated Islands' eelgrass habitats were surveyed between August 19th and October 8th, 2014. Eelgrass beds cover 16.5% of the shorelines.

Small continuous eelgrass beds were observed in the more protected northern sides of **Higgins** and **Olsen Islands** within False Bay. The backshore was forested with some residences. Backshore was composed of steep rocky cliffs descending to the shore. Most of the eelgrass beds on **Finnerty Island** are on the northeast side between islets in a narrow channel. Shores are characterized as rocky cobble with steep slopes. Oyster catchers were noted feeding within the mussel beds there.

The **Fegan Islands** have dense continuous beds between islets, although there was citing of many boats anchored in areas where substrate would have been suitable for eelgrass growth and none was observed. **Lindbergh Island** in Scottie's Bay contains small continuous flat eelgrass beds on its eastern shores. **Marine Island** to the north contains small continuous and patchy eelgrass on its south facing shores. **Jelina Island's** extensive continuous flat eelgrass beds lie south facing Lasqueti Island and on the southwest shore. One house is constructed on this island.

One small continuous eelgrass bed was located on the western shore of **Jervis Island**. Two small patches less than 10m² were noted on the two islets north west of Jervis. Rocky substrate is most likely the cause of the absence of subtidal eelgrass. Steep drop offs down to the shore characterized **Paul Island** where no eelgrass was observed. On **Jedidiah Island**, designated as a BC Provincial Marine Park, there were small continuous and patchy eelgrass beds observed on the western and eastern rocky shores.

An abundance of green sea urchins were observed off the south side of **Bull Island**, which had eelgrass in patches and small continuous beds on the north side. Green urchins have been observed eating eelgrass in other locations within British Columbia (pers. comm. Cynthia Durance). Eelgrass was absent surrounding **Circle Island** southeast of Jedidiah Island, where green urchin barrens were also noted. No kelps were present, although pelagic cormorants, oyster catchers, gulls and a colony of stellar sea lions were cited.

No eelgrass was noted off of **Bo Ho, Rabbit** or **Sheer Islands**, although eelgrass was expected to be noted on Rabbit Island because of the sandy substrate. The presence of green urchin barrens was noted however. Rocky islets prevented the surveyors from travelling closer to shore on Rabbit Island, so there is a possibility eelgrass was present in shallower waters if sea urchins were absent. Stellar sea lions were hauled out near Sheer islands.

No eelgrass was observed off of **Sangster Island** to the southeast of Lasqueti Island. A sea urchin barren was noted on this island's northeast side.

To the south of Lasqueti Island no eelgrass was noted on **Sea Egg Rocks**. Two small continuous beds were located on the northwest shore of **Jenkins Island**.

Lasqueti and its associated islands may contain the least impacted eelgrass habitat of all the southern Gulf Islands in the Islands Trust Area, as land development and marine activities are at a minimum compared to more populated islands in the southern Salish Sea.

8.3 North Pender Island Local Trust Area

North Pender was inventoried on July 3rd, 4th and 6th 2012. Eelgrass comprises approximately 11.6% of the island's linear intertidal and subtidal shoreline. The majority of the eelgrass beds are flat and continuous. The protected nature of North Pender results in a relatively high proportion of soft substrate in shallower areas.

Impacts include housing developments with accompanying tree and shrub clearings, rip rap and rock wall modifications, some of which were constructed below the high water line, direct raw

sewage outfall at Port Washington which would directly affect the water quality for eelgrass productivity, the presence of Canada geese, direct grazers on eelgrass shoots during low tides, and mooring buoys within eelgrass beds. Port Browning might be an appropriate site for eelgrass restoration as the substrate is suitable and there is a small bed on the northeast side.

The **Associated Islands of North Pender Island** were surveyed between June 5th and 17th 2014. Only shorelines outside the Gulf Islands National Park Reserve were mapped. Eelgrass grows on 17.5 % of these islands' shores, excluding areas within the National Park Reserve. The maps associated with this report show BC Shorezone eelgrass bioband coverage for shorelines within the Gulf Islands National Park Reserve. Impacts on eelgrass beds include derelict fishing gear, removal of native shoreline vegetation, shading by docks and shoreline modifications. Two potential restoration sites were identified: one off of Knapp Island and one off of Sidney Island.

Extensive eelgrass beds surround the west and east shores of **Knapp Island**. One restoration site was located between two continuous beds on the eastern shore near a constructed breakwater. Rocky substrate limits eelgrass extent on the southeastern shore. **Pym Island** to the east has small fringing patchy beds on its west facing shoreline. The western shore of this island has a 70 metre retaining wall in back of beds of fringing patch surf grass (*Phyllospadix* sp.), a plant that is an indicator of high wave energy in the intertidal zone.

The major distribution of **Coal Island's** eelgrass lies near its southern shores. In a bay on the northwestern side of the island sheltered by a breakwater lies a continuous flat bed of eelgrass. A large dock and several large boats are situated within eelgrass depth range.

Goudge Island has two small continuous flat beds on its northern shore, characterized by natural vegetation and a forested backshore. South of Canoe Cove is **Kolb Island** where a continuous flat eelgrass bed grows on its western shore. **Fernie Island** has no eelgrass present. **Ker Island** has a continuous flat bed of eelgrass below a backshore of Garry Oaks on its south shore and another small continuous bed on the north shore in front of a rocky shore.

Forrest, Sheep, Domville, Brethour, Comet and **Gooch Islands** have small continuous flat eelgrass habitats where suitable substrates allow for their growth. The islands are mostly cobble rocky beaches as indicated by an abundance of kelp beds and rocky slopes. A 50 metre rip rap wall has been erected on the southern shore of Brethour Island below the High Water Mark (HWM). On the northern side of Brethour shoreline modifications such as a rock wall and rip rap were also observed.

Between Sheep Island and Domville Islands a derelict trap was noted. An extensive kelp bed was also noted on the north end of Comet Island. There was no eelgrass habitat observed off of **Ruby Island** to the south east of Domville Island.

Small continuous flat and fringing eelgrass beds were located on the northwest and eastern coasts of **Moresby Island**. Possible impacts to the habitat on the west facing shore are cleared

landscaped and agricultural areas close to shore and some dock construction. Most of the shoreline of Moresby is characterized as rock/cobble. Kelp beds were abundant near the east and south shorelines, where some continuous flat beds were located. Most of the backshore in these areas was forested.

James Island was surveyed June 25th, 2014. Because of its eroding sandy bluffs on the northeast end of the island and relative lack of backshore activities, extensive continuous flat eelgrass habitats were located along the west and eastern sides of the island, at times in deeper water (-5 to -7.6 m). Percent of cover was between 26-75%. On the southwestern shore, a dense kelp bed interrupted the eelgrass survey, but eelgrass seemed to be growing around the kelp. Most likely, since this is a depositional area for the sandy sediment eroding from nearby sandy bluffs, cobbles and boulders are providing anchors for kelp holdfasts amidst an otherwise sandy substrate. An extensive patchy flat eelgrass habitat was located here. High wave energy arriving from the southwest most likely prevents stable sediment for eelgrass growth.

Eelgrass surrounding **Sidney Island** was surveyed June 26-27th, 2014. Continuous and patchy flat eelgrass habitats were located on the west facing shores and south of the Parks Canada National Park boundary on the east side. Percent of cover on the western side ranged from continuous beds of <25% to 75%. The backshore on this side of the island is characterized as steep high sandy bluffs, which create sandy sediment for abundant eelgrass habitat. Anthropogenic backshore activities that would lead to damage of these beds are minimal. Kelp beds were dense on the southwest shore. *Sargassum* was also noted in this area. Eelgrass was growing at depths of - 8.6 metres. Though not directly surveyed, it is worth noting that the shoreline of the northern spit on Sidney Island is shown to have significant eelgrass coverage by the BC Shorezone eelgrass bioband.

The most southern part of Sidney Island had surfgrass appearing to be growing out of the rock outcroppings. High wave energy might explain the scarcity of eelgrass on this side. Patchy surfgrass was also observed on the south eastern shoreline. Patchy eelgrass beds on the eastern side were less dense (<25%) and growing in shallower depths (-2.5 to -3.6 m). One potential eelgrass restoration site was indicated in this area. Continuous flat eelgrass beds were surveyed on the west side of **Little D'Arcy Island**.

8.4 South Pender Island Local Trust Area

South Pender was surveyed on July 6th 2012. Eelgrass comprises approximately 8.5% of the island's linear intertidal and subtidal shoreline. South Pender has more exposed shoreline therefore less eelgrass is to be expected. Roughly the same proportion of flat and fringing beds are present with slightly more than half of them being continuous.

8.5 Mayne Island Local Trust Area

Mayne Island was surveyed from 2009-2012 using two methodologies on a variety of platforms including: 1) delineation and creation of polygons (with towed underwater camera, on foot, by kayak, by free diver), 2) linear presence/absence (by kayak). Data was converted to

presence/absence line format for incorporation into the 2012 Islands Trust Eelgrass Inventory.

Mayne Island is mostly protected except on the Northeast side which is exposed to winds from the Strait of Georgia. Eelgrass comprises approximately 22% of the island's linear intertidal and subtidal shoreline. Mayne Associated Islands, Georgeson and Curlew contain 15.7% and 24.8% respectively.

Evidence from the Mayne Island Conservancy's eelgrass monitoring program and historical anecdotal evidence has shown loss in intertidal eelgrass in Miners Bay and two Southeast facing bays on the Southeast side of Mayne. Reasons for loss are unknown, but ongoing monitoring will indicate natural variability in these eelgrass beds. Potential impacts include grazing from Canada geese, anchoring, mooring buoys, trampling by kayakers and damage from boats and propellers. Winter heavy rain events could be introducing increased sediment loads into eelgrass beds, but this would need to be studied.

Gallagher Bay (on Navy Channel) and Conconi Reef Park are potential eelgrass restoration sites. They both have large bare areas adjacent to continuous eelgrass beds and have suitable substrate.

8.6 Thetis Island Local Trust Area

Thetis and its associated islands were surveyed July 31st through August 3rd, 2012, except for the inside of Cufra Inlet which was inaccessible because of low tides, and Valdes Island. The Cufra Inlet survey was completed in the summer of 2013. Valdes Island was surveyed July 29th, and 30th, 2013.

Approximately 26.6% of the linear subtidal shoreline on Thetis Island is composed of eelgrass habitat, 72% of which is continuous. Fringing continuous eelgrass beds were observed off the western shore of Thetis where the ShoreZone map indicates a preponderance of low rock and boulder (not a typical shoreline type for eelgrass). North Cove is also rich with an abundance of eelgrass, except where it is shaded by overwater structures.

Cufra Inlet contains dense (26-75% cover) flat continuous eelgrass beds. The inside of the inlet was surveyed during the summer of 2013 by local residents using kayaks and hand held GPS units but without the use of an underwater camera, as the water was shallow enough for eelgrass to be observed from the kayaks. Low tides in 2012 prevented an aluminum boat from approaching close to shore during the low tides occurring during the survey. The continuous bed begins on the western shore of Cufra Inlet as a narrow 1 m wide swath on the shoreward side and then widens out. An abundance of drifting sea lettuce (*Ulva* spp.) was observed within this area. Eelgrass became denser seaward in the muddy/shell hatch substrate. The substrate became sandier as the mappers traveled towards the mouth of the channel. Patches of sand dollars were noted as the inlet widens and the eelgrass extends towards the eastern shore. Diatoms were noted growing on the eelgrass blades. At the western edge of the mouth of the inlet eelgrass is patchy and sparse despite its ShoreZone classification of 'cliff'.

Clam Bay eelgrass was dense and continuous.

Telegraph Harbour on Thetis Island had a preponderance of algae (*Ulva* spp.), *Sargassum muticum* and filamentous algae growth. Visibility was poor. Upland and shoreline development (rip rap, retaining walls and cement ramps) with accompanying vegetation clearing most probably has led to higher sedimentation in the nearshore waters.

Understory kelps were observed at most sites, although no fish or crab species were present at the time of the survey in the majority of the survey area. Possible impacts from boat moorings within eelgrass beds (e.g. **Ruxton Island** had >15 boats moored off shore in one small area), recreational overwater play structures, shoreline modifications and nutrient run-off could be impacting nearshore habitats. Where there was suitable substrate for eelgrass as indicated by the ShoreZone data, eelgrass was present, with the exception of the narrow channel between Thetis and Penelakut Islands. However a long-time resident remembers eelgrass presence there approximately 40-50 years ago. Islets and small islands are important refugia for wildlife and often are less impacted than the surrounding larger islands.

A short description of the smaller islands and islets associated with Thetis Island are described below.

Percentages of eelgrass for each associated islet are:

Island	Eelgrass % Cover
Ruxton	11.6%
Pylades	0%
Bute	50.3%
Dunsmuir Islands (2)	34.7%
Hudson	30.9%
Reid	3.9%
Dayman & Scott Islands	39.6%
Valdes	12.7%

Hudson Island west of Thetis is rich with continuous fringing beds of eelgrass (26-75% cover) on both its eastern and western subtidal areas. **Dayman Island** has just under approximately 25% coverage of patchy eelgrass habitat mostly on its eastern facing side. **Reid Island** to the east has dense patches of fringing eelgrass on its northeast facing shore.

Ruxton Island to the north of Thetis has flat, continuous (less than 25% cover) eelgrass beds

within sheltered sites on the western facing area; an abundance of nudibranchs was observed on eelgrass blades. The eastern shore, with the exceptions of some sites with fringing patchy beds, is too deep for eelgrass growth.

Whaleboat Island to the east of Thetis had too steep a drop off to be suitable for shallow eelgrass habitats. **Tree Island** contained 100% cover of understory kelps, which is an indication of a dominance of cobble/pebble substrate. As well, the subtidal area is too deep for eelgrass production.

Bute Island off of Ladysmith Harbour contained dense continuous beds because it is surrounded by a shallow bay with sandy substrate. There is a potential eelgrass restoration site on the northeast side of **Dunsmuir Island**, as it is composed of clean sandy substrate in a protected site. The narrow channel between Dunsmuir Island and Ladysmith Harbour contains continuous dense flat eelgrass beds.

Valdes Island was surveyed between July 29th and 30th, 2013. Eelgrass covers 12.69 % of its linear subtidal shores. The majority of the habitat is flat and continuous, with most of the locations cited on the northeastern and southwestern shorelines. Although the majority of the shorelines on the western portion of Valdes are ShoreZone classified as low rock/boulder or cliff, the presence of flat continuous beds with bare patches was noted on the north and south western shores. Three potential restoration sites were identified; one on the central western side of the island, the second site on the northern tip of the island containing a small degraded eelgrass bed adjacent to the BC Parks dock, and the third is located on the southwestern shore which might have been historically impacted by log storage. The substrate at this site is suitable for a transplant; however *Ulva* spp. is present, which might be an indication of a high level of nutrient inputs.

The location of mooring buoys in eelgrass habitats with fifty-one buoys observed within beds and the interruption of eelgrass continuity by the construction of docks are the major anthropogenic impacts affecting eelgrass habitats on Valdes. The majority of the shoreline is naturally vegetated.

9 2013 Inventory Findings

Areas mapped in 2013 for eelgrass (*Zostera marina*) within the Islands Trust Area include:

- Denman Island Local Trust Area,
- Hornby Island Local Trust Area,
- Winchelsea - Ballenas (Executive Islands) Local Trust Area,
- Gabriola Island Local Trust Area,
- Galiano Island Local Trust Area,
- Valdes Island and Cufra Inlet in the Thetis Island Local Trust Area (Findings included in Section 8.6 above)

- Bowen Island Municipality
- Gambier Island Local Trust Area Associated Island in the Howe Sound excluding the islands off of the Sunshine Coast. (Findings included in Section 8.1 above)

The characteristics and locations of eelgrass habitats for each island are described below in order of the beginning dates eelgrass inventories occurred. Note that Valdes and Cufra Inlet are described in Section 8 above as they are in the Thetis Island Local Trust Area. Similarly the Gambier Island Local Trust Area Associated islands are also described in Section 8 as they are in the Gambier Local Trust Area. Both Thetis and Gambier Islands were mapped in 2012.

9.1 Galiano Island Local Trust Area

Galiano and its associated islands were inventoried over seven days between June 26th and November 25th, 2013. Approximately 16.7 % of the linear subtidal shoreline of Galiano Island is eelgrass habitat.

ShoreZone maps indicate that most of the southwestern and northeastern shorelines of Galiano Island are not suitable substrates (coastal bluffs and low rock/boulder respectively), except where there are sheltered embayments. However there are notable exceptions over the north, south west, south and eastern areas of the entire island.

The eelgrass distribution on Galiano is 88% continuous; 12% patchy. The placement of mooring buoys (at least 14 were noted within eelgrass beds, especially on the southwestern shores of the island), private docks (at least 12) and log storage have damaging effects on the habitat's continuity and function as a wildlife corridor. The construction of retaining walls (rip rap, rock and wooden) and the removal of backshore vegetation (at least 10 sites were observed) are obstacles for eelgrass to flourish in certain sites.

Most of the backshore on Galiano Island remains naturalized, with notable exceptions where trees and understory vegetation surrounding residences are removed and where shores are modified with retaining walls. Exotic invasive plants include English ivy, St John's Wort and gorse. Heavy epiphytic algae growth on eelgrass blades were noted within **Montague Harbour**, a possible indication of a high level of non-point source pollution. Another site for pollution is the public dock in **Whaler Bay** where boats are worked upon. Best management practices are recommended for boat sewage disposal and using tarps for collection of boat paint chips at each location.

There is the potential for eelgrass restoration within Whaler Bay, as the channel in front of the public dock contains a narrow band of eelgrass that could be expanded shoreward if log leases were retired in the future. In November, bufflehead and Barrow's Goldeneye as well as schooling forage fish were observed. Patchy eelgrass beds were noted off the eastern shores of Galiano Island. This area is ShoreZone classified as low rock/boulder. Four mooring buoys were located with these beds.

The eelgrass habitats covering the associated islands of Galiano comprise approximately 19.98% of the islands' linear shorelines. **Parker Island** has extensive eelgrass on its northeastern shores (96% continuous). The construction of docks and the placement of mooring buoys within eelgrass beds, however, may be impacting the habitat. Most of the eelgrass surrounding **Gossip Island** lives on the island's east facing shores is continuous (95%); however docks (7 were noted within the eelgrass beds) interrupt their form and function. Mooring buoys (3 observed) are situated within the existing beds on the south-western facing shores also disrupt the connectivity of eelgrass habitats.

No eelgrass was observed on **Ballingall** and **Lion Islets**, **Wise**, **Charles**, **Sphinx** or **Julia Islands**.

9.2 Gabriola Island Local Trust Area

Gabriola Island and associated islands were surveyed between July 8th and 21st, 2013. Gabriola Island's linear shores are comprised of 24.8 % eelgrass, with 89% continuous distribution. Two potential eelgrass restoration sites were identified on this island. The first is on the southwestern shore facing **Mudge Island** near an active log booming site. When the log lease is retired at this site, a small eelgrass transplant (100-500 shoots) could indicate whether the area is suitable for a larger transplant. The second site is on the northeast tip of Gabriola Island where a small existing bed could be expanded.

Wildlife in some areas abound, including Canada geese, an abundance of fish species, Great Blue Herons (22 at the southern channel entrance between Gabriola and Mudge Islands), sand dollars and Bald Eagles. Beaches that have suitable substrate for sand lance and surf smelt spawning were also noted. Healthy eelgrass beds near the **Malaspina Galleries** in Gabriola Sands Provincial Park are not surrounded by mooring buoys and docks and are thriving in in 4-5 metres water depth, although the area also contains rocky substrates.

Possibly the biggest impacts to marine wildlife habitats on Gabriola and its associated islands are the locations of floats and mooring buoys (in one embayment on the northwestern shore of Gabriola, over 12 floats – moorings and/or crab traps – and 14 buoys were observed in a continuous eelgrass bed); construction of retaining walls (nine riprap or rock walls identified); and, the removal of native backshore vegetation (13 sites). Numerous moorings are located in an otherwise robust eelgrass bed in **Degnen Bay**.

The eelgrass coverage for the Gabriola associated islands' linear shorelines totals 19.98%. Near the eastern shore of **DeCourcey Island** south of a marine park there are many docks and boats. Poor water quality was noted, and there are no washroom facilities at this location. No marine life was observed growing on the seafloor. North of the marine park there is a potential restoration site facing a steep rock ramp foreshore and a steep grassy conifer backshore near a former log booming site.

Snake Island has the potential for eelgrass restoration on its southern tip where there is a protected area with suitable subtidal sandy mud substrate, although this location may be too

close to active boating. Seal pups and oyster catchers were cited near a large mussel bed.

There was no eelgrass habitat observed on Hudson Rocks. Marine life there included seal pups hauled out, bird habitats, cormorants and oyster catchers. The shell hash substrate off of Five Finger Island was noted to be situated too deep for eelgrass growth.

Mudge Island also has a potential eelgrass restoration site on its southeastern shore. Kelps are mixed with sandy/muddy/shell substrate. Most of the backshores are naturally vegetated, with exceptions near residential developments where mooring buoys are situated within eelgrass beds (4 observed). The eelgrass habitat observed on Mudge was a mix of patchy/ continuous and flat / fringing beds on the eastern shores of the island. One bed in particular, located mid- island on the eastern side extended 100 metres shoreward beyond the waypoint, but the water depth was too shallow to delineate the bed.

Eelgrass on Link Island is characterized as flat continuous beds on its eastern shores. On the south shore of Link Island there are multiple docks (4) and mooring buoys (6).

Continuous fringing beds lie next to the northwest shores of Breakwater Island. Near Saturnina Island there are fringing continuous beds of eelgrass habitat on the western and northern shores.

Bath Island has a wide rock ramp in front of a windblown forest with a patchy bed with two larger patches surrounded by kelp and *Sargassum muticum* on its northwestern shore, while on its western shore there was a flat continuous bed.

Eelgrass habitat on Tugboat Island is characterized as narrow beds tucked between shore and wharf floats on the eastern side of the island and between the Tugboat Island and Sear Island to the south, which has flat continuous beds on its western shores. Continuous flat beds lie at the entrance to a marina on Vance Island. A rock/boulder shoreline with a, private dwelling with floating dock and several moorings are near flat continuous eelgrass habitat on Acorn Island.

9.3 Denman Island Local Trust Area

Denman Island and its associated islands were inventoried on several boat expeditions between August 20th and September 15th, 2013. In the Denman Island Local Trust Area 33.24% of the linear shore contains eelgrass. In some areas, especially in eastern subtidal areas, patchy eelgrass was observed amongst broad leaf kelps and *Sargassum muticum*, where the substrate is classified as low rock/boulder. A potential restoration site is located on the southwest area of the island near Metcalf Bay and is close to a site that could be used for harvesting transplants. The substrate south of this site gradually changes to cobble and gravel. Most of the beds surrounding the island are fringing, most likely due to coarser substrate changes at depth.

Eelgrass habitat is situated on the north eastern shores, classified by ShoreZone as sand/cobble and where numerous overwater structures are located and associated with industrial aquaculture activities. The eelgrass here was predominately patchy; most likely there are more patchy beds both shoreward and seaward of the mapped area. This area is the second most

patchy eelgrass habitat observed, second only to areas in Howe Sound.

The majority of the backshore is not heavily impacted by development; most of the residences had either forested or grassy areas between them, with a minimum of landscaping. Abundant species of birds including black legged kittiwakes, surf scoters, marbled murrelets, grebes, harlequin ducks, surf scoters, herring gulls, and other marine wildlife species such as hooded nudibranchs, sand dollars, sand lance juveniles and abundant schooling fish were observed.

Sandy Island north of Denman Island contains continuous (99%) eelgrass habitats although the southern shores are ShoreZone classified as sand/cobble and the northern areas are classified as altered. Sand dollars were observed on both eastern and western sides of the island. **Seal Islets** were surrounded by fringing continuous (81%) eelgrass habitats. Associated with these beds were observed marbled murrelets and rafts of harlequin ducks and surf scoters, kittiwakes, gulls and seals. The backshore consisted of flat shrub, herbaceous and grassy slopes. . No eelgrass habitat was observed near **Chrome Island** due to unsuitable rocky substrates.

9.4 Hornby Island Local Trust Area

Eelgrass beds on Hornby Island were mapped over several days between August 21st and September 12th, 2013. The linear shoreline of the Hornby Island Local Trust Area is composed 31.70 % of eelgrass habitat. Large areas on both the western and northeastern shores of Hornby have continuous (90%) flat beds, although the classification by ShoreZone of these shorelines is low rock/boulder. The small areas of eelgrass found in these otherwise rocky cobble areas are valuable as critical habitat and corridors for marine life.

Most of the backshore is naturalized, even where residential houses are situated. Suitable substrate for spawning sites for forage fish was identified on the north eastern shores. Three potential restoration sites were also noted; one near this area for potential forage fish spawning, the second within a sandy embayment on the eastern shore (if boat anchoring pressures were decreased), and the third near the Hornby Island ferry terminal on the western side of the island (eelgrass was noted just north of the terminal growing in pebbles). There is also an opportunity for a community clean-up of underwater debris near a breakwater and marina on the southern end of the island. On **Toby Island** dozens of seals were hauled out.

9.5 Winchelsea-Ballenas (Executive Islands) Local Trust Area

The islands within the Winchelsea-Ballenas Local Trust Area were surveyed for eelgrass habitat between November 21st and 23rd, 2013. The total linear shoreline coverage of the Local Trust Area is 1.4%.

Mistaken Island west of Parksville has two eelgrass sites, one fringing patchy bed and the second within a cove with a dock, both on the southwestern shore. A flat continuous bed lies between the channel separating the **Ballenas Islands**. A continuous bed also lives on the north shore of the south island, punctuated with rock substrate. A school of forage fish, possibly sand lance was observed at the time of the survey in the shallow subtidal zone.

A small flat continuous bed on the west facing shores of the Ada Islands also may serve as suitable habitat for forage fish, prey for ancient murrelets, of which one was cited by field staff (unconfirmed). A second eelgrass bed is situated on the western shore of the west Ada Islands. The substrate at this location is primarily sandy with a secondary substrate of bedrock with associated intermixing rockweed and detritus. A seal haul out with 61 seals was noted near this site.

A small flat continuous eelgrass bed is located on the northeastern side of Southey Island. No eelgrass habitats were observed on Gerald, Yeo, Amelia, Ruth or Winchelsea Islands.

9.6 Bowen Island Municipality

Bowen Island was surveyed between Aug 6th - 11th and Oct 4th, 5th and 12th, 2013 using the polygon mapping methodology. The island is characterized by a mix of sandy bays and steep shorelines. Large homes are common, with docks constructed both in the bays and on the steep cliffs. Bays, which are areas in which eelgrass is expected to grow, were also the location of waterfront homes and associated docks (both land-based and floating), moorings and anchored boats.

Eelgrass was estimated to extend along 11.6% of the shoreline of Bowen Island. The area of mapped eelgrass polygons was observed to total 41,917 m² and the length of mapped line features was observed to total 958 meters. Percent cover was low, however, and in addition to continuous beds, 84 individual patches of eelgrass were recorded and noted on the map as points. Eelgrass was observed within bays and straight sections of coastline on the southwest, northwest, northeast tip, east (Mannion Bay and north) and southeast coasts.

Around much of the island eelgrass was characterized by frequent individual patches, with each patch often consisting of very few shoots. Patches on the west coast were observed in areas that, from the shoreline or ShoreZone analyses, would not have been predicted, as the plants occurred seemingly opportunistically in patches of soft substrate located amid boulders and other coarser substrate. Percent cover even in continuous beds was consistently far less than 25% and noticeably sparser than other islands within the Islands Trust areas also surveyed during the 2013 mapping season.

Docks in areas such as in Tunstall Bay were located in depths suitable for eelgrass growth. Distances between some points on the polygon mapped in Tunstall Bay are longer than 20 meters as the eelgrass field surveyors needed to navigate around swimmers, docks and moored boats. Large clusters of sunflower stars (*Pycnopodia helianthoides*) were observed in the bay on sandy bottoms that did not contain eelgrass. Docks and moorings were also located in eelgrass depth elsewhere on the west coast of Bowen Island (e.g. the relatively straight shoreline north of Bowen Bay, King Edward Bay, the shoreline north of King Edward Bay and Galbraith Bay).

In some sites such as Galbraith Bay and Columbine Bay, eelgrass was only observed on one side of the bay despite suitable sandy substrate on the other side. For example, the substrate on the

north side of Galbraith Bay was bare sand. There were several moorings in that bay. Eelgrass in Columbine Bay was sparse and appeared unhealthy; individual clumps were surrounded by bare sand. One hypothesis for this is that eelgrass may be impacted by boat wakes in the area. Boats were moored throughout eelgrass depth in **Cates Bay**.

Multiple beds of continuous eelgrass were identified throughout **Mannion Bay** between zero and more than 5 meter depth relative to chart datum. These beds, however, were not as dense as would be predicted given the soft substrate and sheltered environment. In the northeast side of the bay bare sandy fringing beds are interrupted by the construction of docks.

Mannion Bay is heavily used for boat anchoring, mooring and docking within depths suitable for eelgrass growth. The construction of docks and floats and their associated chains are impediments for eelgrass productivity in this area. Multiple adjacent docks have been constructed within eelgrass depth. Ropes and chains from docks, moorings or anchors had dragged on the sea floor, apparent due to the patterns they had created in the sand. The motion of the chains due to waves and currents can damage or uproot eelgrass.

Eelgrass otherwise appeared healthy in Mannion Bay and there are opportunities to restore lost eelgrass habitat if boat anchoring were restricted to a defined area outside of the depth range for eelgrass growth, i.e. if they were limited to 6 m depth or deeper. Schools of fish were observed within the existing sparse eelgrass; therefore, restoring the eelgrass in the area would serve to enhance fish habitat. Although it was not included in the project deliverables, the research team had been requested to look for evidence of litter on the sea floor in this bay; however, only a few cans and the possible remnants of a shopping cart were observed. Some of the moorings and anchored boats appeared derelict. Many crabs were observed on the south side of the bay, but were not identified to species.

No eelgrass was observed in **Snug Cove** including the head of the cove, near Crippen Park beach. Possible reasons include dredging, ferry wakes, eutrophication and boat traffic associated with the marina, and pollution of the substrate due to chipped wood debris. No flora was observed on the sea floor except for encrusting algae. There are restoration opportunities for the nearshore environment by Crippen Park beach if the historical and present impacts from the marina and former log booming site are addressed.

The inner portion of the eastern cove of **Konishi Bay** on the south coast of the island appeared suitable for eelgrass due to the sandy substrate and sheltered cove with a sandy beach. The substrate was bare sand, however. Eelgrass was observed in deeper locations of that bay. Removal of native plants and retaining wall constructions were noted around residences. In another eelgrass location in the southern portion of Seymour Bay/Seymour Landing where an adjacent coastal lot was for sale, coastal vegetation had been cleared and there is already evidence of slope failure both at the top and foot of the slope, despite installation of riprap. Water flow had also been channeled in the area, which could intensify water and sediment flow into the nearshore environment. Slope failure is a possible threat to eelgrass through smothering by eroding sediments. Shoreline hardening also increases wave energy and wave deflection, which can scour shorelines (Lamont 2013).

The area around **Cape Roger Curtis** has been of concern to local residents due to the construction of large docks and potential for damage to submerged habitats. Eelgrass was not observed around the exposed cape, as the observed substrate was steep and rocky. Kelp was observed in the area, however. Chains from the new construction were observed on the ocean floor. Kelp beds are a major feature along the rocky parts of the Bowen Island shoreline. Several schools of small or juvenile fish were also observed around the island.

10 2014 Inventory Findings

Areas mapped in 2014 for eelgrass (*Zostera marina*) within the Islands Trust Area include:

- Salt Spring Island Local Trust Area
- Saturna Island Local Trust Area
- Thormanby Islands and Gambier - Sunshine Coast associated islands (findings included in Section 8.1 above)
- Lasqueti Associated Islands (findings included in Section 8.2 above)
- North Pender Associated Islands (findings included in Section 8.3 above)

The characteristics and locations of eelgrass habitats for Salt Spring Island and Saturna Island local trust areas are described below. Thormanby Islands are described in Section 8.1 above as they are in the Gambier Island Local Trust Area; Lasqueti Associated Islands are included in Section 8.2 as they are part of the Lasqueti Island Local Trust Area; and North Pender Associated Islands are included in 8.3, as they are part of the North Pender Island Local Trust Area.

10.1 Salt Spring Local Trust Area

Eelgrass surrounding Salt Spring and its associated islands was surveyed between April 18th and August 1st, 2014. Approximately 18% of the Island's linear shorelines are eelgrass habitats. The shore composition is mostly low rocky boulder (62%) with softer sediments in pocket beaches on the west facing shorelines. Most of the impacts on eelgrass habitat are heavy boat usage near the shore (boat moorings and anchoring, fuel docks, marinas, sewage discharge and derelict boats, docks and buoys), non-point source pollution and the removal of shoreline riparian native vegetation. Seven potential eelgrass restoration sites were identified.

It is recommended that intertidal mapping by community members be undertaken to update intertidal mapping data collected by the community in 1975 and 1996. It is also suggested that an eelgrass monitoring schedule be developed to measure potential eelgrass habitat impacts of aquaculture activities on the island over time. Improved anchoring methods for mooring buoys would decrease scouring of the seabed.

Compared to maps of intertidal eelgrass beds completed in the past (1975 and 1996), eelgrass beds are greatly reduced in size and spatial extent in **Ganges Harbour**. Flat patchy beds with less than 25% cover (density) were growing near its south western shores. Surveyors identified one

potential eelgrass restoration site on this side of the harbour and another site south of the harbour's entrance near a large continuous bed. Major impacts to eelgrass distribution within the harbour include historical log storage, present day non-point pollution and heavy usage by recreational boats.

The north eastern shoreline of the harbour contains small areas of continuous fringing eelgrass beds. No eelgrass was observed growing on Goat, Deadman or Sister Islands. Ruckle Park to the north of Beaver Pt. contains a naturalized shoreline and is protected as a BC Provincial Park. Densities of eelgrass varied from 25% to 75% in small bays within the Park boundary.

Fulford Harbour contains continuous flat eelgrass habitat on the western shoreline. The density changes into fringing continuous beds to the south of these beds. Five eelgrass patches less than 10m² were noted on the eastern shores. Two potential restoration sites are suggested near two of the eelgrass patches to the south.

Off the shores facing Sansum Narrows eelgrass grows intertidally, some of which lies between aquaculture rafts. Some riparian vegetation had been removed from behind a 30 metre long brick wall. At one site where there is a natural shoreline with a fringing continuous eelgrass bed, an abundance of salmon smolts was noted (May 6, 2014).

Eelgrass in Burgoyne Bay is composed of small fringing continuous beds delineated by a sharp drop off into deeper waters on the southern shores of the bay. Closer to the mouth of Burgoyne Bay, known to be used by salmon (pers. comm. Kathy Reimer), there is extensive flat continuous eelgrass. A derelict dock was observed and there was evidence of past log booming activities. Approximately seven boats, including house boats and a sailboat, some of them with small attached docks, were observed.

Over ten harbour seals were noted in the eelgrass beds in the bay. No eelgrass was noted on the northern shore or on the shores of Mt. Maxwell Ecological Reserve, with the exception of a small patch and a small continuous bed to the north of the patch. The sediment on this side of the island is low rocky boulder.

Bader's Beach contains three small but continuous flat eelgrass beds. The continuity of the habitat may be affected by a boat ramp and nearby placement of rip rap, as well as boat moorings. Booth Inlet contains extensive continuous flat eelgrass habitat amongst mooring buoys and a gravel boat launch site. It is recommended that a more detailed polygon be created of this habitat to monitor changes over time from aquacultural activities and from the effects of mooring buoys. A potential restoration site was located north of Booth Bay. Many eagles were cited in this area.

Vesuvius Bay also contains extensive continuous flat eelgrass beds, as well as Duck Bay. Surrounding the shores of Idol Island eelgrass habitat is characterized as patches and fringing and flat continuous beds. Small eelgrass patches (<10m²) to small continuous flat beds were observed from Duck Bay to Stone Cutters Bay. In Stone Cutters Bay an increase of continuous flat eelgrass habitat was noted, although there was clearing of backshore native vegetation near residences.

At the northern tip of the bay, dense continuous beds extend into the intertidal zone, but the habitat is interrupted by docks and mooring buoys and most likely impacted by the removal of backshore vegetation.

Continuous flat eelgrass habitat continues along the more protected northeastern shore of the island. Along the shores there was a groin, clearing of riparian vegetation by shore residences and docks. There is a gap in the habitat, beginning with a residential site with cleared vegetation from the house to the beach. The gap might be due to a change from shallow sand to cobble. Another gap in otherwise continuous eelgrass occurs further south where again backshore vegetation was cleared.

At the northern and southern outside edges of **Walker's Hook** lie continuous flat eelgrass beds, associated with natural shores and backshores. From the end of the southern bed of Walker's Hook to Nose Pt., small patches, with some fringing continuous beds were surveyed. Dense kelp (*Nereocystis* sp.) obstructed surveyors from traveling closer to shore. Most likely exposure to southwesterly waves and storms limits eelgrass growth in this area.

A derelict buoy was observed in an eelgrass bed on the south side of Walker's Hook. It is providing a subtidal platform for kelp settlement and may be shading out eelgrass beneath it. River otters were observed on the eastern facing shore of Walker's Hook near a small fringing patch of eelgrass.

Intertidal eelgrass habitats along the eastern shores of **Long Harbour** were observed by community mappers in the past. In 2014, four small continuous flat beds were noted in the same areas. On the northwestern shore, sandy substrate where eelgrass should have been present but was absent was noted by the surveyors. Two potential restoration sites were indicated within the harbour. An eelgrass restoration test plot (1200 shoots) was installed during the summer of 2014 near one of these sites. It will be monitored in the spring of 2015 to evaluate whether the transplanted eelgrass site can be expanded. On the western shore two small fringing continuous beds were found. A yacht club outstation and approximately 20 mooring buoys were observed in the harbour.

The eastern shore of **Madrona Bay** contains patchy continuous beds. Some dock construction and boat moorings were present. Gravel beaches line the bay.

The **Associated Islands of Salt Spring** are composed of 14% eelgrass habitat. Four potential eelgrass restoration sites were noted. Impacts included boat anchoring, present day and historical log booming operations, placement of mooring buoys in shallow waters and shoreline modifications resulting in potential hardening of the shore. Note that the Isabella Islets were not surveyed as they are within the Gulf Islands National Park Reserve boundary.

Wallace Island to the northeast of Salt Spring Island contains extensive continuous flat eelgrass habitat on its northwestern shores. However, **Princess Cove** is composed of sandy substrate and was evaluated as a suitable eelgrass restoration site, as well as another site to the south of this area. Boat anchoring may be impacting this area; with improvements in boat mooring practices,

eelgrass in Princess Cove, within the Wallace Island Marine Provincial Park, could be restored. Two potential eelgrass restoration sites were located on the western shore of Wallace Island.

One potential eelgrass restoration site was also located off the southeastern shore of **Secretary Island**. A small patch of eelgrass is growing in this area, which may have been used for log storage in the past. Dense intertidal and subtidal eelgrass beds were noted on the southern end of the Secretary Islands. Most likely rocky cobble substrate limits eelgrass growth between otherwise continuous eelgrass. A seal haul out was observed in one of the south west facing bays. The survey of shallow eelgrass habitat in these bays was limited by tide levels and rocky substrate.

Mowgli Island has a small fringing continuous bed on its south and north shores. The southwestern facing shores of **Norway Island** contain continuous and patchy eelgrass habitats amidst rocky outcrops. **Jackscrew Island** has small continuous flat eelgrass beds growing in muddy sandy bottoms of its western shores. Some of the beds are extending into the intertidal zone. **Hall Island** has two continuous eelgrass beds and a patchy bed less than 10 m² on its southeastern shore which extends into the intertidal zone. Eelgrass patches are growing within a small cove in the most southern area. The entrance of this site is surrounded by *Nereocystis* sp. and other kelps.

Eelgrass is continuous along the eastern, northern and southern areas of **Shoal Islands**. The northern Shoal Island eelgrass is dense (26 %-> 75% percent cover) and in shallow water (-0.9 to -3.5 m depth). Large schools of fish, harbour seals, gulls, Blue Herons, Canada Geese and eagles were observed here. One buoy was observed within the bed. There was also a logging operation noted on a large tidal flat site in this area. On the farthest northern section of this area, there was an abundance of logs and woody debris on shore, indicators of a highly impacted shoreline. Eelgrass distribution changes in this site from continuous to patchy or absent.

The southern, east facing beds of the Shoal Islands were dense (26%-75% cover) continuous flat habitats. A pulp mill and associated activities have impacted the southern area of these beds, such as the placement of a modified shoreline composed of rip rap. A white slime was observed on eelgrass blades in this area. However, it is recommended that the eelgrass beds surrounding Shoal Islands be protected as they illustrate a rich biodiversity within the Salish Sea, even though industrial activities are operating nearby (log booms to the north and a pulp mill in the south).

All eelgrass surrounding **Prevost Island** was surveyed, except for beds occurring within the boundary of the Gulf Islands National Park Reserve (Parks Canada). The majority of eelgrass habitats were situated on the southwestern shores and most were characterized as either fringing or flat continuous beds, some of which extended into the intertidal zone. One restoration site was indicated on the southeastern bay. One small continuous flat bed was observed on the central east side of the island. Most likely rocky substrate limits extensive eelgrass growth. Most of the backshore was naturally vegetated.

Piers Island eelgrass habitat is composed of extensive continuous bands on the south and eastern shorelines. Docks, boat moorings and their associated chains, and seawalls may be

causing some of the habitat to be interrupted or less dense than if these structures were not present. In many places eelgrass was located behind docks closer to shore, which might indicate the locations of these docks may be shading otherwise continuous beds.

10.2 Saturna Island Local Trust Area

Eelgrass surrounding Saturna Island was surveyed between July 2nd and 29th, 2014 and is present on 19.5% of its shores, excluding the shores within the Parks Canada's Gulf Islands National Park Reserve. Fifty-seven percent of Saturna Island's shoreline is composed of rocky boulder and 32% sea cliffs.

Most of the eelgrass located within the Islands Trust Area on Saturna Island was located on the east side, where it is protected from the north westerly winds and waves by Mayne Island. The majority of shoreline on the south end of the island is under the protection and jurisdiction of Parks Canada's Gulf Islands National Park Reserve and was not included in this eelgrass inventory. Eelgrass on the southwest and southeast of the Parks Canada boundary was distributed in patchy and continuous flats. Impacts on eelgrass beds include mooring buoys, docks and shoreline developments that remove native plant vegetation from the marine riparian areas. One potential restoration site was located.

Within **Boot Cove** on the west side of Saturna Island, eelgrass was expected to be observed, as it is a very sheltered site with sandy substrate. However, the area is very heavily used with the construction of docks, placement of multiple mooring buoys and attached boats, floats and ramps throughout the cove. Eelgrass is present but is not dense and absent in many areas where it should be growing. There is potential at this site for restoration in cooperation with local residents. The eelgrass between **Trevor Islet** and Saturna Island was growing in shallow waters (-1.3m). The surveyors were not able to access the site to map, but it was evident the entire area is eelgrass. Canada geese were observed swimming in the bed.

Eelgrass on the south shores of **Lyall Harbour** is mostly continuous flat beds with boulder shores and forested backshores. Towards the east of the harbour there is evidence of a former log booming site with three dolphins (upright log poles) in the site as well as a constructed breakwater and a grouping of wooden floats. Eelgrass is patchy at this location. Approximately one half of the backshore at the end of the harbour is landscaped (i.e. natural native vegetation has been removed). The north side of the harbour contains continuous beds extending into the intertidal zone. The backshore here is forested with rocky boulder shores. At some shore sites the eelgrass becomes dense (26%-75%).

The southwestern entrance to **Winter Cove** is composed of fringing continuous eelgrass with *Nereocystis* sp. kelp growing in deeper waters. The shores are predominately rocky with very small sandy beaches. The majority of the backshore in the bay is treed, with some rip rap placed on shore.

Eelgrass habitats off the southwestern shores of **Samuel Island** are continuous and flat. Canada geese were observed on shore. Except for a small continuous bed mid-island, there was no

eelgrass noted on the northeastern shore. Most likely exposure to northwesterly winds and waves prevent its growth. Natural shorelines and backshores characterize this island.

11 Threats to Eelgrass Habitats

The impacts from human activities have been described previously (Section 4.0). Other field observations are described below.

There seems to be an increase in the abundance and distribution range of the invasive seaweed, *Sargassum muticum* within the Islands Trust Area, although there is at present no research to substantiate this. Although the plant settles and grows on cobble, surrounding eelgrass in sandy/muddy sediment can be shaded out by its overarching canopy. The presence of *Zostera japonica* was noted on Lasqueti and Thetis Islands and other areas within the Islands Trust. This non-native species of eelgrass is not known to compete with *Z. marina*, though it can be found mixed with the native eelgrass in the lower reaches of the intertidal zone.

Though there is some disagreement about the causes of epiphytic algae growth on eelgrass blades, it was noted within Telegraph Harbour on Thetis Island and Montague Harbour on Galiano Island. This could be an indication of excessive nutrients, causing an abundance of algae growth on the blades and blocking light, nutrients and gas exchange (Mumford 2007).

Canada geese are infamous for their grazing on eelgrass shoots. They were noted in large numbers on Lasqueti, Gabriola, and North Pender and South Pender Islands. Overgrazing of shallow eelgrass beds might be a growing concern as the birds are increasing in range and numbers.

As winter storms intensify, there might be an increase in burial of eelgrass shoots by sand over wash. Monitoring eelgrass habitats over time in selected locations vulnerable to storm events might shed light on the effects of climate changes upon the nearshore environment.

12 Opportunities for Eelgrass Restoration

A total of forty-two sites were identified as potential eelgrass transplant areas during the inventories that occurred between 2012-2014. These sites are shown on the maps produced by this project. When funding is available, these sites can be further investigated. The history of eelgrass transplants and their success in British Columbia to date is described below.

12.1 History of Eelgrass Restoration

In the Pacific Northwest, the history of success for *Zostera marina* transplanting projects was dismal prior to 1985. Initially transplant techniques were developed and successful on the Atlantic coast. However, these techniques were not well suited to the Pacific north coast environment and

eelgrass. Many of the early transplants were conducted without a thorough understanding of eelgrass physiology and ecology; the donor stock was not always well suited to the area where they were transplanted, and the biophysical conditions of the transplant site were not always appropriate for the species (Durance 2001).

Since 1985, knowledge and experience from adaptive management practices have resulted in a higher success rate for focused mitigation and enhancement projects along the Pacific coast (Thom, Borde, Williams, Southard, Blanto and Woodruff 2001). Factors that led to a higher success rate include the correct selection of physical attributes for the restoration area, including elevation, substrate composition and light and current regime. The selection of the most suitable ecotype or genotype increased the likelihood for success and rate of production. The criteria for success included shoot density and area re-vegetated (Durance 2001).

12.2 Criteria for Successful Restoration

In British Columbia, the criterion for transplant success is based upon the mean shoot density being equal or greater than the area of adjacent natural beds and the area coverage. Projects are thus considered successful if the habitat that was created provided habitat equal in eelgrass productivity (shoot density) to that which it was designed to replace (Durance 2001).

Site selection with the appropriate biophysical characteristics (salinity, sediment type, current velocity, light/depth, temperature, and pH), using suitable plant donor stock (ecotype), using an appropriate transplanting technique and handling the donor plants with care are necessary for successful transplants. Several restoration transplants have occurred in Squamish, the Sunshine Coast, Campbell River, Cowichan Bay and Saanich Inlet. Most of the locations have been impacted by historical log storage practices. The majority of these transplants are considered successful based on monitoring of shoot densities and area coverage post-transplant. They were completed under the supervision of a scientific advisor with community volunteer support and a Workers Compensation Board (WCB) certified team, with funds collected by environmental conservation groups.

13 Recommendations

Globally, eelgrass has been used as an indicator of water quality (Neckles 1994). Often, a bed will decrease or increase in width and length dependent on light availability. The lower depth distribution of eelgrass is related to overall water clarity. Water quality, including water clarity, is affected by land practices and water uses. If, for example, a large scale development occurs on shore near an eelgrass bed, the bed may decrease in size because the water quality in the nearshore is consistently compromised by the increased pollution load, known as non-point source pollution, frequently delivered by the storm water system. When the amount of light reaching the plants is limited by shading from increased sediment or plankton blooms associated with increased nutrients from land, eelgrass meadows adapt to the poor light availability through dieback, decreases in density or width and migration to shallower depths.

The Islands Trust Area is home to more than 25,000 people and is located between the highly populated centres of Vancouver, Victoria and Nanaimo. However, only approximately 12.5 % of the marine environment has some type of protection. Most of this protection is in Rockfish Conservation Areas, with Provincial and Federal Marine Protected Areas accounting for only 1.53% (Islands Trust Fund Regional Conservation Plan 2011-2015). Sound decisions by local trustees and an educated public are necessary to protect the functions of the nearshore for all who benefit from their healthy ecology.

A set of recommendations is listed below to contribute to the conservation work of the Islands Trust and Islands Trust Fund.

13.1 Education

1. Educate boaters and coastal residents about the presence and importance of eelgrass beds.
2. Encourage shoreline landowners to replace light-impenetrable docks with materials that allow light penetration.
3. Encourage signage at boat ramps reminding boaters to avoid eelgrass beds in shallow water.
4. Build public awareness about the importance of reducing nutrient inputs in marine riparian areas; encourage protection and restoration of wetlands and the construction of retention ponds to filter land based pollutants; and encourage reduction in the use of fertilizers, pesticides and herbicides.
5. Develop a long term public outreach nearshore marine education strategy that includes new shoreline property owners.

13.2 Regulatory and Enforcement

1. Limit dock development, particularly in established and potential eelgrass areas (i.e. areas where substrate is suitable for eelgrass growth).
2. Encourage creation of “No anchoring/mooring” zones in suitable eelgrass areas (based on substrate, depth and observed presence of eelgrass); encourage movement of moorings to areas that are too deep for eelgrass.
3. Limit shoreline development; maintain a coastal riparian zone that will enable inland shift of eelgrass beds as sea levels rise.
4. Create and implement appropriate setbacks for built structures from the nearshore.

5. Limit or reduce overwater structures; increase shared community docks and wharves when possible.
6. Require removal of illegal shoreline modifications; require restoration or removal of aged derelict structures where possible.

13.3 Opportunities for collaboration with other agencies

1. Encourage and undertake as resources allow regularly scheduled monitoring of sensitive or vulnerable shorelines; make monitoring results readily accessible to all.
2. Where boat traffic must go through an eelgrass bed, encourage establishment of marked boat channels so that the least damage is done to the habitat.
3. Create protected marine zones and encourage planned siting for mooring buoys for recreational boats around eelgrass beds.
4. Promote management strategies to mitigate conflicting uses in eelgrass habitat, such as oyster and clam harvesting, boating and anchoring in meadows and near-shore development requiring dredging.
5. Promote restoration of natural hydrology when opportunities arise.
6. Promote restoration of eelgrass habitats where possible.
7. Work with BC Parks staff and other organizations to establish best practices for anchorages and mooring buoy sites and encourage active monitoring of the usage of those sites.

14 Conclusion

Changes from increased human population, more frequent and intense storms and changes in sea levels and pH of the oceans emphasize the need to monitor eelgrass habitat and protect it with sound science-based policies and regulations.

Eelgrass meadows function as natural marine sanctuaries, as indicators of nearshore ecological health, and as sequesters of atmospheric carbon. As well, these valuable habitats are important sources of nutrients for local and off-shore marine and nearshore systems. The conservation, protection, monitoring and restoration of native eelgrass within the Islands Trust Area is and will continue to be a long term smart investment in the social, cultural and biological vitality of the islands.

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Appendix A: Mapping Methodology 2012 – 2014

2012 Methodology for *Zostera marina* Presence and Absence Mapping With a Towed Underwater Camera

The following methodology for eelgrass mapping (*Zostera marina*) was used to determine the location (presence/absence) of eelgrass habitats for Thetis, North and South Pender, Mayne, Lasqueti and Gambier Islands in 2012 under contract with the Islands Trust Fund.

The methodology reported here is an addendum to “Methods for Mapping and Monitoring Eelgrass Habitat in British Columbia” (“Methods”) authored by Precision Identification Biological Consultants and peer reviewed by experts in the field. This addendum was created by the Seagrass Conservation Working Group with input and review by Precision Identification.

The purpose of presence and absence mapping methodology is to determine the linear extent of eelgrass along the coastline. This is achieved by deploying an underwater camera that is towed by a boat and recording the geographic location of eelgrass beds using a hand held GPS. The resulting representation of eelgrass beds are lines.

General habitat characteristics outlined in Methods are also recorded: Form (flat/fringing), Distribution (continuous/patchy), Percent Cover (<25%, 26-75%, >75%), and Substrate type (sand/mud/pebble/cobble/boulder). The state of the tide was recorded as “slack” or “running” in order to indicate the level of confidence in the percent cover estimate. A slack tide yields a higher level of confidence than a running tide, which causes the eelgrass lay across the ocean floor.

Eelgrass ShoreZone bioband mapping and marine charts were used to determine potential locations of eelgrass beds. The majority of the eelgrass beds in the Southern Salish Sea include habitat between 1 and 3 m chart datum. This depth contour was followed and eelgrass presence within this depth range was recorded. If eelgrass was not found in this depth range where bathymetry and substrate characteristics were suitable for eelgrass growth, a perpendicular transect was followed ranging from +1m to -6m which is the typical range of eelgrass in the Salish Sea.

GPS waypoints and the following parameters were recorded at roughly 10m intervals: depth, eelgrass presence, form, distribution, substrate, percent cover, tide state, presence of broad or tuft algae, visibility.

Where marine charts indicated suitable conditions (a shallow bathymetric relief) for eelgrass but eelgrass was not present; waypoints and substrate type were recorded at 20m intervals. Where marine charts indicated unsuitable conditions for eelgrass (steep bathymetric relief), only waypoints were recorded to indicate mapping coverage.

2013 Methodology for *Zostera marina* Presence Mapping with a Towed Underwater Camera

For the 2013 contract, the following methodology for eelgrass mapping (*Zostera marina*) was used to determine the location (presence) of eelgrass habitats for the Gabriola Island Local Trust Area, the Galiano Island Local Trust Area, Valdes Island, Winchelsea-Ballenas (Executive Islands) Local Trust Area, Cufra Inlet (Thetis Island) and the Gambier Associated Islands found within Howe Sound (excluding the Thormanbies and other islands off of the Sunshine Coast).

The methodology reported here is an addendum to “Methods for Mapping and Monitoring Eelgrass Habitat in British Columbia” (“Methods”) authored by Precision Identification Biological Consultants and peer reviewed by experts in the field. This addendum was created by the Seagrass Conservation Working Group with input and review by Precision Identification. For 2013 mapping Islands Trust Global Positioning System Specifications (Schedule G to the contract) were adopted except for Cufra Inlet on Thetis Island where a hand held GPS was used to be consistent with 2012 mapping. Average accuracy was 0.814m and was the combined result of the built-in accuracy of the GPS unit, lag time between sighting eelgrass and the unit gathering enough satellite data to create a waypoint, in combination with boat drift.

Linear Mapping

With the exception of the islands in Metro Vancouver, the Islands Trust eelgrass mapping was done using a linear method to determine presence of eelgrass along the shoreline. This linear eelgrass mapping is achieved by towing an underwater camera using a boat, except for the mapping done in Cufra Inlet in 2013, where the water was shallow enough to observe eelgrass from kayaks, and by concurrently recording the geographic location of eelgrass beds using a GPS. The resulting representations of eelgrass beds are lines and points (where the eelgrass patch was less than 3m in length).

Polygon Mapping

With financial assistance from Metro Vancouver, eelgrass beds on Bowen, Bowyer and Passage Islands were mapped using polygons to show their full extent. In addition to the linear mapping described above, underwater camera transects were conducted perpendicular to shore to map shoreward and seaward edges. In some areas, fringing eelgrass and eelgrass patches were too small to map as polygons. In these locations lines and points were used respectively to show eelgrass presence. Fringing eelgrass bands $\leq 5\text{m}$ wide were mapped as lines and patches less than 10m^2 were mapped as points. Mapping of polygons according to standard methodology was limited due to safe boat operation in wind, current and tidal movements, as well as navigation around boats and swimmers.

For all the islands, general habitat characteristics outlined in Methods are also recorded: Form (flat/fringing), Distribution (continuous/patchy), Percent Cover (<25%, 26-75%, >75%), and Substrate type (sand/mud/pebble/cobble). The state of the tide was recorded as “slack” or

“running” in order to indicate the level of confidence in the percent cover estimate. A slack tide yields a higher level of confidence than a running tide, which causes the eelgrass to lie across the ocean floor.

ShoreZone eelgrass bioband mapping and marine charts were used to determine potential locations of eelgrass beds. The majority of the eelgrass beds in the Southern Salish Sea are found between 1 and 3m chart datum. This depth contour was followed and eelgrass presence within this depth range was recorded. If eelgrass was not found in this depth range where bathymetry and substrate characteristics were suitable for eelgrass growth, a perpendicular transect was followed ranging from +1m to -6m which is the typical range of eelgrass in the Salish Sea.

GPS waypoints and the following parameters were recorded at roughly 10m intervals with intervals no longer than 20m: depth, eelgrass presence, form, distribution, substrate, percent cover, tide state, presence of broad or tuft algae, visibility.

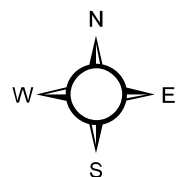
The following section was removed from the methodology for 2013:

Where marine charts indicated suitable conditions (a shallow bathymetric relief) for eelgrass but eelgrass was not present, waypoints and substrate type were recorded at 20 metre intervals. Where marine charts indicated unsuitable conditions for eelgrass (steep bathymetric relief), only waypoints were recorded to indicate mapping coverage.

Appendix B: Maps of Shoreline Units

Shoreline Units & Zostera Bioband Units -- Pender Islands --

Produced By: Galiano Conservancy Association
Data Source: Provincial Shorezone Database
Map Date: June 2012
Projection: UTM Zone 10 NAD83



 Zostera Bioband Units

SHORELINE_UNITS

-  Estuary
-  Sand / Cobble
-  Low Rock / Boulder
-  Altered
-  Cliff
-  Coastal Banks or Bluffs

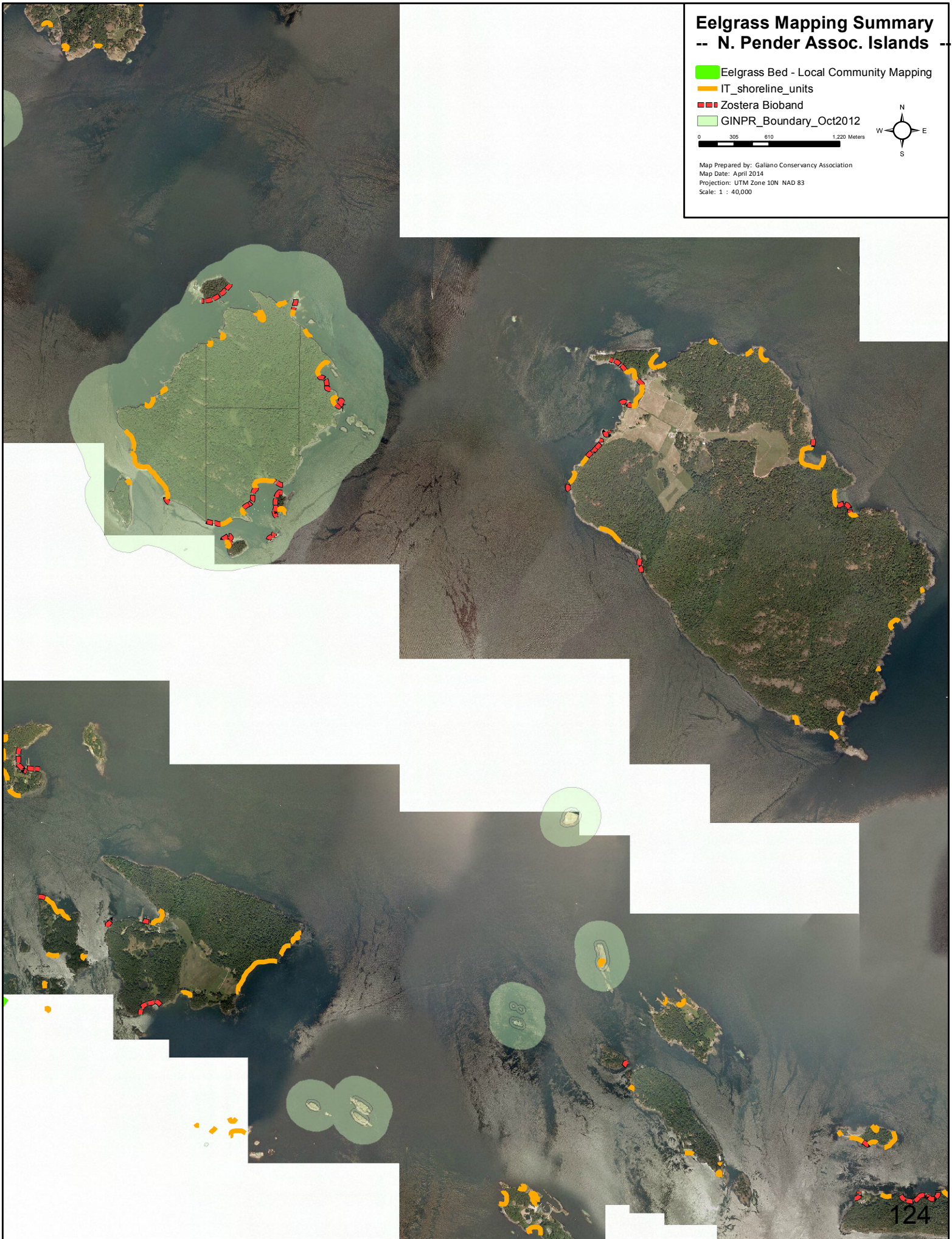
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Eelgrass Mapping Summary -- N. Pender Assoc. Islands

- Eelgrass Bed - Local Community Mapping
- IT_shoreline_units
- Zostera Bioband
- GINPR_Boundary_Oct2012

0 305 610 1,220 Meters

Map Prepared by: Galliano Conservancy Association
Map Date: April 2014
Projection: UTM Zone 10N NAD 83
Scale: 1 : 40,000



Eelgrass Mapping Summary -- N. Pender Assoc. Islands

- Eelgrass Bed - Local Community Mapping
- IT_shoreline_units
- Zostera Bioband
- GINPR_Boundary_Oct2012

0 345 690 1,380 Meters



Map Prepared by: Galliano Conservancy Association
Map Date: April 2014
Projection: UTM Zone 10N NAD 83
Scale: 1 : 40,000



Shoreline Units

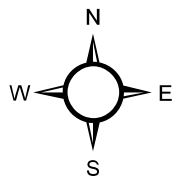
-- Gambier Island --

Produced By: Galiano Conservancy Association

Data Source: Provincial Shorezone Database

Map Date: June 2012

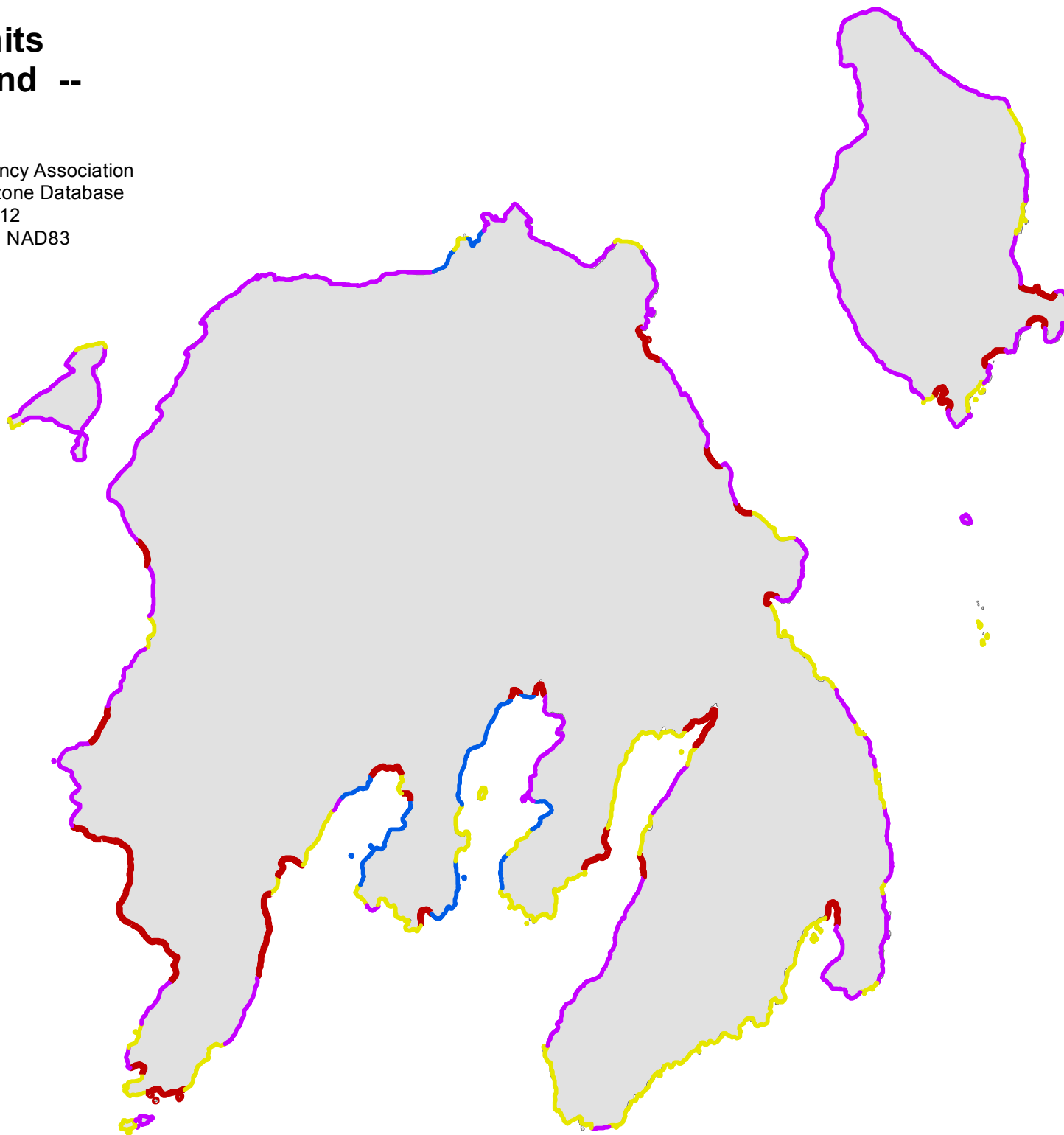
Projection: UTM Zone 10 NAD83



SHORELINE_UNITS

- Estuary
- Sand / Cobble
- Low Rock / Boulder
- Altered
- Cliff
- Coastal Banks or Bluffs

1:70,000



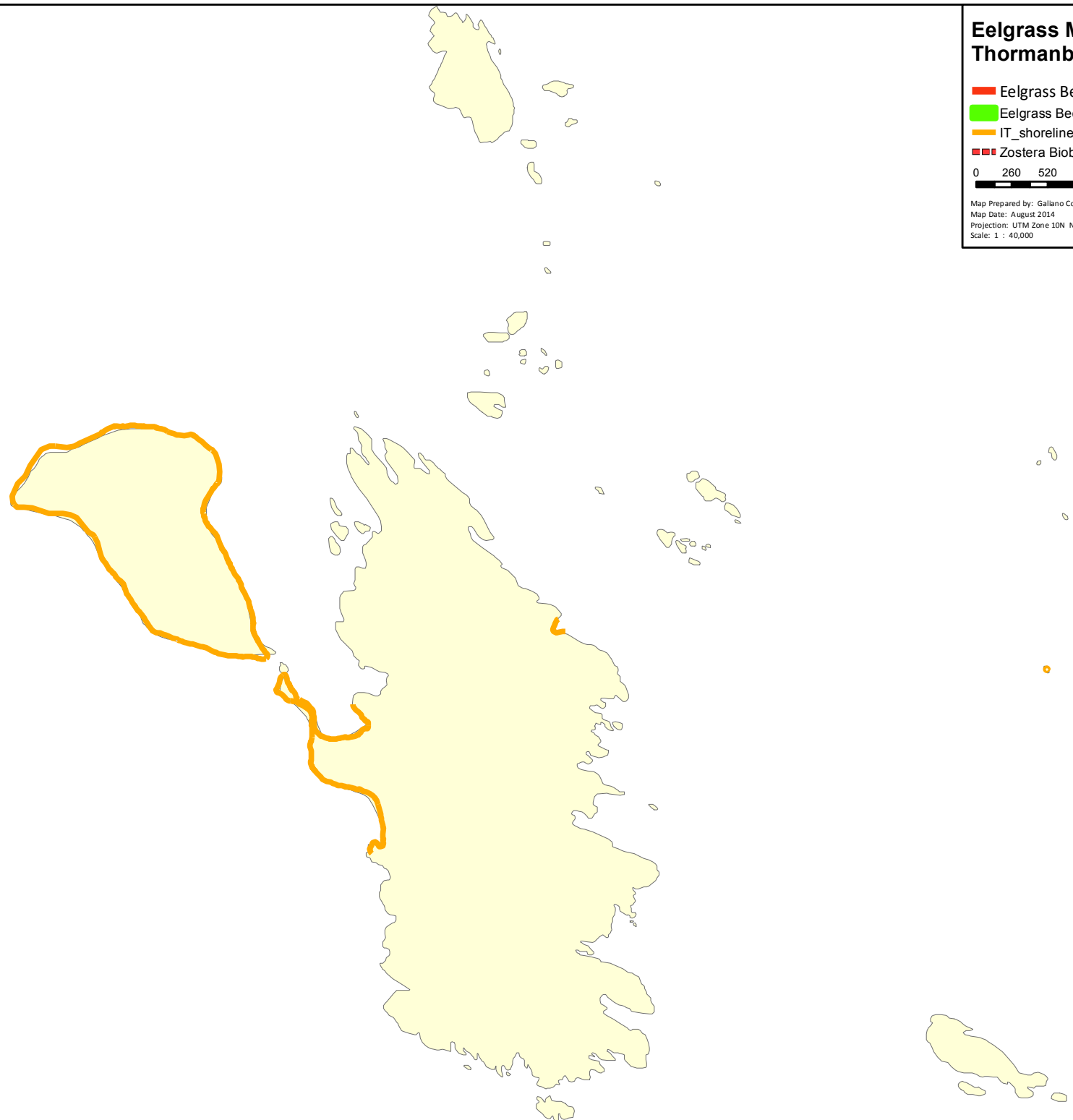
Eelgrass Mapping Summary Thormanby & Assoc. Islands NW

-  Eelgrass Bed - 2012 Islands Trust Inventory
-  Eelgrass Bed - Local Community Mapping
-  IT_shoreline_units
-  Zostera Bioband

0 260 520 1,040 Meters



Map Prepared by: Gallano Conservancy Association
Map Date: August 2014
Projection: UTM Zone 10N NAD 83
Scale: 1 : 40,000



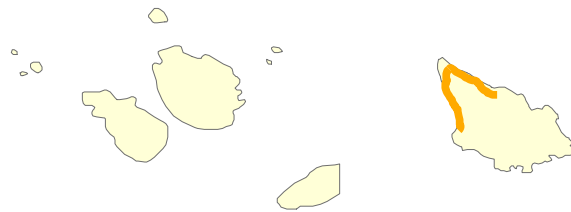
Eelgrass Mapping Summary

-- Thormanby Assoc. Islands SE --

-  Eelgrass Bed - 2012 Islands Trust Inventory
-  Eelgrass Bed - Local Community Mapping
-  IT_shoreline_units
-  Zostera Bioband

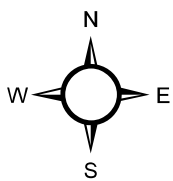
0 260 520 1,040 Meters

Map Prepared by: Galliano Conservancy Association
Map Date: August 2014
Projection: UTM Zone 10N NAD 83
Scale: 1 : 40,000



Shoreline Units & Zostera Bioband Units -- Thetis Island Trust Area --

Produced By: Galiano Conservancy Association
Data Source: Provincial Shorezone Database
Map Date: June 2012
Projection: UTM Zone 10 NAD83



 Zostera Bioband Units

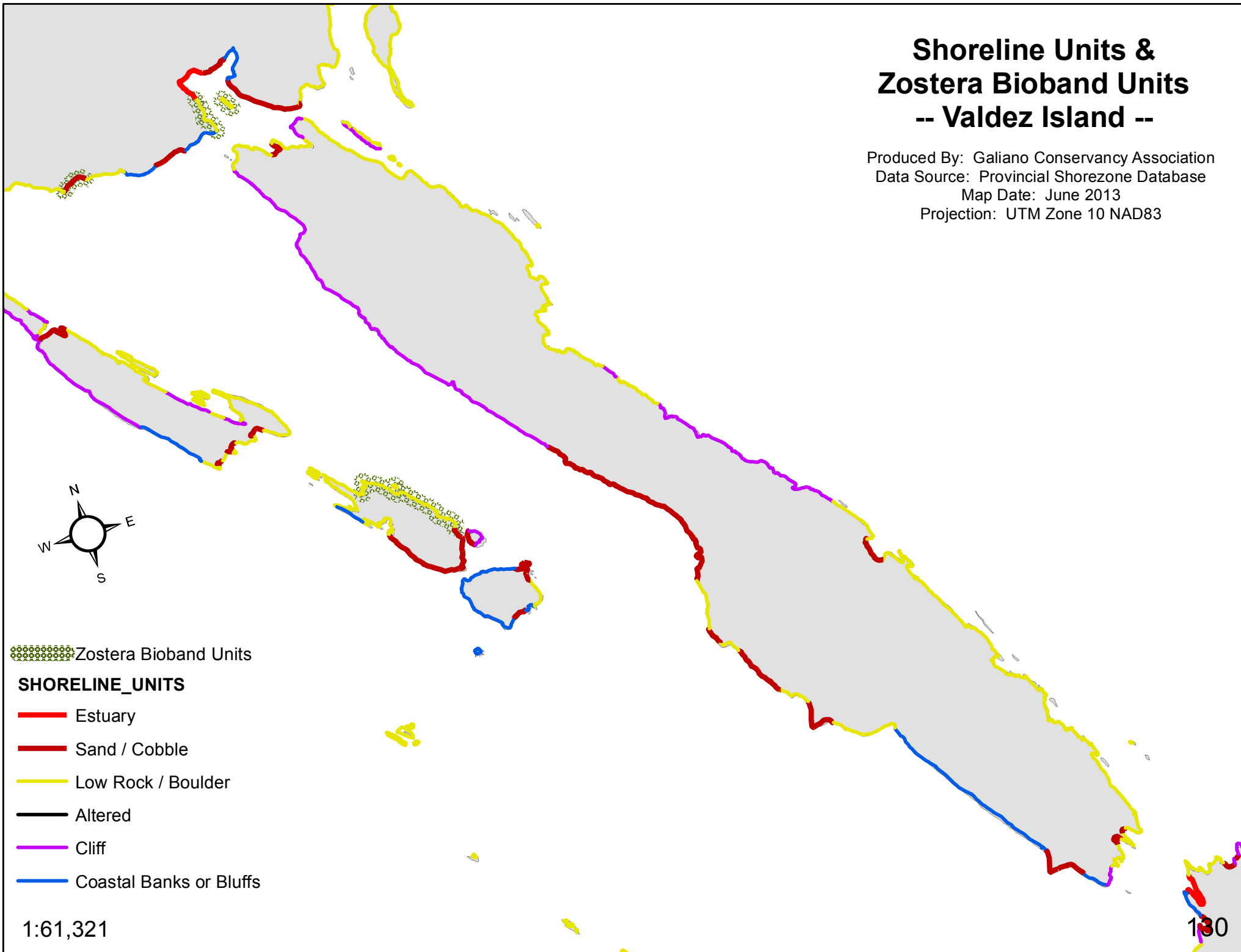
SHORELINE_UNITS

-  Estuary
-  Sand / Cobble
-  Low Rock / Boulder
-  Altered
-  Cliff
-  Coastal Banks or Bluffs

1:55,000

Shoreline Units & Zostera Bioband Units -- Valdez Island --

Produced By: Galiano Conservancy Association
Data Source: Provincial Shorezone Database
Map Date: June 2013
Projection: UTM Zone 10 NAD83



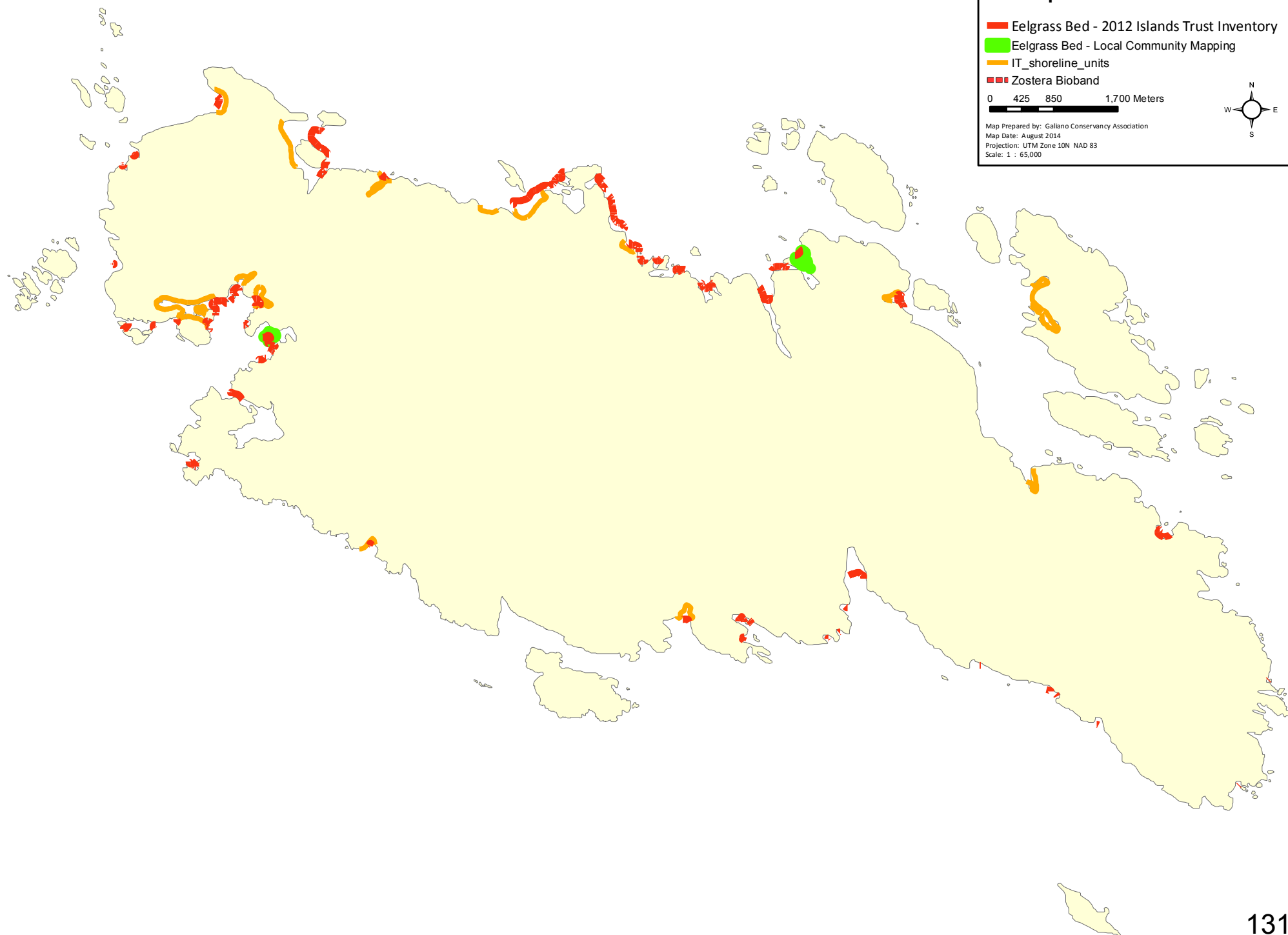
Eelgrass Mapping Summary -- Lasqueti & Associated Islands --

- Eelgrass Bed - 2012 Islands Trust Inventory
- Eelgrass Bed - Local Community Mapping
- IT_shoreline_units
- Zostera Bioband

0 425 850 1,700 Meters

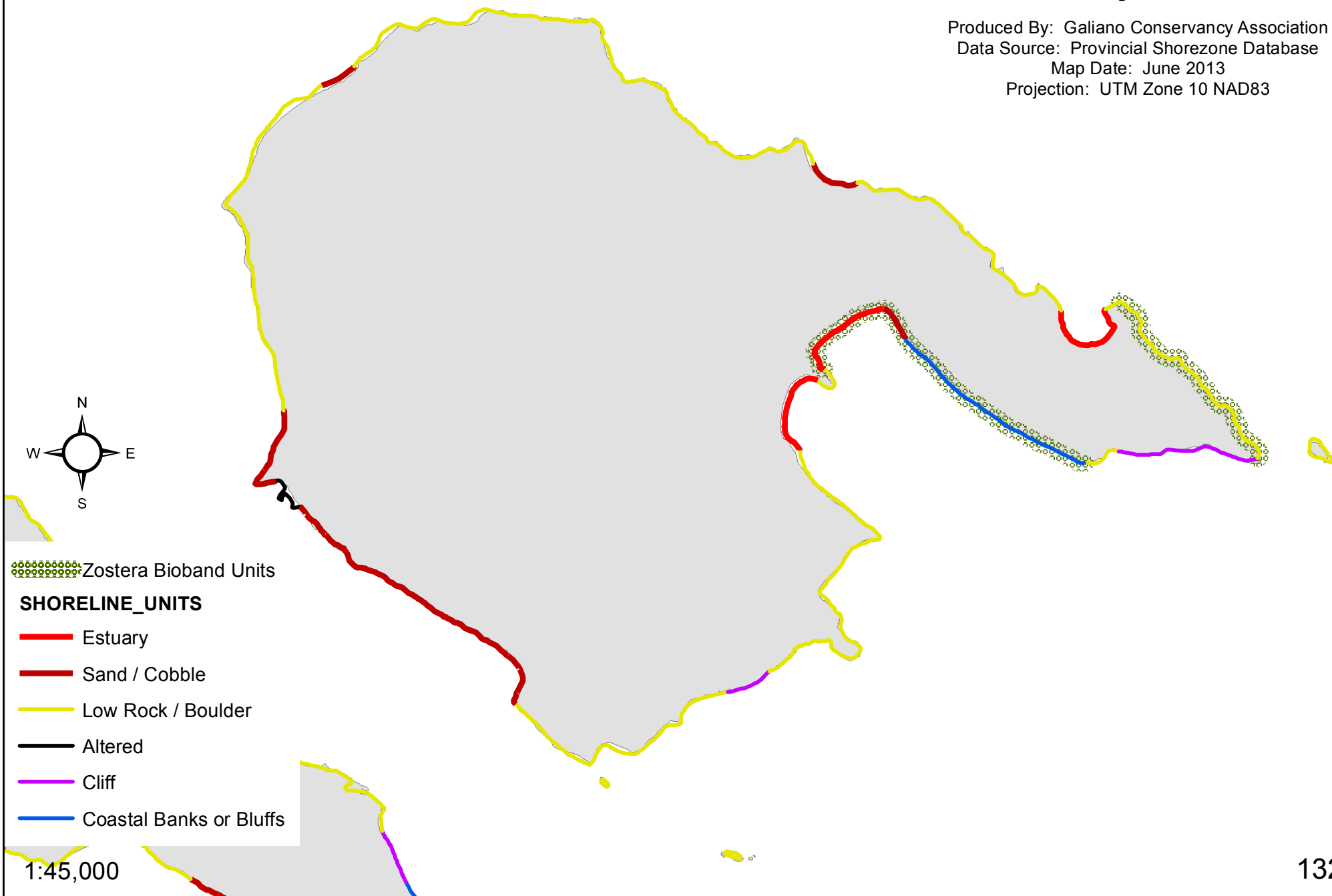


Map Prepared by: Galliano Conservancy Association
Map Date: August 2014
Projection: UTM Zone 10N NAD 83
Scale: 1 : 65,000



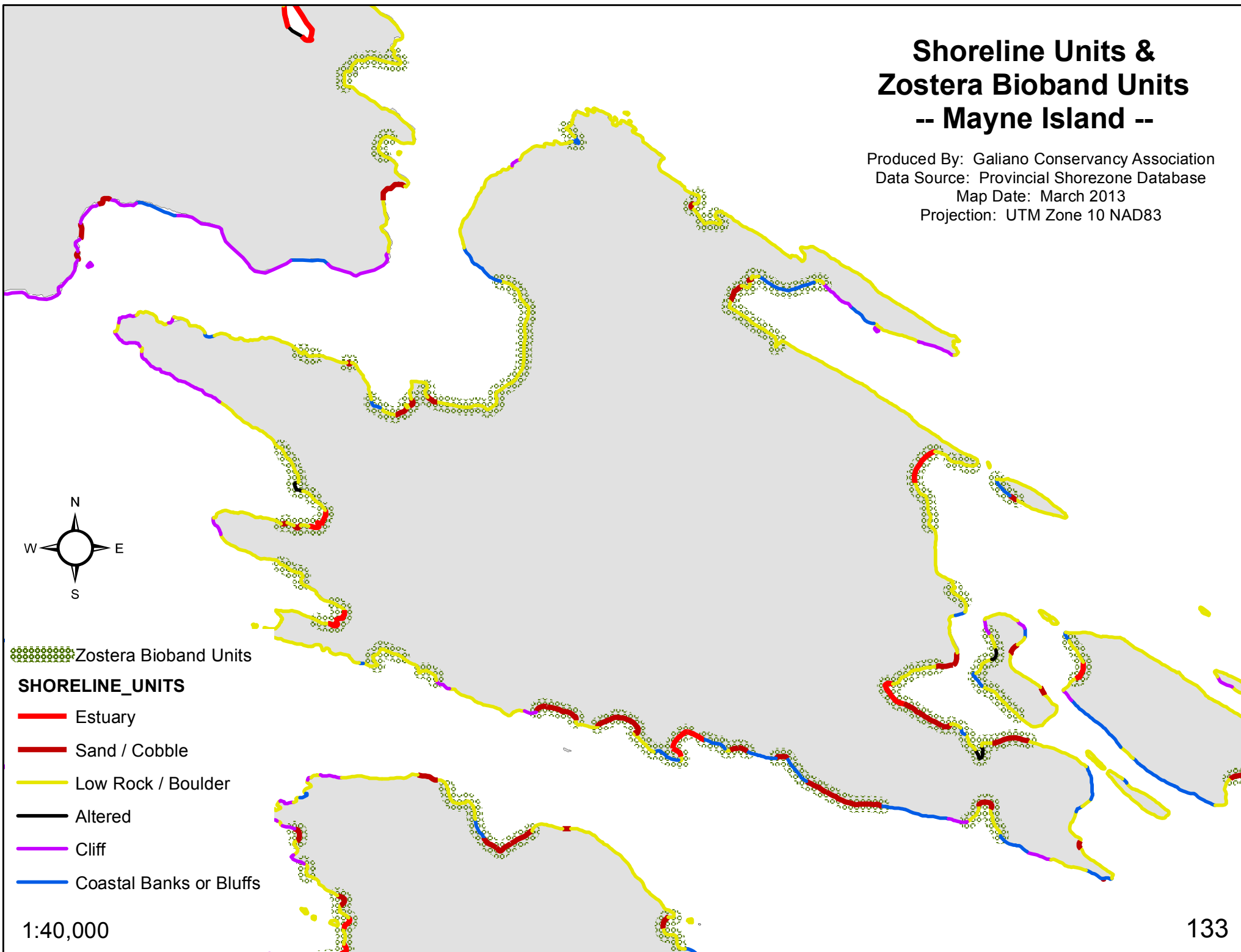
Shoreline Units & Zostera Bioband Units -- Hornby Island --

Produced By: Galiano Conservancy Association
Data Source: Provincial Shorezone Database
Map Date: June 2013
Projection: UTM Zone 10 NAD83



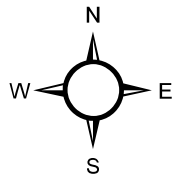
Shoreline Units & Zostera Bioband Units -- Mayne Island --

Produced By: Galiano Conservancy Association
Data Source: Provincial Shorezone Database
Map Date: March 2013
Projection: UTM Zone 10 NAD83



Shoreline Units & Zostera Bioband Units -- Executive Islands --

Produced By: Galiano Conservancy Association
Data Source: Provincial Shorezone Database
Map Date: June 2013
Projection: UTM Zone 10 NAD83



 Zostera Bioband Units

SHORELINE_UNITS

-  Estuary
-  Sand / Cobble
-  Low Rock / Boulder
-  Altered
-  Cliff
-  Coastal Banks or Bluffs

1:46,362

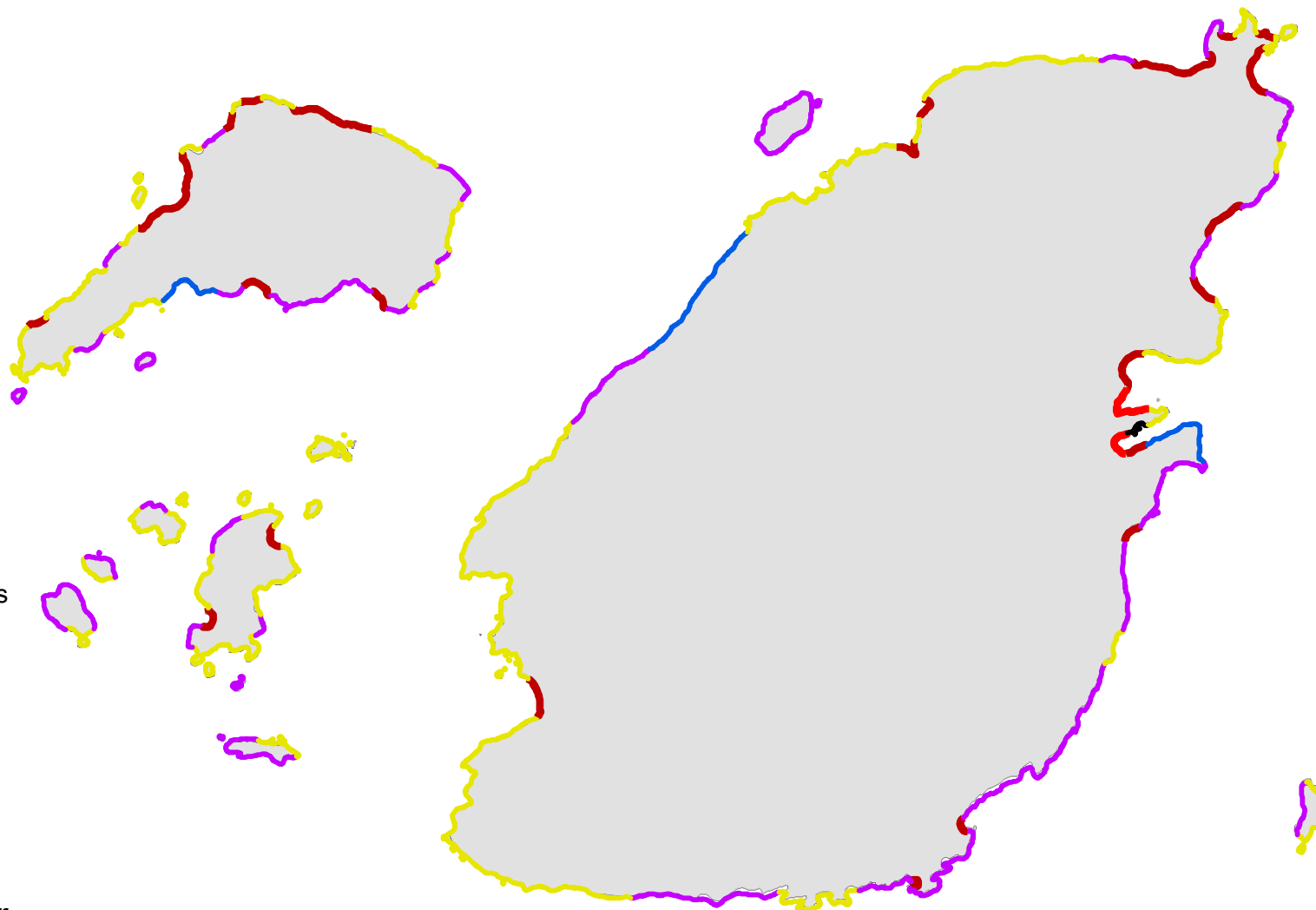
Shoreline Units & Zostera Bioband Units -- Bowen Island --

Produced By: Galiano Conservancy Association

Data Source: Provincial Shorezone Database

Map Date: June 2013

Projection: UTM Zone 10 NAD83



 Zostera Bioband Units

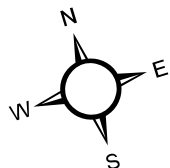
SHORELINE_UNITS

-  Estuary
-  Sand / Cobble
-  Low Rock / Boulder
-  Altered
-  Cliff
-  Coastal Banks or Bluffs

1:70,000

Shoreline Units & Zostera Bioband Units -- Denman Island --

Produced By: Galiano Conservancy Association
Data Source: Provincial Shorezone Database
Map Date: June 2013
Projection: UTM Zone 10 NAD83



 Zostera Bioband Units

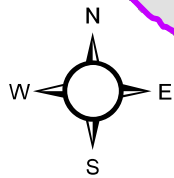
SHORELINE_UNITS

-  Estuary
-  Sand / Cobble
-  Low Rock / Boulder
-  Altered
-  Cliff
-  Coastal Banks or Bluffs

1:70,000

Shoreline Units & Zostera Bioband Units -- Gabriola Island --

Produced By: Galiano Conservancy Association
Data Source: Provincial Shorezone Database
Map Date: June 2012
Projection: UTM Zone 10 NAD83



 Zostera Bioband Units

SHORELINE_UNITS

-  Estuary
-  Sand / Cobble
-  Low Rock / Boulder
-  Altered
-  Cliff
-  Coastal Banks or Bluffs

1:57,500

137

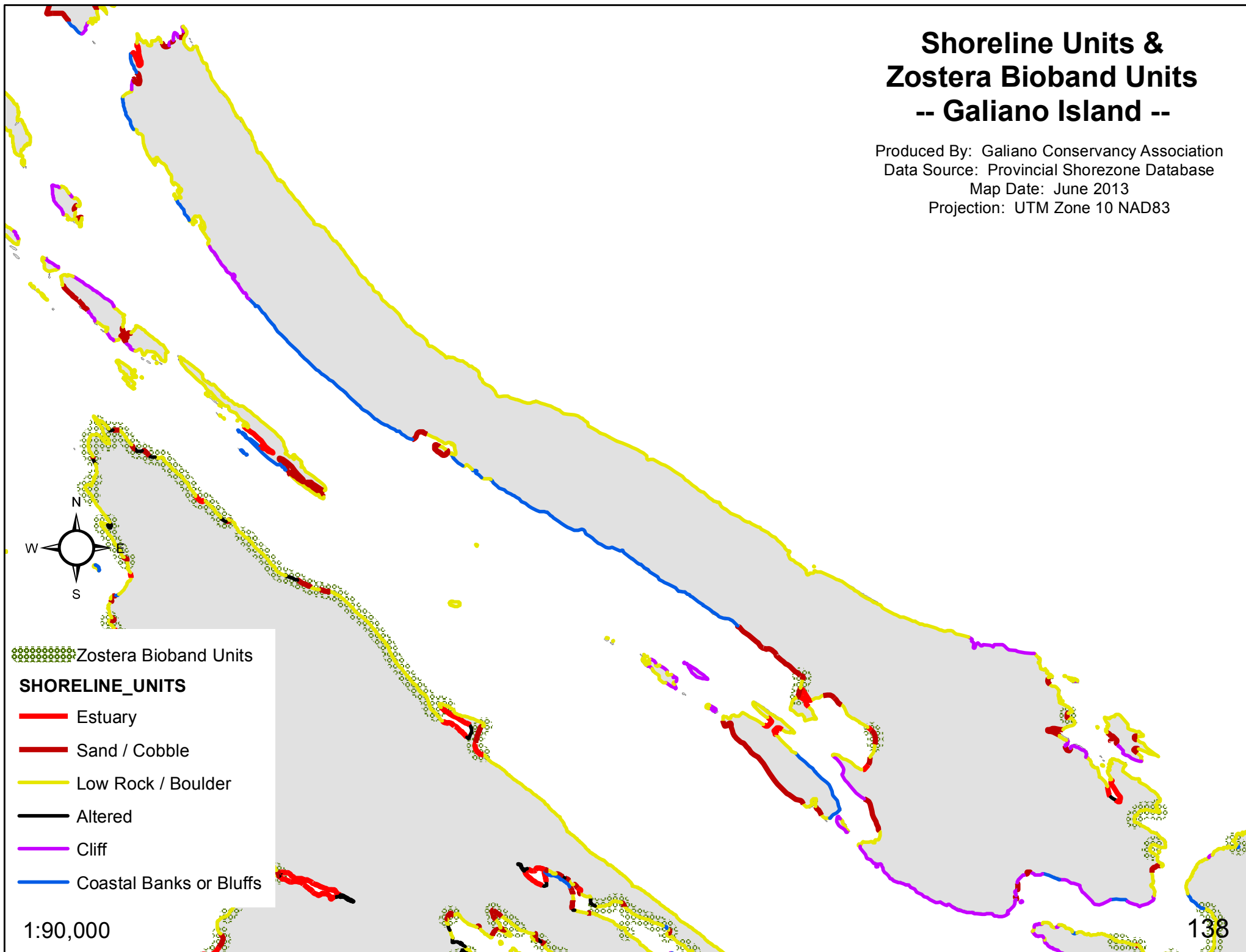
Shoreline Units & Zostera Bioband Units -- Galiano Island --

Produced By: Galiano Conservancy Association

Data Source: Provincial Shorezone Database

Map Date: June 2013

Projection: UTM Zone 10 NAD83



Eelgrass Mapping Summary -- Salt Spring Island --

 Eelgrass Bed - Local Community Mapping
 IT_shoreline_units
 Zostera Bioband

0 295 590 1,180 Meters



Map Prepared by: Galliano Conservancy Association
Map Date: April 2014
Projection: UTM Zone 10N NAD 83
Scale: 1 : 40,000

Eelgrass Mapping Summary -- Salt Spring Island --

 Eelgrass Bed - Local Community Mapping
 IT_shoreline_units
 Zostera Bioband

0 295 590 1,180 Meters



Map Prepared by: Galliano Conservancy Association
Map Date: April 2014
Projection: UTM Zone 10N NAD 83
Scale: 1 : 40,000

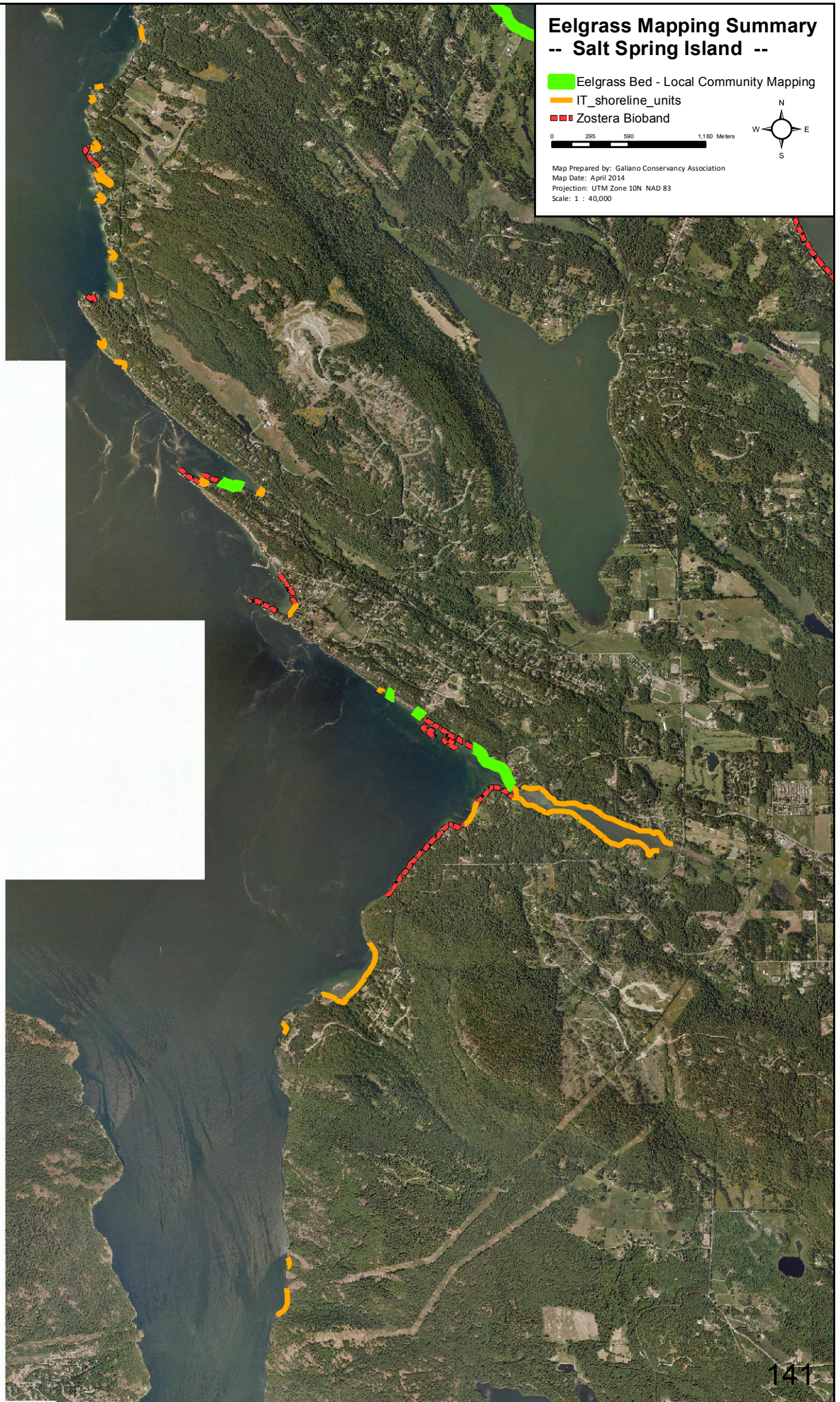
Eelgrass Mapping Summary -- Salt Spring Island --

 Eelgrass Bed - Local Community Mapping
 IT_shoreline_units
 Zostera Bioband

0 295 590 1,180 Meters



Map Prepared by: Galliano Conservancy Association
Map Date: April 2014
Projection: UTM Zone 10N NAD 83
Scale: 1 : 40,000



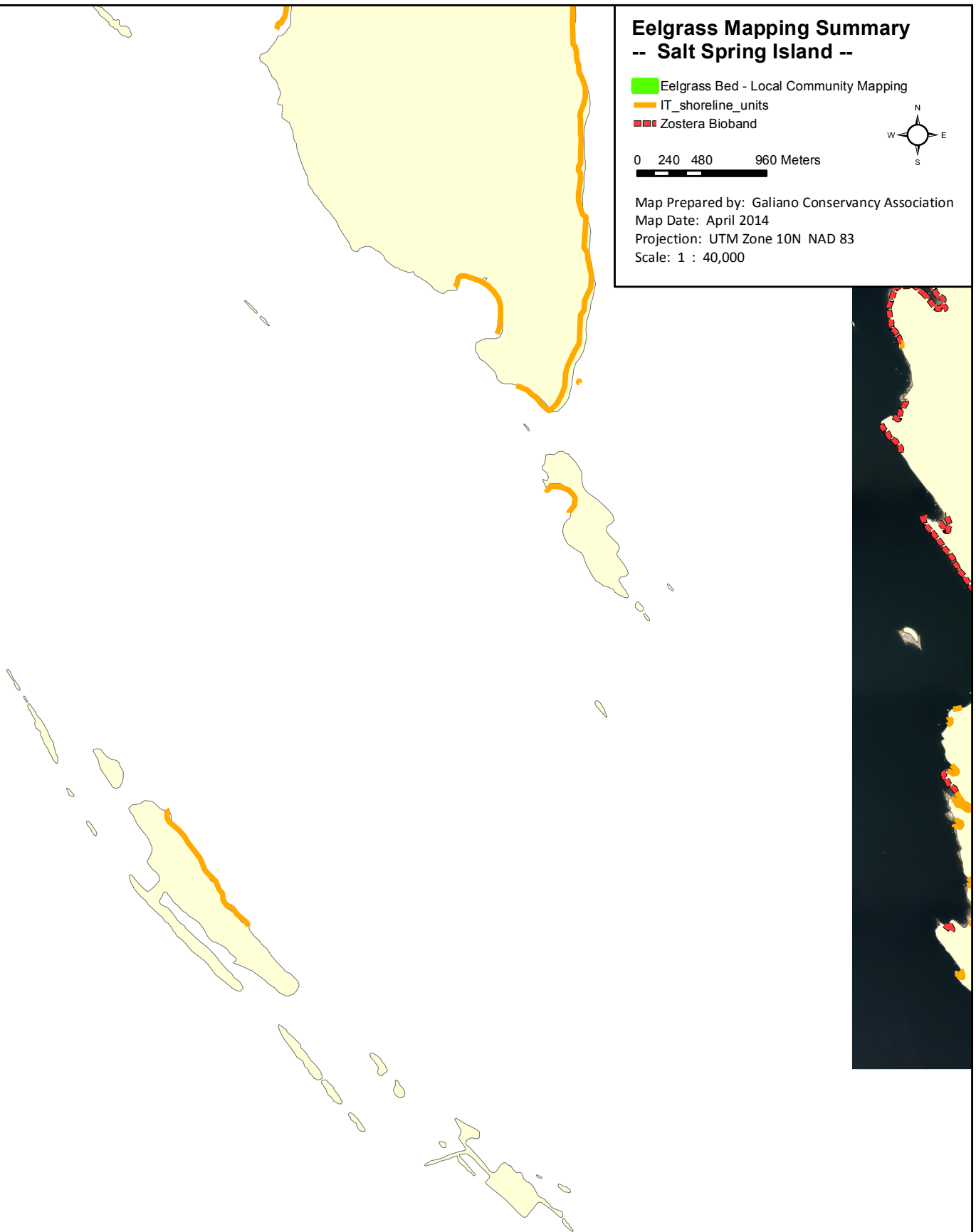
Eelgrass Mapping Summary -- Salt Spring Island --

 Eelgrass Bed - Local Community Mapping
 IT_shoreline_units
 Zostera Bioband

0 240 480 960 Meters



Map Prepared by: Galiano Conservancy Association
Map Date: April 2014
Projection: UTM Zone 10N NAD 83
Scale: 1 : 40,000



Eelgrass Mapping Summary -- Salt Spring Island --

 Eelgrass Bed - Local Community Mapping

 IT_shoreline_units

 Zostera Bioband

0 295 590 1,180 Meters



Map Prepared by: Galliano Conservancy Association
Map Date: April 2014
Projection: UTM Zone 10N NAD 83
Scale: 1 : 40,000

Eelgrass Mapping Summary -- Salt Spring Island North --

 Eelgrass Bed - Local Community Mapping
 IT_shoreline_units
 Zosteria Bioband

0 240 480 960 Meters



Map Prepared by: Galiano Conservancy Association
Map Date: April 2014
Projection: UTM Zone 10N NAD 83
Scale: 1 : 40,000

Eelgrass Mapping Summary -- Salt Spring Island --

Eelgrass Bed - Local Community Mapping

IT_shoreline_units

Zostera Bioband

0 295 590 1,180 Meters



Map Prepared by: Galliano Conservancy Association
Map Date: April 2014
Projection: UTM Zone 10N NAD 83
Scale: 1 : 40,000



Eelgrass Mapping Summary -- N. Pender Assoc. Islands

Eelgrass Bed - Local Community Mapping

IT_shoreline_units

Zostera Bioband

GINPR_Boundary_Oct2012

0 410 820 1,640 Meters

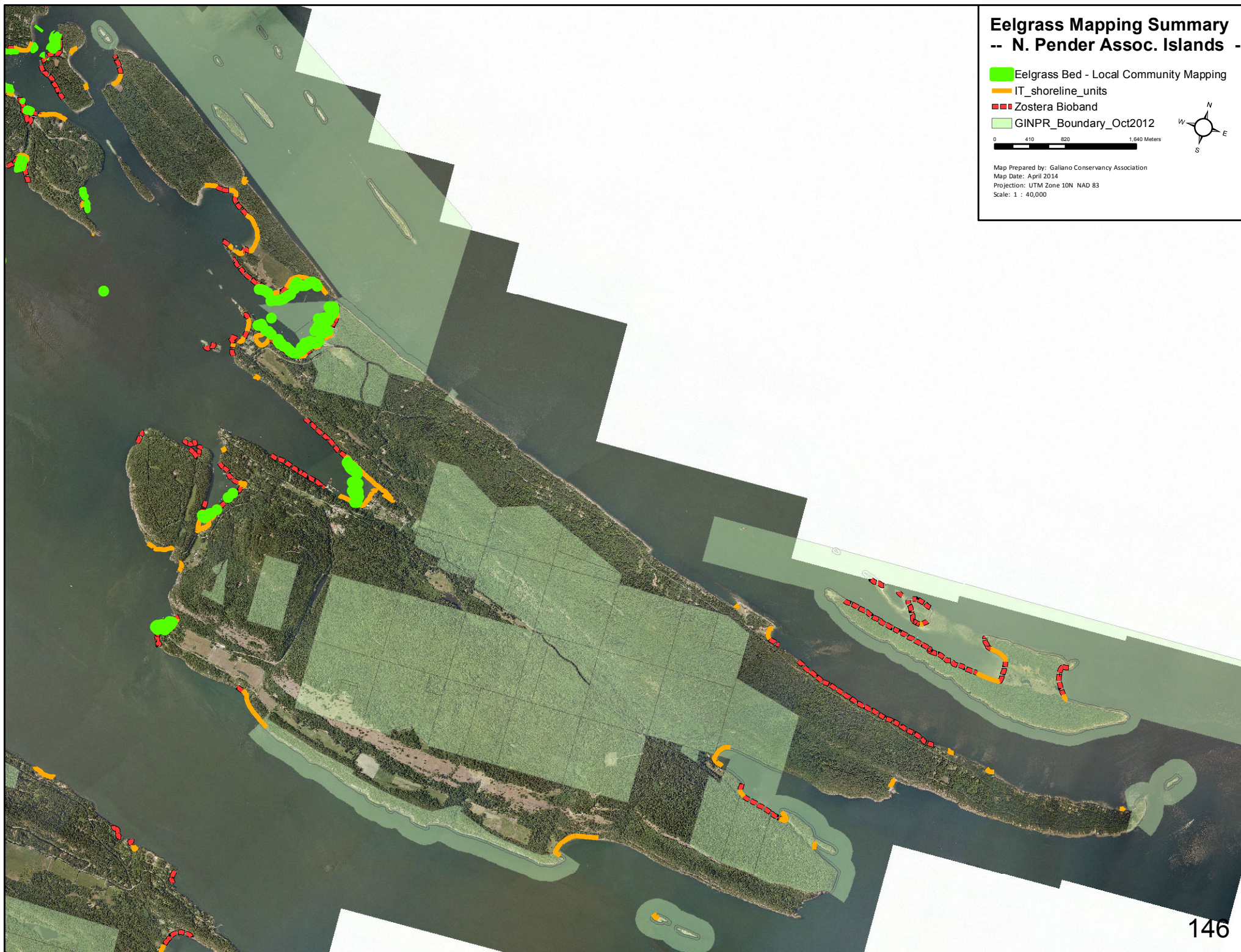


Map Prepared by: Galliano Conservancy Association

Map Date: April 2014

Projection: UTM Zone 10N NAD 83

Scale: 1 : 40,000



Appendix C: Summary of Overwater Structures

The Impacts of Overwater Structures on the Marine Nearshore Environment



The following information was taken from two sources. A Green Shores document summarizes possible effects of docks.¹ A White Paper published in 2001² for the Washington State Transportation Commission in Puget Sound is more detailed. The page numbers at the end of paragraphs indicate the page on which the information was found in the original document.

Information collated by Nikki Wright, Executive Director

SeaChange Marine Conservation Society

¹ Province of British Columbia. *Coastal Shore Stewardship: A Guide for Planners, Builders and Developers on Canada's Pacific Coast*. www.greenshores.ca

² Nightingale, B. & Simenstad, C.A. (2001) *Overwater Structures: Marine Issues White Paper Research Project T 1803, Task 35*. Prepared for Washington State Transportation Commission and in cooperation with U.S. Department of Transportation, Federal Highway Administration. 108 pages.

Summary of Possible Effects of Docks

Coastal Shore Stewardship: A Guide for Planners, Builders and Developers on Canada's Pacific Coast Province of British Columbia (Available on the Green Shores Web site:

www.greenshores.ca)

What Can Happen (p. 65)

The installation of docks can affect the coastal biophysical environment in a variety of ways:

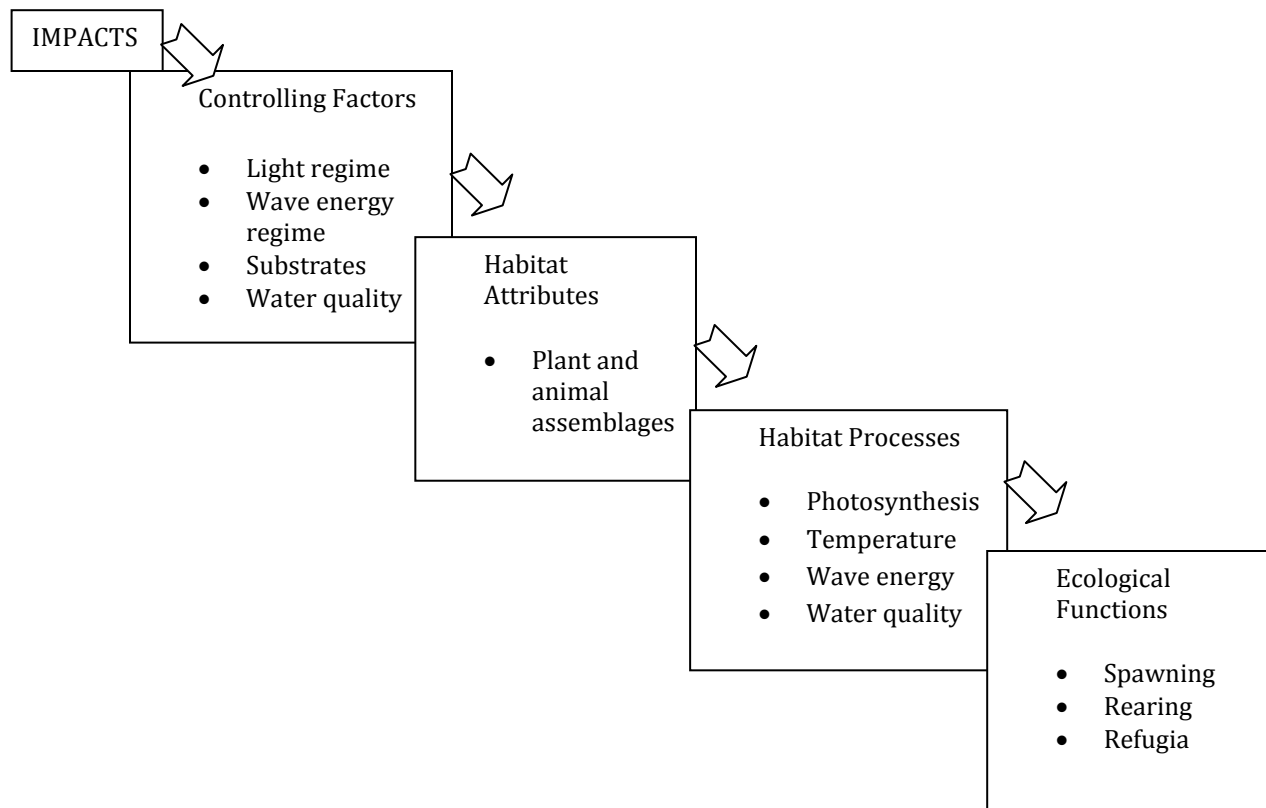
- Shading: Shading caused by the dock can affect the vigor of intertidal and subtidal plant communities, such as marsh plants, eelgrass and kelp beds. These impacts may be chronic (reduced productivity) or acute (wiping out plant communities, leaving the area barren).
- Disruption of shore drift patterns: This can result in updrift beach formation and downdrift shoreline erosion.
- Shore damage: Removal of shore plants and disturbance of soils where docks are attached to land can increase erosion and sedimentation of the intertidal and adjacent subtidal areas.
- Bottom habitat: Installation of footings, pilings and other structures permanently alienates benthic habitat. Dredging to create sufficient depth next to the dock can also disrupt or destroy bottom habitat.
- Operational pollution: poor refueling and dock maintenance practices, bilge releases and accidental spills from boats and docks can release contaminants into the nearby waters. (p. 65)

Overview of Ecological and Habitat Issues

From: Overwater Structures: Marine Issues White Paper Research Project T 1803, Task 35.

Estuarine and shallow marine nearshore habitats provide passage for fish and fish larvae, ocean water and human transportation, as well as areas for settlement of marine shellfish and other marine life. These sites are important sources of prey resource production, refugia, and spawning areas for Pacific salmon, groundfish, and forage fish, such as herring, sand lance and surf smelt. Overwater constructed structures can pose alterations to key factors that control prey production and spawning. Light, wave energy and substrate regimes determine the habitat characteristics that support these critical functions (p. 1).

Overwater structures are typically located in intertidal areas from above the area submerged by the mean higher high tides and out to 15 meters below the area exposed by the mean lower low tide. The primary physical processes controlling habitat attributes (i.e. plant and animal assemblages) and functions are depth (elevation) substrate type, wave energy, and light and water quality. These are the most important factors influencing the development and distribution of nearshore habitats (p. 33).



Conceptual model used by authors to define overwater structure impacts to nearshore habitat (p. 33).

Overwater structures and associated activities can impact the ecological functions of habitat through the alteration of habitat controlling factors (light regime, wave energy regime, and substrate and water quality). These alterations can, in turn, interfere with habitat processes supporting the key ecological functions of spawning, rearing and refugia. Whether any of these impacts occur and to what degree they occur at any one site depend upon the nature of site-specific habitat controlling factors and the type, characteristic, and use patterns of a given overwater structure located at a specific site (p. 34).

In addition to impacts associated with overwater constructed structures, activities associated with docks can also pose risks to the quality and quantity of habitat through prop scour, groundings, contaminant introduction to the marine environment and structural interferences with shallow nearshore habitats with the placement of ramps and haul-outs in nearshore areas.

Habitat Impact Mechanisms (p. 34)

Habitat Controlling Factors	Overwater Structures & Activities	Habitat Impact Mechanisms	Habitat Impacts
Light Regime	• Docks • Floats • Pilings • Moored vessels	• Reduced light levels	• Limited plant growth & recruitment • Altered animal behavior and assemblages
Wave Energy Regime	• Floats • Breakwaters • Prop wash • Marina	• Altered wave patterns	• Altered plant and animal assemblages • Altered substrate type • Altered sediment transport & distribution
Substrate	• Prop & anchor scour • Pilings, breakwaters & floats	• Altered substrate characteristics	• Altered sediment transport & distribution • Altered substrate type • Altered plant & animal assemblages
Water Quality	• Discharges • Boat & upland run-off	• Increased exotics, toxics, nutrients and bacterial introductions	• Altered plant & animal assemblages • Limited growth & recruitment • Exotic species replacement of natives

Overwater Structure Effects on Light Regime

Effects on Underwater Vegetation

Without proper precautions, docks, piers, and pilings can cast shade upon the underwater water environment thereby limiting light availability for plant photosynthesis. Distributions of invertebrates, fishes, and plants have been found to be severely limited in under-dock environments when compared to adjacent vegetated habitat in the Pacific Northwest not shaded by overwater structures (p. 38).

Each dock defines a shade footprint specific to its structural specifications. Dock height, width, construction materials, and the dock's orientation to the arc of the sun are primary factors in determining the shade footprint that a given dock casts over the submerged substrates. Researchers found underwater light availability and eelgrass bed quality under docks to be primarily dependent upon dock height, followed in importance by dock width and dock orientation to the arc of the sun. Light is the most important variable affecting canopy structure (i.e. shoot density and height) and eelgrass bed quality. To the degree that a shade footprint limits plant photosynthesis, it decreases the extent and quality of habitat that support a wide variety of fish and shellfish populations. Construction of even partially shading types of structures, floating or on pilings, could be expected to largely eliminate existing eelgrass and other macroflora with little chance for replacement plant growth (p. 39).

Effects on Fish

Overwater structures can create sharp underwater light contrasts by casting shade in ambient daylight conditions. They can also produce sharp underwater light contrasts by casting artificial light in ambient nighttime conditions. Changes to ambient underwater light environments pose a risk of altering fish migration behavior and increasing mortality risks. Findings have demonstrated that fish responses to piers are ambiguous with some individuals passing under the dock, some pausing and going around the dock, schools breaking up upon encountering docks, and some pausing and eventually going under the dock (p. 43).

Light is considered to be the primary factor limiting the survival and distribution of eelgrass. Given the strong association of important fish prey resources with eelgrass, limitations in the extent of eelgrass pose a potential risk of reduced prey resources. Prey resource limitations likely impact migration patterns and the survival of many juvenile fish species. For smaller fish less than 50 mm in length, residence times along particular shorelines are thought to be a function of prey abundance. Research in the Hood Canal demonstrated that outmigrating juvenile chum fry (30-45 mm) feed extensively upon small, densely distributed harpacticoid

copepods selecting for the largest copepods available. As the fish grew in size, their diet content became composed more of larger epibenthos and pelagic crustaceans. Consistent with other studies, the highest densities of harpacticoid copepods occurred in magnitudes 4-5 times higher in eelgrass stands than in sand habitat without eelgrass. Similarly, the largest abundance of first post-larval stage crabs of 0+ age are found in eelgrass beds (p. 45).

Impacts on Wave Energy

Wave energy and water transport alterations imposed by docks, bulkheads, breakwaters, ramps and associated activities alter the size, distribution, and abundance of substrate and detrital materials required to maintain the nearshore detrital-based food web. Alteration of sediment transport patterns can present potential barriers to the natural processes that build spits and beaches and provide substrates required for plant propagation, fish and shellfish settlement and rearing, and forage fish spawning. Although the specific characteristics of the factors at play vary with the geology of each region or subsystem, changing the type and distribution of sediment will likely alter key plant and animal assemblages. Wave and current interactions in shallow water (i.e. depths <1.0m) are particularly important to intertidal flora and fauna (p. 48).

Dock pilings have also been found to alter adjacent substrates with increased shell hash deposition from piling communities and changes to substrate bathymetry. Similarly, dock uses and construction activities are known to limit underwater light and redistribute sediments through prop scouring, vessel shading, and pile driving. These changes in substrate type can change the nature of the flora and fauna native to a given site. In the case of pilings, native dominant communities typically associated with sand, gravel, mud, sand, and seagrass substrates are replaced by those communities associated with shell hash substrates (p. 49).

Cumulative Effects

Given the apparent increasing demand for overwater structures, structural design to allow maximum light transmission and to mitigate energy and substrate changes is required to protect the ecosystems marine fishes rely upon. Given what is known concerning overwater structure impacts in marine and estuarine ecosystems, we conclude that multiple placements of overwater structures in marine waters can pose substantive risks of significant changes to the immediate and surrounding marine and estuarine ecosystems. These risks require the assessment of existing cumulative light limitation effects and wave energy and substrate effects to the shoreline environment. These risks require assessment at the drift cell before considering the addition of new structures (p. 91).

Appendix D: 2012 - 2014 Islands Trust Area Eelgrass Inventory Meta Data

1. File Identification Information:

2012-2014 Islands Trust Eelgrass Inventory.dbf
 2012-2014 Islands Trust Eelgrass Inventory.prj
 2012-2014 Islands Trust Eelgrass Inventory.sbn
 2012-2014 Islands Trust Eelgrass Inventory.sbx
 2012-2014 Islands Trust Eelgrass Inventory.shp
 2012-2014 Islands Trust Eelgrass Inventory.shx

2012-2014 Islands Trust Eelgrass Inventory Points.dbf
 2012-2014 Islands Trust Eelgrass Inventory Points.prj
 2012-2014 Islands Trust Eelgrass Inventory Points.sbn
 2012-2014 Islands Trust Eelgrass Inventory Points.sbx
 2012-2014 Islands Trust Eelgrass Inventory Points.shp
 2012-2014 Islands Trust Eelgrass Inventory Points.shx

2012-2014 Islands Trust Eelgrass Inventory Polygons.dbf
 2012-2014 Islands Trust Eelgrass Inventory Polygons.prj
 2012-2014 Islands Trust Eelgrass Inventory Polygons.sbn
 2012-2014 Islands Trust Eelgrass Inventory Polygons.sbx
 2012-2014 Islands Trust Eelgrass Inventory Polygons.shp
 2012-2014 Islands Trust Eelgrass Inventory Polygons.shx

2. Standard: GPS survey was conducted in accordance with “Methods for Mapping and Monitoring Eelgrass Habitat in British Columbia (MMEHBC)” and the addendum included below as *Appendix A*. GPS data (2013/2014) was collected in accordance with 'Ammended Schedule G: GLOBAL POSITIONING SYSTEM SPECIFICATIONS' included below as *Appendix B*.
3. GPS Receiver Type: 2012 Data: Garmin GPSMAP 62s with build in high sensitivity receiver (Penders, Lasqueti, Thetis). Garmin GPSMAP 60C and Garmin GPSMAP 62st with built in high sensitivity receiver (Gambier). 2013/2014 Data: Trimble Pathfinder ProXR.
4. Correction Type: 2012 Data: Uncorrected 2013/2014 Data: Post Processed (Trimble Pathfinder Office Pro)
5. Accuracy: GPS data was exported to ESRI shape file format and brought into an ArcMap project. GPS line segments were interpreted and edited to improve accuracy in accordance with MMEHBC standards. The following tables summarize reported GPS accuracy:

2012 Data:

Worst Horizontal Precision Reading (m)	
Gambier Island	12
Lasqueti Island	2
Thetis Island	7
North Pender Island	2
South Pender Island	2

Average Horizontal Precision Reading(m)	
Gambier Island	3
Lasqueti Island	2
Thetis Island	3
North Pender	2
South Pender	2

2013 & 2014 Data:

	2013	2014	2013/14 Combined
Total Point Features	11,754	9,032	20786
Best Reported Horizontal Precision	0.3 m	0.3 m	0.3
Worst Reported Horizontal Precision	69.3 m	75.6 m	75.6
Average Horizontal Precision	0.814 m	0.615 m	0.728
Standard Deviation of Horizontal Precision	1.812 m	1.644 m	1.739
% Point Features with Reported Horizontal Precision < 1.0m	91.44%	97.00%	93.85%
% Point Features with Reported Horizontal Precision < 5.0m	97.04% *	99.06%*	97.91%
% Point Features with Maximum HDOP < 3	99.62%	99.62%	99.62%
% Point Features with Maximum HDOP < 5	100%	99.98%	99.99%

*All point features with reported horizontal precision over 5.0m were duly noted and assessed on a case by case basis for their utility as guides for interpretation of line / polygon / point placement.

6. Geographic Extent: Islands Trust Area
West Bounding Coordinate: 365551
East Bounding Coordinate: 496460
North Bounding Coordinate: 5499562
South Bounding Coordinate: 5379453

Areas Exempted From Inventory:

- i. Shoreline areas within the Gulf Islands National Park Reserve
- ii. Shoreline areas directly adjacent to First Nations Reserves

7. Contact Information
Keith Erickson
Galiano Conservancy Association
RR#1 Sturdies Bay Road
Galiano Island, BC V0N 1P0
Canada

8. Data Projection: UTM, Zone 10, NAD 83

9. Definitions of Attributes in Database Fields:

Field	Description
ObjectID	Unique number ID for labeling purposes
ID	Code used to match up records with GPS data
Trust_Area	Code for Islands Trust Area
Is_Name	Code for island located in Trust Area
Presence	Presence (Y) or Absence (N) of eelgrass
Form	Describes the shape of an eelgrass bed as either flat (FL) or fringe (FR)
Distrib	Indicates the distribution of eelgrass as either continuous (C) or patchy (P)
Sub_sand	Indicates proportion of sand substrate as primary (1), secondary (2) or tertiary (3)
Sub_mud	Indicates proportion of mud substrate as primary (1), secondary (2) or tertiary (3)
Sub_shell	Indicates proportion of shell substrate as primary (1), secondary (2) or tertiary (3)
Sub_pebble	Indicates proportion of pebble substrate as primary (1), secondary (2) or tertiary (3)
Sub_cobble	Indicates proportion of cobble substrate as primary (1), secondary (2) or tertiary (3)
Cover	Estimate of percent cover of eelgrass; <25% (1), 26-75% (2), >75% (3)
Tide	Describes whether the tide is running (R) or slack (S). A running tide increases error of percent cover estimate.
Algae	Describes presence of broad (B) and/or tufty (T) algal species. Presence of broad algae can impair surveyor's ability to characterize the substrate.
Visibility	Refers to the ability of the surveyor to see through the water column; high (H), medium (M), low (L). Low visibility can impair surveyor's ability to characterize substrate and can increase error of percent cover estimate.
Comments	Comments on backshore and eelgrass limiting factors such as presence of docks, wharves, mooring buoys, anchoring boats, shoreline erosion, point source pollution.
Length_m / Area	Length of line segment in meters / Area of polygon in square meters
Map_Class	Categories used for map display (Presence + form + distribution)
Rest_Pot	Yes – identified as a potential site for ecological restoration
Survey_Yr	Year that ground inventory was completed

Local Trust Area Codes

BO Bowen
 DE Denman
 EX Ballenas – Winchelsea (Executive Committee)
 GB Gabriola
 GL Galiano
 GM Gambier
 HO Hornby
 LA Lasqueti
 MA Mayne
 NP North Pender
 SA Saturna
 SP South Pender
 SS Salt Spring
 TH Thetis
 VA Valdes

SCHEDULE G

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.

For boat-based, eelgrass surveys, occupation time for static point features must be less than 5 seconds with a target of 1 position fix and never more than 3 position fixes for each feature. Line and polygon features may be interpreted from successive static point features. The majority of the static point features must be no more than 15 metres apart. The maximum distance between successive static point features is 20 metres.

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.

2.07

For line (and polygon) features surveyed in dynamic mode, the majority of the individual position fixes must be no more than 2.5 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

For line (and area) features surveyed in station-to-station mode, the maximum distance between stations is 10 metres.

2.10

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.

2.11

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.

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.

3.04

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.

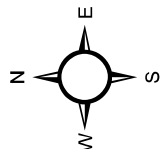
Map 15: Eelgrass Presence Saturna Local Trust Area

- Potential site for restoration
- Eelgrass Patch: < 10m2
- Eelgrass Bed: Flat, Continuous
- Eelgrass Bed: Flat, Patchy
- Eelgrass Bed: Fringing, Continuous
- Eelgrass Bed: Fringing, Patchy
- Zostera Bioband Units (BC Shorezone)
- Gulf Islands National Park Reserve Boundary

The eelgrass inventory was completed by SeaChange Marine Conservation Society under contract by Islands Trust Fund and the Islands Trust. The inventory was conducted from June to September, 2014 using a towed underwater camera and Trimble Pathfinder Pro XR GPS.

Produced by: Galliano Conservancy
Map Date: Nov. 28th, 2014
Orthophoto Date: 2013
Scale: 1 : 16,000
Projection: UTM Zone10N, NAD83

Each line segment is labeled with its unique ID number. This number corresponds with the ID column in the associated data table.





BYLAW ENFORCEMENT STAFF REPORT

Date: 2 February 2015

To: Saturna Local Trust Committee
Meeting of February 19, 2015

From: Miles Drew
Bylaw Enforcement Manager

Re: Enforcement Policy for Research Use of Instrumentation

PURPOSE:

On July 10 2014 the Saturna Island Local Trust Committee adopted the following resolution:

SA-2014-046

It was **MOVED** and **SECONDED** that, the Saturna Local Trust Committee adopt the standing policy that the use of instrumentation for research purposes not be subject to enforcement and that the policy be referred to Islands Trust Bylaw Enforcement Manager Miles Drew for comment.

The LTC also considered the below:

SA-CL-2014.1 Crown Land Referral Response Letter - RE: Tidal Energy Exploration in Boundary Pass

Planner Richardson conveyed that this does not comply with the current Land Use Bylaw. Trustee Brent commented that there are already hydrophones in place to study whales to learn about and protect these mammals. He proposed that staff redraft the bylaws to allow instrumentation for research purposes anywhere on our island.

Trustee Janszen concurred on both points.

It was agreed to carry this item forward to be addressed under the Work Program for possible Land Use Bylaw amendments and a potential standing policy regarding enforcement.

This report will make recommendations on the above resolutions.

BACKGROUND:

Currently there is no complaint about hydrophones or other such research activity and there is no open bylaw enforcement file or investigation.

COMMENT:

It is not an appropriate use of an enforcement policy to exempt unlawful activities from enforcement, especially if the policy was written for one person or organization. Bylaw enforcement policies are intended to help interpret bylaws and to place a priority for enforcement on types of complaints. The LTC has indicated that it wishes to consider this issue under its general land use regulation review. Placement on a projects list other than the top priority list does not forestall enforcement. But given that the issue is on the project list bylaw enforcement would consult with the LTC before undertaking enforcement actions if a complaint were ever received. At that time the LTC could issue instructions not to enforce on a specific complaint for specific reasons.

RECOMMENDATIONS:

That the Saturna Island LTC review regulations pertaining to instrument use for research purposes as part of its general review of the Land Use Bylaw regulations and that if there is a complaint about such uses before a review is complete it consider what enforcement actions are appropriate at the time.

Submitted by:



Miles Drew
Bylaw Enforcement Manager

2 February 2015

Date



Memorandum

200 - 1627 Fort Street Victoria BC V8R 1H8

Telephone (250) 405-5151 FAX: (250) 405-5155

Toll Free via Enquiry BC in Vancouver 660-2421. Elsewhere in BC 1.800.663.7867

information@islandstrust.bc.ca www.islandstrust.bc.ca

Date December 8, 2014 File Number SA-APC 3050-05

To Saturna Island Local Trust Committee

From Sharon Lloyd-deRosario
Legislative Clerk
Local Planning Services

Re Advisory Planning Commission Appointments

Please be advised that three (3) members' appointments have expired on January 1, 2015. I have attached a list of the APC members for your convenience.

The Advisory Planning Commission can consist of not more than seven (7) members. The LTC may direct staff to find out if the expired APC members have any interest in being reappointed, they may do so by considering the following resolution:

"That Saturna Island Local Trust Committee directs staff to contact expired APC members to find out if they would be interested in being reappointed to the Saturna Island Advisory Planning Commission."

And;

If the LTC wishes to advertise for up to three (3) members they may do so by considering the following resolution:

"That Saturna Island Local Trust Committee directs staff to advertise for up to 3 member(s) to sit on the Saturna Island Advisory Planning Commission."

Advertising:

A notice of Expression of Interest is drafted and published in the Sunset Scribbler, if they can meet our timelines. This notice can also be published in the Island Tides. The notice is posted on Saturna Island notice boards and posted on the Saturna Island Home Page and sent to the subscribers of this page.

pc Gary Richardson, Planner



Advisory Members

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Advisory Members: Saturna Island

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Advisory Planning Commission

Last Name	First Name	Title	Start Date	End Date	
D. Gaines	John	Member	Apr-17-2012	Jan-01-2016	View/Edit
Reif	Charles	Chair	Jan-01-2013	Jan-01-2015	View/Edit
Surm	Hubertus	Member	Jan-01-2013	Jan-01-2015	View/Edit
Quinn	Wayne	Member	Apr-17-2014	Jan-01-2016	View/Edit
Seed	Peter	Member	Apr-17-2014	Jan-01-2016	View/Edit
Johnson	Ryan	Member	Feb-14-2013	Jan-01-2015	View/Edit
Lowsley	Bev	Secretary	Apr-17-2014	Jan-01-2016	View/Edit
Rowe	Ian	Member	Apr-17-2014	Apr-01-2016	View/Edit