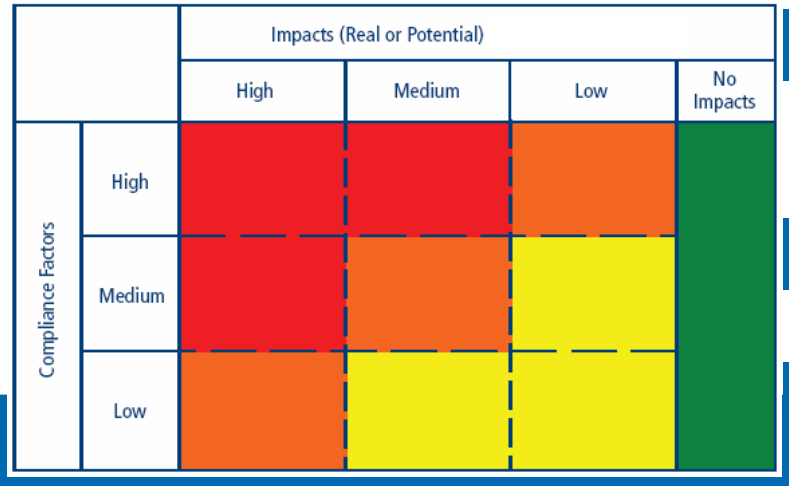
Shuswap Watershed Mapping Project

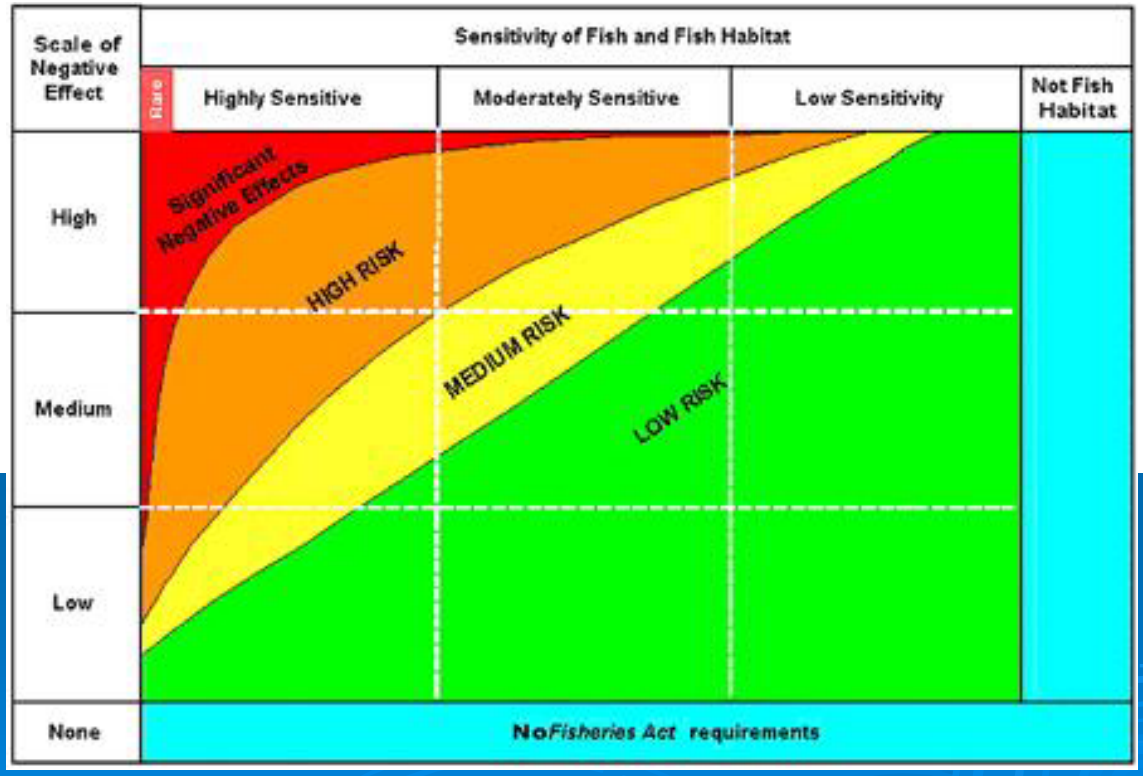
Overview of 16 Occurrences Posing High Risk to Fish Habitat on Shuswap, Little Shuswap and Mara Lakes

DFO Habitat Compliance Decision Framework



- Assessment of impacts (real or potential) on fish and fish habitat
- Assessment of compliance factors
- Compliance Risk Assessment Matrix
- Response to non-compliance based on the level of risk

Assessment of impacts (real or potential) on fish and fish habitat



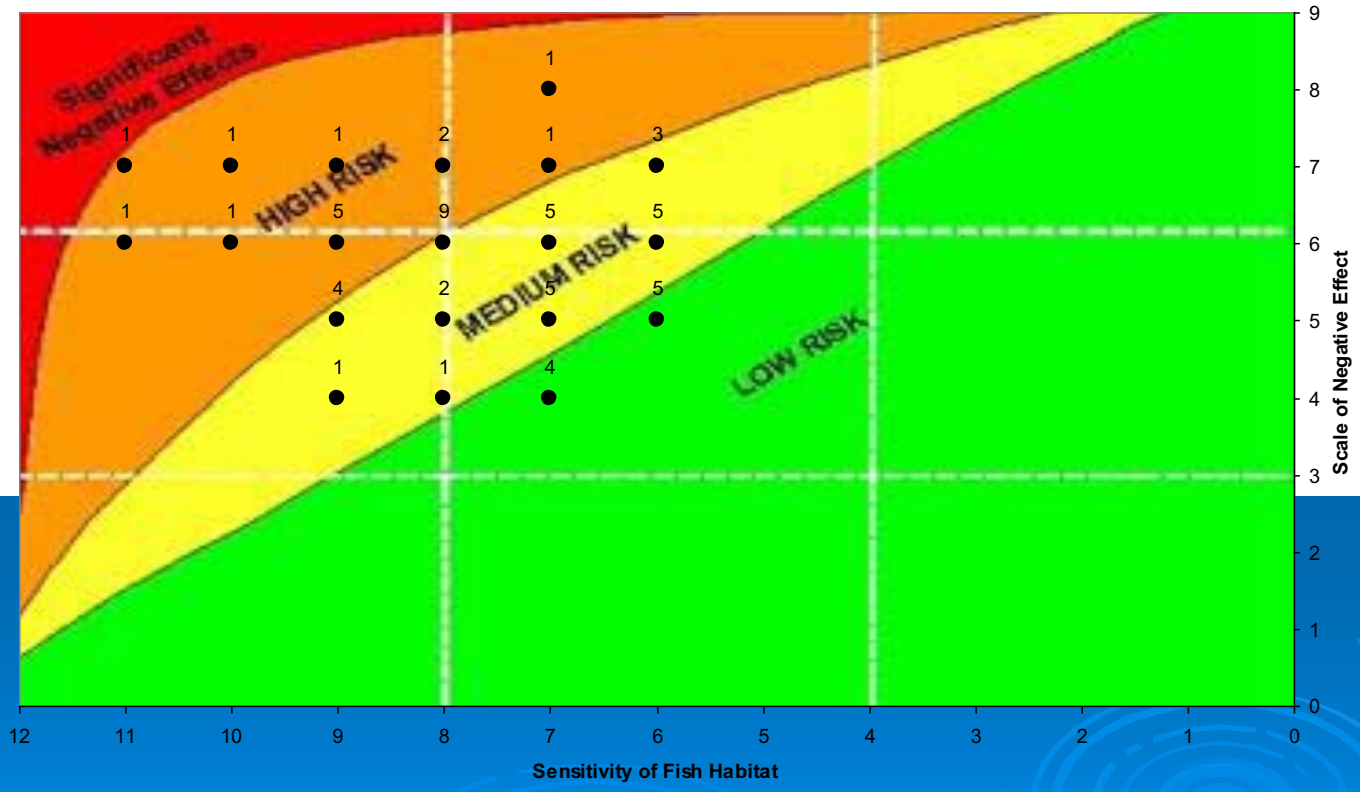
Assessment of impacts (real or potential) on fish and fish habitat

- Scale of Negative Effect
  - Extent*
    - Single Property (1)
    - Multi-property or Strata (2)
    - Shoreline Segment (3)
  - Duration
    - Short (days) (1)
    - Medium (weeks-months) (2)
    - Long (years-permanent) (3)
  - Intensity
    - Habitat still suitable but not as productive (1)
    - Habitat quality significantly reduced (2)
    - Habitat quality unusable (3)

- Sensitivity of Fish Habitat
  - Species Sensitivity (AHI)*
    - Very Low, Low (1)
    - Moderate (2)
    - High, Very High (3)
  - Species Dependence on Habitat
    - No use (1)
    - Migration, feeding, rearing (2)
    - Spawning (3)
  - Rarity
    - Common (1)
    - Limited to small areas (2)
    - Rare (>1 Sensitive Site Type)* (3)
  - Habitat Resiliency
    - Stable and resilient (2)

*modified to utilized FIM for Little Shuswap, Shuswap and Mara Lakes

FIM Top Occurrences
Fish Habitat Risk Matrix - Confirmed Works/Undertakings



Site S22

s.15, s.22

s.13, s.15, s.17, s.22

Site S22

s.15, s.22

s.15, s.16, s.17, s.22

Site S22

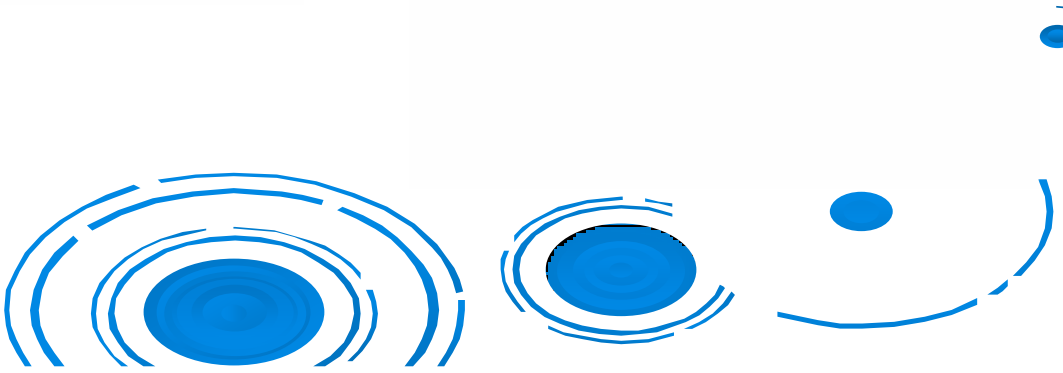
s.16, s.22

s.15, s.16, s.17, s.22

Site S22

s.15, s.22

s.15, s.16, s.17, s.22



Site S22

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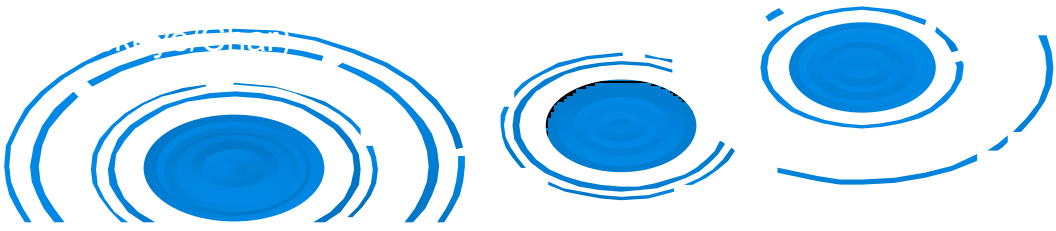
s.15, s.16, s.17, s.22



Site S22

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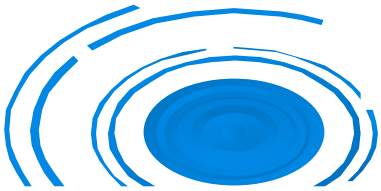
s.15, s.16, s.17, s.22



Site S22

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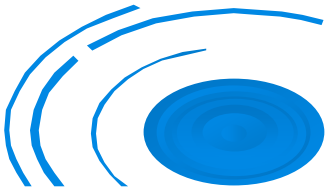
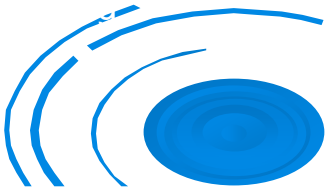
s.15, s.16, s.17, s.22



Site S22

s.15, s.22

s.14, s.16, s.17, s.22



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Site S22

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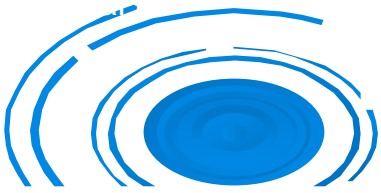
s.15, s.16, s.17, s.22, Not Responsive

s.15, s.22

s.15, s.16, s.17, s.22



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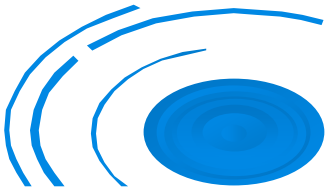


Site S22

s.15, s.22

s.15, s.16, s.17, s.22

Site Activity?

S22

s.15, s.22, s.21

s.15, s.16, s.17, s.22

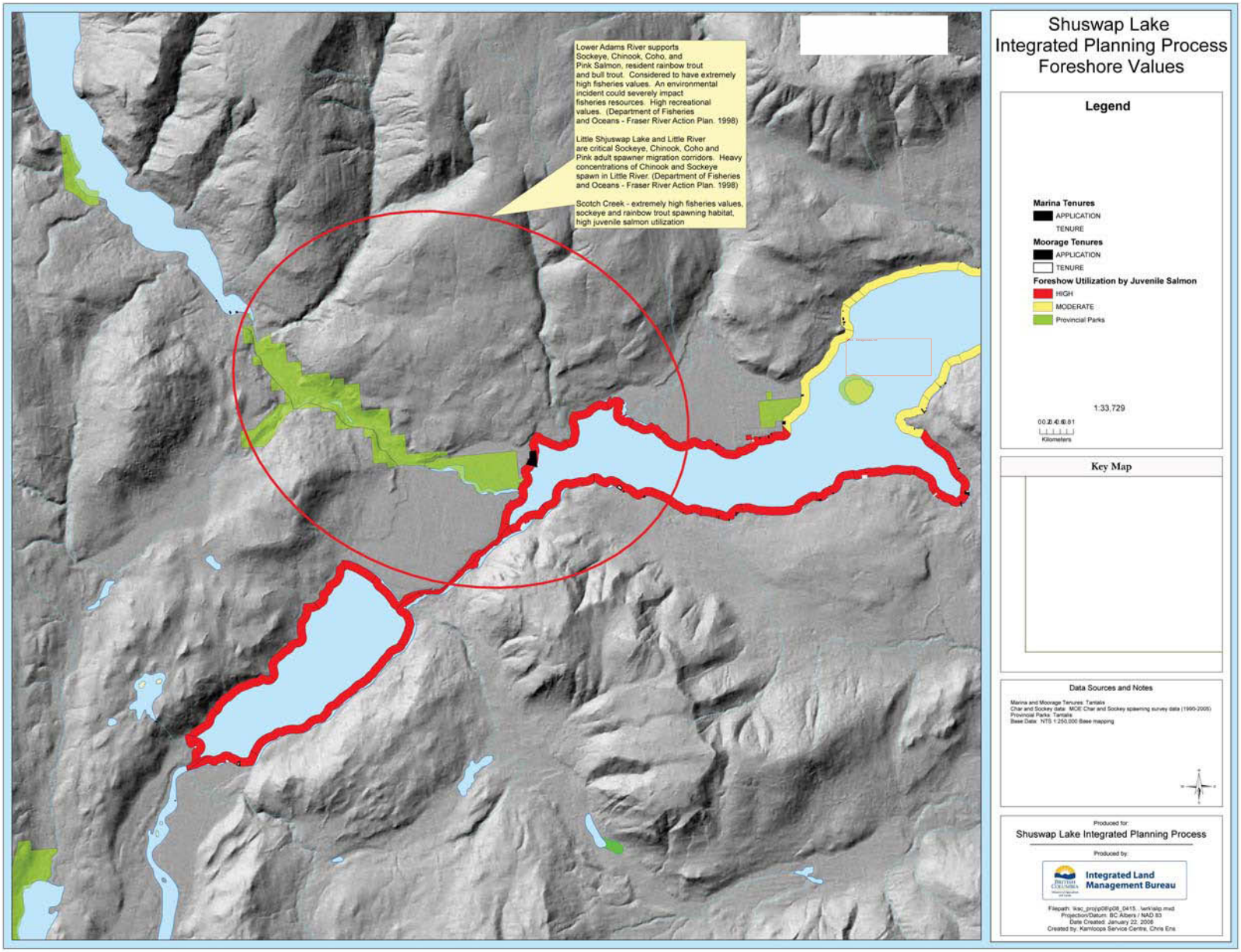
Site Activity?

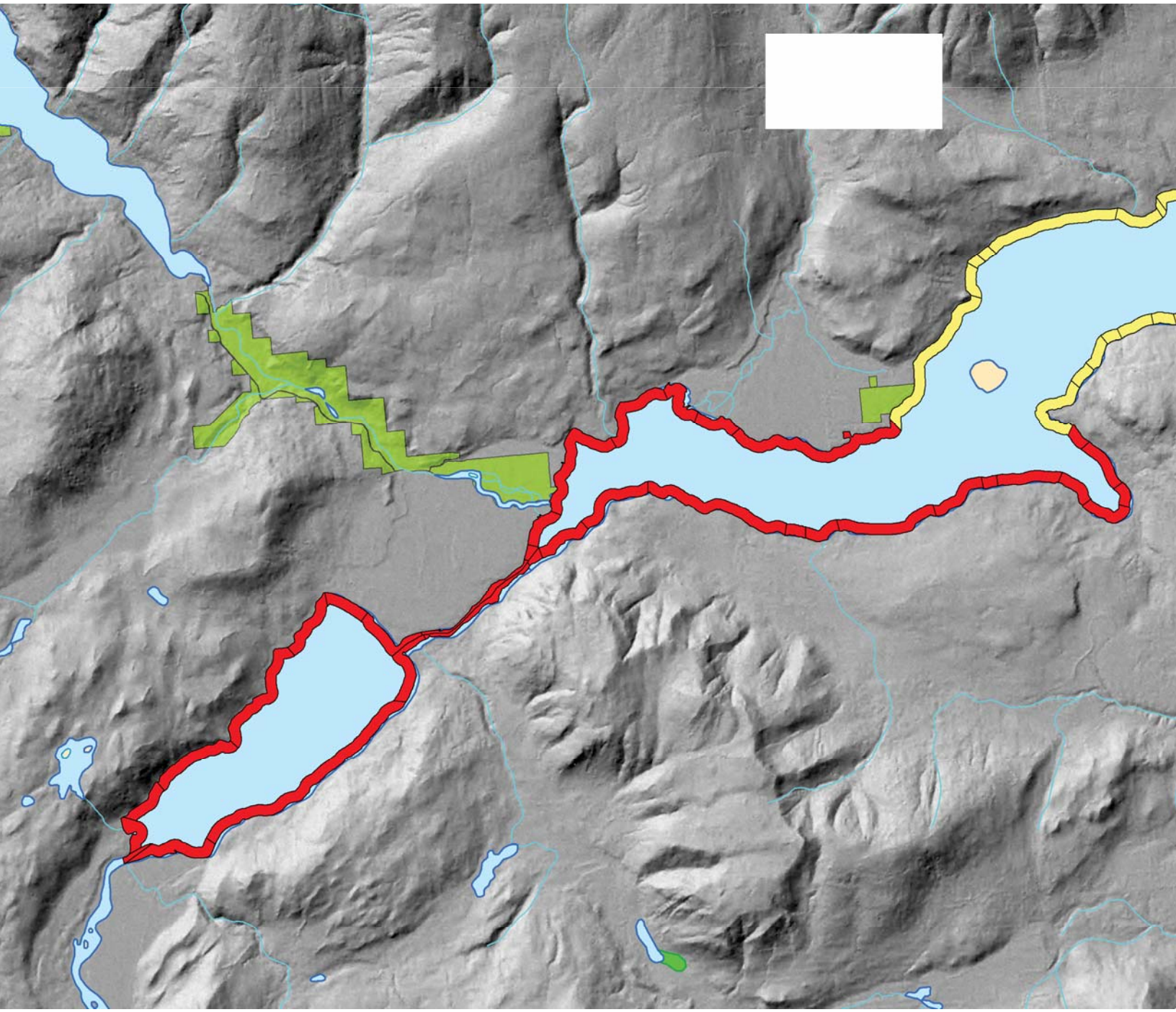
S22

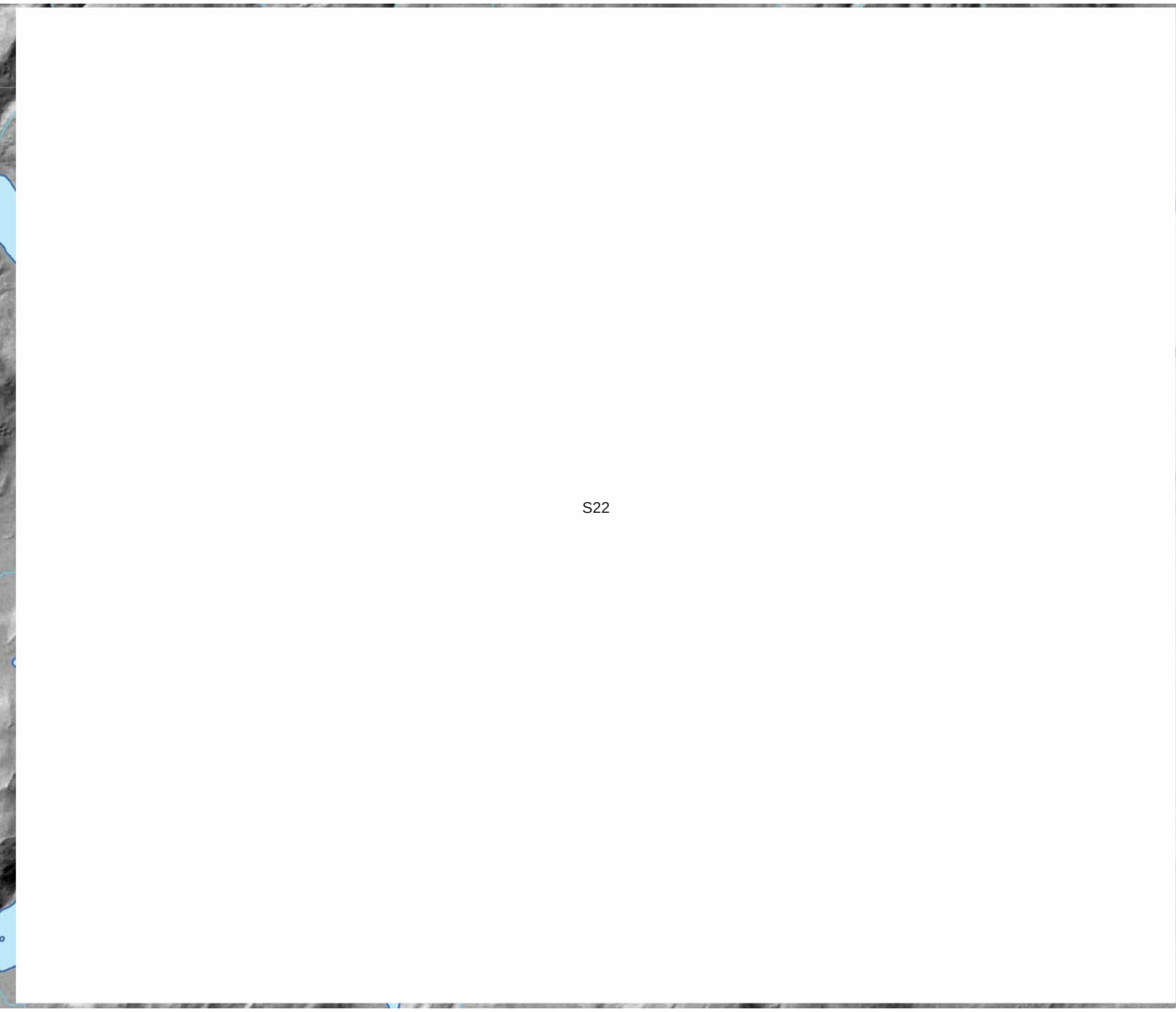
s.15, s.22

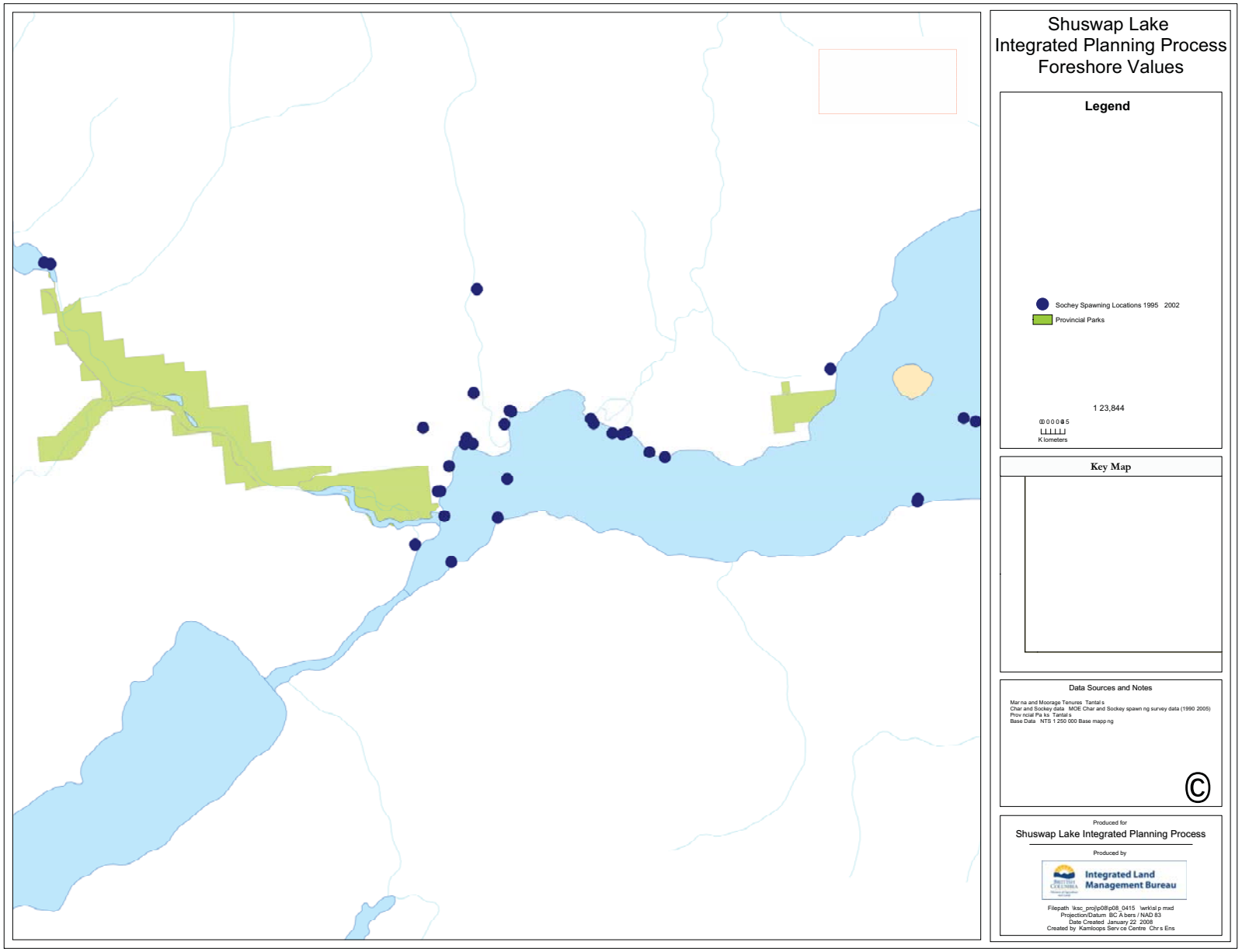
s.15, s.22

s.15, s.16, s.17, s.22, Not Responsive


Lower Adams River supports Sockeye, Chinook, Coho, and Pink Salmon, resident rainbow trout and bull trout. Considered to have extremely high fisheries values. An environmental incident could severely impact fisheries resources. High recreational values. (Department of Fisheries and Oceans - Fraser River Action Plan. 1998)
Little Shjuswap Lake and Little River are critical Sockeye, Chinook, Coho and Pink adult spawner migration corridors. Heavy concentrations of Chinook and Sockeye spawn in Little River. (Department of Fisheries and Oceans - Fraser River Action Plan. 1998)
Scotch Creek - extremely high fisheries values, sockeye and rainbow trout spawning habitat, high juvenile salmon utilization
Shuswap Lake Integrated Planning Process Foreshore Values
Legend
Marina Tenures
APPLICATION
TENURE
Moorage Tenures
APPLICATION
TENURE
Foreshow Utilization by Juvenile Salmon
HIGH
MODERATE
Provincial Parks
1:33,729
Kilometers
Key Map
Data Sources and Notes
Produced for:
Shuswap Lake Integrated Planning Process
Produced by:
Integrated Land Management Bureau




S22


Shuswap Lake
Integrated Planning Process
Foreshore Values
Legend
Sochey Spawning Locations 1995 2002
Provincial Parks
1 23,844
K lometers
Key Map
Data Sources and Notes
Mar na and Moorage Tenures Tantal s
Char and Sockey data MOE Char and Sockey spawn ng survey data (1990 2005)
Prov ncial Pa ks Tantal s
Base Data NTS 1 250 000 Base mapp ng
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Produced for
Shuswap Lake Integrated Planning Process
Produced by
Integrated Land Management Bureau
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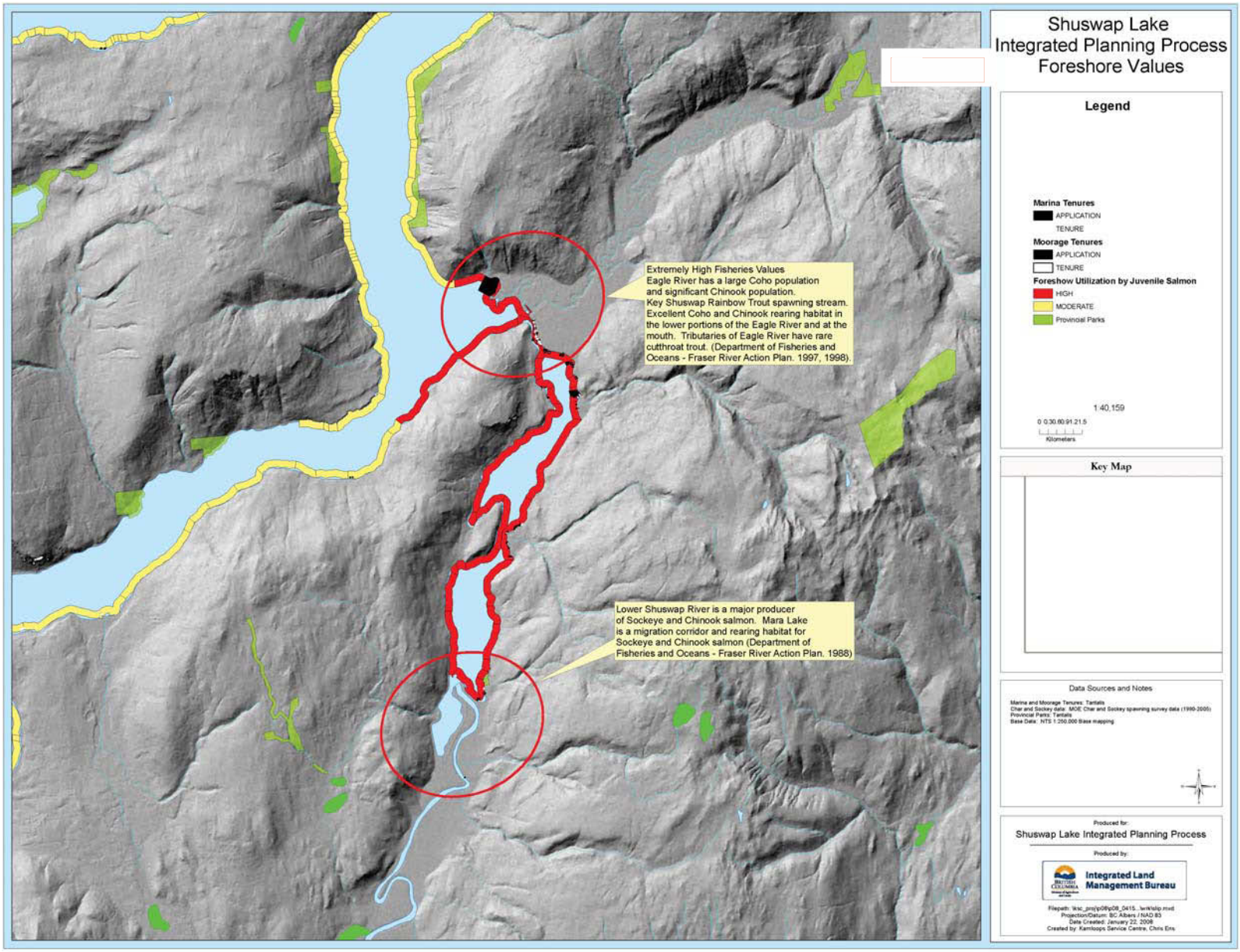
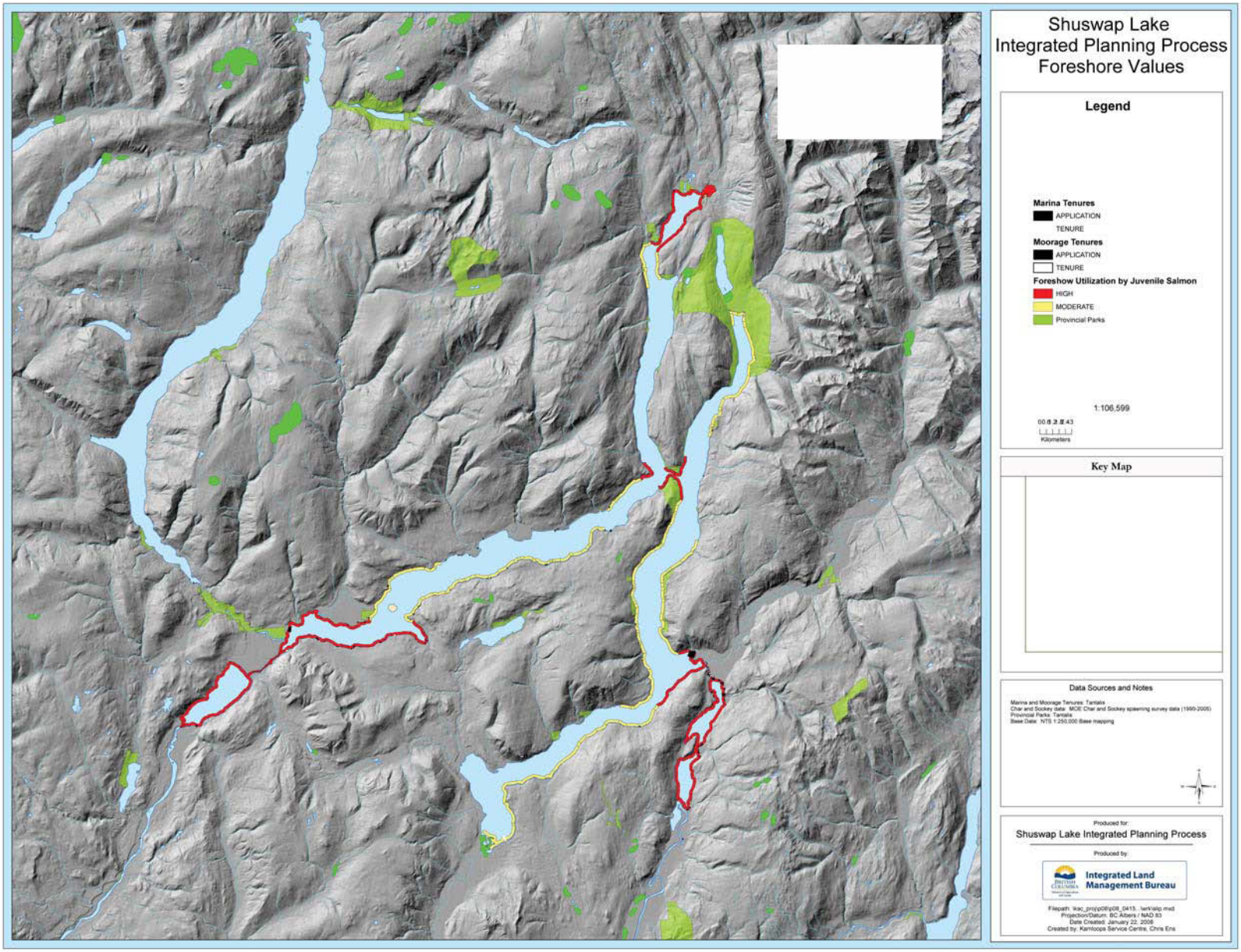
Date Created January 22 2008
Created by Kamloops Serv ce Centre Chr s Ens


Extremely High Fisheries Values
Eagle River has a large Coho population and significant Chinook population.
Key Shuswap Rainbow Trout spawning stream.
Excellent Coho and Chinook rearing habitat in the lower portions of the Eagle River and at the mouth. Tributaries of Eagle River have rare cutthroat trout. (Department of Fisheries and Oceans - Fraser River Action Plan. 1997, 1998).
Lower Shuswap River is a major producer of Sockeye and Chinook salmon. Mara Lake is a migration corridor and rearing habitat for Sockeye and Chinook salmon (Department of Fisheries and Oceans - Fraser River Action Plan. 1988)
Shuswap Lake
Integrated Planning Process
Foreshore Values
Legend
Marina Tenures
APPLICATION
TENURE
Moorage Tenures
APPLICATION
TENURE
Foreshow Utilization by Juvenile Salmon
HIGH
MODERATE
Provincial Parks
1:40,159
0 0.30.60.91.21.5
Kilometers
Key Map
Data Sources and Notes
Produced for:
Shuswap Lake Integrated Planning Process
Produced by:
Integrated Land Management Bureau


Shuswap Lake
Integrated Planning Process
Foreshore Values
Legend
Marina Tenures
APPLICATION
TENURE
Moorage Tenures
APPLICATION
TENURE
Foreshow Utilization by Juvenile Salmon
HIGH
MODERATE
Provincial Parks
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Kilometers
Key Map
Data Sources and Notes
Produced for:
Shuswap Lake Integrated Planning Process
Produced by:
Integrated Land Management Bureau

Shuswap Watershed Mapping Project

Overview of Top Occurrences

Shuswap, Little Shuswap and Mara Lakes

Overview of Top Occurrences

- How many are there and where did they come from?
- What was the plan?
- What actually happened?
- What's happening now?
- What's next?

How many are there and where did they come from?

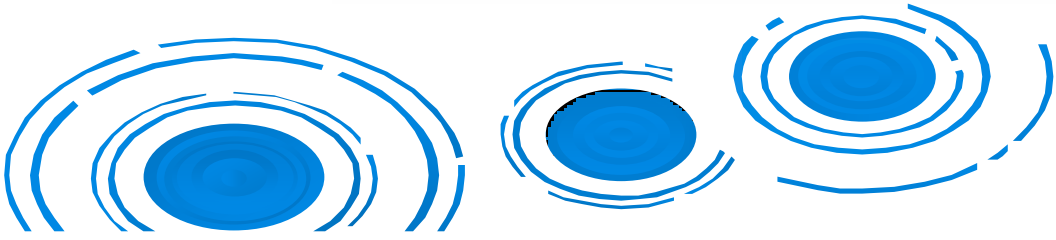
- 55 “sites” identified by FIM field staff based on:
  - Large Size
  - High Impact
  - Recent Timing
  - High Value Fish Habitat
  - Representativeness

s.15, s.16, s.17, s.22

Riparian Clearing

s.15, s.22, s.21

s.15, s.22



Boathouses

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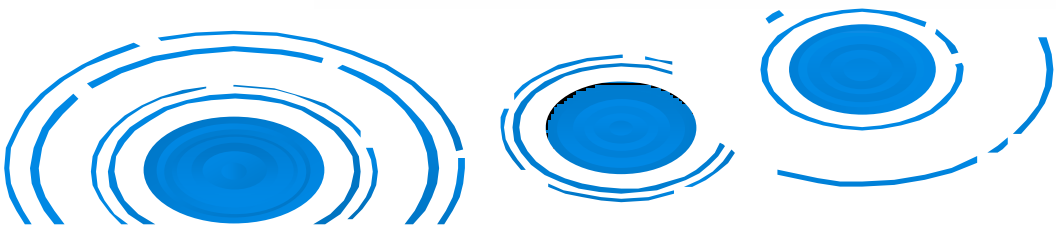

Docks

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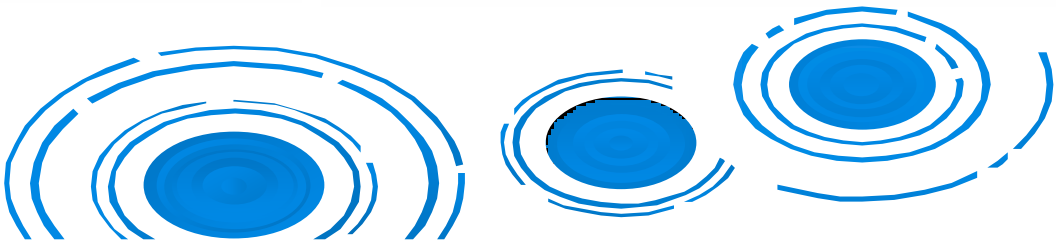
s.15, s.22



Retaining Walls

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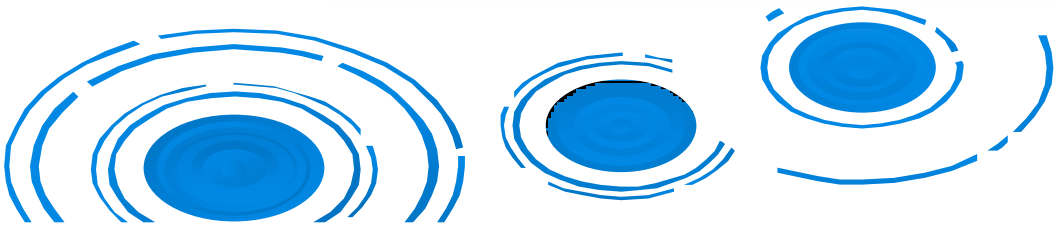

Groynes

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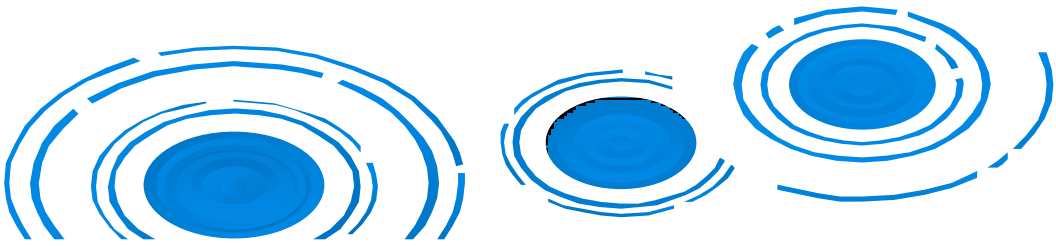
s.22



Boat Launches

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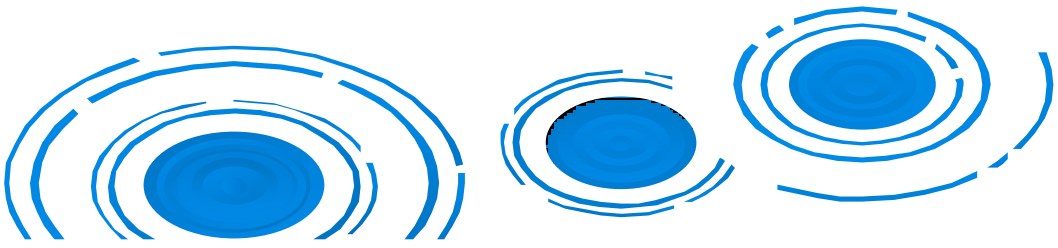
s.15



Lake Infilling

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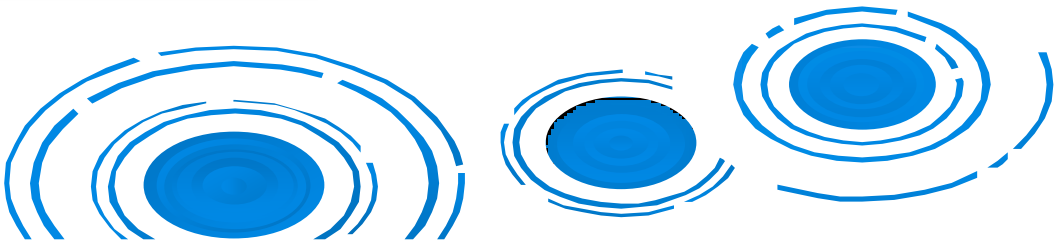
s.15, s.22



Substrate Modification

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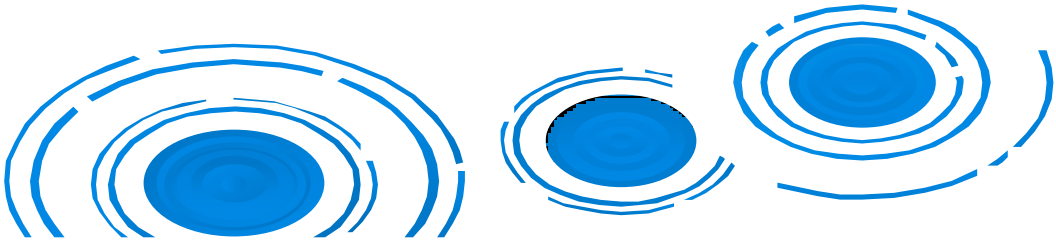
s.15, s.22



Other Works

s.15, s.22

s.15, s.22

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s.15, s.22, s.21

HABITAT CONSERVATION TRUST FOUNDATION

Enhancement Project Application
Funding Cycle 2010-2011

[HCTF to complete] Project File #:_____

PROPONENT INFORMATION

Project Leader & Title: Ian McGregor

Author of Proposal (if different from Project Leader):

Organization Name: Ministry of Environment, Thompson-Nicola Region

Address: 1259 Dalhousie Drive

City: Kamloops Province: British Columbia Postal Code: V2C 5Z5

Email Address: Ian.Mcgregor@gov.bc.ca

Phone: 250-371-6253 Cell: s.17 Fax: 250-828-4000

AMOUNT REQUESTED FROM HCTF FOR FUNDING CYCLE 2010-2011: $ 35,000

Will this be a multi-year project? Y/N **Yes**
(If yes, please complete Budget Section 10.6)

Have you ever received HCTF funding for this project/location/species before? Y/N **No**

If yes, please list the HCTF Project #:

For continuing projects: Year 1 of Year 3 (e.g. 2 of 5 years). *Record only those years that HCTF has provided funding.*

Did this project receive SEED funding from HCTF? Y/N **No**
If yes, please list the HCTF Project #:

PROJECT INFORMATION

Project Name: Shuswap Lake Shoreline Habitat Restoration

Project Location: Shuswap Lake

Project Description: Restore high priority areas of sensitive fisheries habitat on Shuswap Lake to improve spawning habitat for lake char and rearing habitat for juvenile salmonids. This project will repair the damage caused by decades of unregulated residential and commercial foreshore development around the perimeter of Shuswap Lake.

UTM Coordinates: 696350, 5508546

Project Type: Habitat Improvement/Restoration

Species to be enhanced**:** F-ONMY; F-SANA; F-ONNEK; F-ONNE

DETAILED PROJECT PROPOSAL OUTLINE

1. EXECUTIVE SUMMARY (~500 words or less)

Shuswap Lake is the nursery lake for the world famous Adams River sockeye salmon, and supports a regionally and provincially important recreational fishery for rainbow trout, kokanee and lake char. A special angling license fee is charged for Shuswap Lake rainbow trout and lake char, reflecting the high ecological and economic importance of recreational angling in Shuswap Lake. The current unprecedented pace and scale of largely unregulated near-shore residential, commercial and industrial development has damaged extensive sections of near-shore seasonally inundated areas of Shuswap Lake. Shuswap Lake fluctuates approx. 2.5 annually, and numerous area residents and businesses have negatively altered the foreshore area during winter low water periods by removing native vegetation, drainage patterns and habitat structure, and replaced these with sand beaches, concrete retaining walls, boat launches, shoreline infills, rock groins, moorage docks and general landscaping.

In response to this problem, and additional concerns about declining water quality, inadequate septic disposal, unregulated property development and the unprecedented expansion of the houseboat industry, Region 3 MoE lead the formation of the Shuswap Lake Integrated Planning Process (SLIPP) in 2007 to identify cross-cutting issues that were better addressed through collaboration and focused on working with and improving existing public agency coordinating mechanisms and working practices to make them more effective. The motivation for SLIPP was to simplify a complicated regulatory environment, where fourteen public agencies from every level of government had legal jurisdiction over some aspect of the lake. The SLIPP process has been exceptionally well received by MoE, DFO, the two key regional districts (CSRD and TNRD), and area residents.

A series of SLIPP public workshops and information sessions in 2007 and 2008 identified three high priority areas of concern; one of which was to develop a Site Sensitivity Map for the foreshore and upland areas of Shuswap Lake that classified each area into high, medium or low sensitivity status levels. All relevant scientific research, monitoring data and mapping information was utilized to create the maps via the DFO led Shuswap Lake Watershed and Foreshore Mapping Project. The Foreshore Habitat Information mapping (FHIM) started in 2007 with 100K funding from Fraser Salmon and Watersheds Program, the Real Estate Foundation, and DFO, while MoE provided in-kind support. FHIM obtained 30 cm ortho photography of the entire lake, 20 cm ortho tributary photography, digital GPS stamped photographs of the lake, 270 biophysical mappings of sensitive lake habitat, and is completed. FHIM identified thousands of harmful alterations within known sensitive habitat zones that represent significant non-compliance with Best Management Practices and Riparian Area Regulations. Land ownership of affected areas includes private land, commercial land, Indian Reserves, and extensive unauthorized use and trespass of Crown foreshore.

It is now possible to prioritize sensitive areas, and initiate habitat restoration of degraded near-shore fisheries habitat using the state-of-the-art FHIM digital reference mapping file. This will be a three year HCTF project: 35K in year 1 for planning, 65K pilot implementation in Year 2, and 95K in Year 3 for full restoration works and project evaluation.

2. ISSUE (~250 words or less)

The Shuswap Lake Foreshore Habitat Information Mapping (FHIM) project identified thousands of harmful alterations within known fisheries sensitive habitat zones that represent significant non-compliance with Best Management Practices and Riparian Area Regulations. This includes 1,500 retaining walls with greater than 50% of these built below the maximum annual high water mark (i.e. Crown Foreshore); > 2,700 boat docks, many of which were abandoned, numerous boat launches, erosion of emergent vegetation, extensive removal of riparian vegetation for infill for property development, and considerable upland drainage modifications to natural stream courses.

Now that the entire lake has been digitally photographed and ortho referenced at 20 and 30 cm scales, and SLIPP has been endorsed by all levels of government (Federal, Provincial and Regional District), it is possible to initiate restoration of degraded foreshore areas of Shuswap Lake that were identified as being within fisheries sensitive zones. The FHIM maps contain multiple layers of geospatial information including First Nations' archeological and cultural areas of interest, fish spawning and habitat grounds, navigational considerations, historical flood information, public recreational areas and uses, and infrastructure such as water intakes, discharge facilities and jurisdictional boundaries. To increase the ease of access, analysis and restoration works, the various layers are available in separate maps (i.e. recreation activity map, foreshore development map etc.).

This represents an unprecedented opportunity to restore sensitive fisheries habitat in Shuswap Lake using state-of-the-art geo-referenced imagery to document and monitor the success of the restoration efforts and track the performance of restoration works through time.

3. PROJECT OBJECTIVES

The project objective is to (1) priorize the sensitive fisheries habitat identified from the Shuswap Lake Foreshore Habitat Information Mapping (FHIM) project; (2) develop a restoration plan, and (3) implement the restoration works over a 2 year construction program (I year pilot scale and 1 year full scale).

Year 1 is the planning phase of this project, which will involve developing and priorizing potential projects identified from FHIM and obtaining necessary Federal (DFO and Transport Canada), Provincial (MoE and ILMB) and Columbia-Shuswap Regional District construction permits, and preparing construction-ready drawings;

Year 2 is the pilot habitat restoration phase of this project, in which innovative and cost effective restoration techniques will be developed and implemented, including trial use of dedicated barge-mounted mobile restoration units to minimize shoreline access impacts from heavy machinery;

Year 3 is an acceleration of priority habitat restoration plus evaluation of habitat restoration projects completed in Year 2 to facilitate adaptive learning of innovative and cost-effective foreshore habitat restoration techniques.

The overall objective is to restore high priority sensitive fish habitat in the Shuswap Lake foreshore, riparian and near upland areas that have been degraded by deleterious past land use activities, and widely publicize the project to prevent future habitat degradation and illustrate HCTF's leadership role in habitat restoration. s.13, s.16, s.17

s.13, s.16, s.17

4. ACTIVITIES/METHODOLOGY

The activities and methodology are straightforward. The Shuswap Lake Foreshore Habitat Information Mapping (FHIM) project has already developed a Site Sensitivity Map for the foreshore and upland areas of Shuswap Lake that classified each area into high, medium or low sensitivity status levels using 30 cm ortho photography of the entire lake, 20 cm ortho tributary photography and digital GPS stamped photographs of the lake.

The next step is to form a small expert technical team with Kamloops region DFO and MoE staff and develop a priorized list of sites to be restored within the high sensitivity status classification using the state-of-the-art image data base. Once the site list is priorized, tenders will be issued for contractors with adequate restoration experience to bid on prepare engineered blueprint drawings of individual or multiple site projects.

The blueprints and project site descriptions will then be forwarded to the appropriate regulatory agencies (e.g., Transport Canada, DFO, CSRD, MoE) using the new Front Counter BC-SLIPP project approval window. Upon approval of the plans, tenders will be issued for restoration works, starting in April 2011, subject to obtaining Year 2 project funding from HCTF and partners.

The project timeline in Year 1 will be as follows:

a. Develop priorized list of fisheries sensitive habitat restoration projects;
b. Prepare engineered blueprint drawing of each restoration site project;
c. Obtain necessary, Federal, Provincial and Regional District time sensitive fish window construction permits;
d. Identify suitable contractors, equipment operators and bioengineers for pilot year restoration work.

Project Objective	Activities/Methods	Timeline
Develop priorized list of projects	Review FHIM data base	June 15, 2010
Prepare engineering drawings	Engineering CAD technician	Sept 15, 2010
Obtain necessary permits	Apply for appropriate permits with regulatory agencies	Feb 15, 2011
Identify contractors with barge and land based equipment	Local advertising and liaison with Regional District engineering staff	March 20, 2011

5. BENEFITS/RISK

- There is minimal identifiable risk from this project;
- All access and construction work window permits will be approved in advance;
- There are minimal liability concerns as all project drawings will be by BC Registered Professional Engineers and Geoscientists, and project site-supervision will include on-site engineering staff;
- Project benefits will include restoration of foreshore and riparian habitat, reduced siltation of near-shore salmonid spawning and rearing areas, reduced egg and incubation mortality of salmonids, and increased abundance of juvenile salmonids;

- Project benefits will also include heightened public and agency awareness of the requirement to preserve and protect sensitive fisheries habitat in foreshore, riparian and upland areas of Shuswap Lake.

6. EVALUATION/MEASURES OF SUCCESS

Year 1 of the restoration of sensitive fisheries habitat project will be evaluated upon achieving 4 key steps within the requested budget:
(1) developing a priorized list of fisheries sensitive habitat restoration projects;
(2) preparing engineered blueprint drawing of each restoration site project;
(3) obtaining necessary, Federal, Provincial and Regional District time sensitive fish window construction permits and;
(4) identifying suitable contractors, equipment operators and bioengineers for pilot year restoration work.

Successful completion of this phase of the project will lead to the Year 2 request to HCTF in 2011-12, subject to obtaining additional in-kind support from DFO, CSRD and Region 3 MoE fisheries staff, to initiate the pilot restoration works program in Shuswap Lake in 2011-12.

The final measure of success after the completion of the three year project is restoration of 100% of the high priority fisheries sensitive areas in Shuswap Lake that were identified as being damaged or degraded via the FHIM digital imaging project.

Project benefits will include restoration of foreshore and riparian habitat, reduced siltation of near-shore salmonid spawning and rearing areas, reduced egg and incubation mortality of salmonids, and increased abundance of juvenile salmonids, and increased public and agency awareness of the requirement to protect foreshore, riparian and near-upland habitat.

We do not expect any problems with this project given the habitat restoration expertise available in BC and the straightforward nature of this project.

7. COMMUNICATION/OUTREACH

SLIPP will print an information brochure and circulate it to the general public, contractors and developers through CSRD, DFO and Front Counter BC which will explain the HCTF foreshore fish habitat restoration project, and caution developers and the public on the risk of conducting harmful alternation and/or destruction of fish habitat in foreshore, riparian and near upland areas of Shuswap Lake. HCTF funding support will be acknowledged on this brochure.

SLIPP will develop a web-site and conduct a series of annual public meetings in the Shuswap Lake area in 2010-2011 as part of the annual SLIPP implementation reporting progress. SLIPP will also create and maintain a web-site which will be linked to MoE, DFO, TNRD and CSRD websites.

SLIPP, MoE, DFO and CSRD will acknowledge HCTF support in all meetings, presentations and communications it provides on the shoreline fisheries habitat restoration project.

LITERATURE CITED

8.

Shuswap Lake Integrated Planning process: Strategic Plan for Shuswap and Mara lakes. 2009. Deloitte. 35 p.

Shuswap Lake Watershed Mapping Project: Foreshore Inventory and Mapping, Shuswap and Mara Lakes. 2009. Ecoscape Environmental Consultants Ltd. 51 p.

9. MAP

Map of Shuswap Lake. Various fisheries sensitive zones around the perimeter of Shuswap Lake will be the project site, and are concentrated in the Main Arm, Salmon Arm and Sicamous Arm.

HABITAT CONSERVATION TRUST FOUNDATION

Enhancement Project Application
Funding Cycle 2011-2012

[HCTF to complete] Project File #:_____

PROPONENT INFORMATION

Project Leader & Title: Andy Morris

Author of Proposal (if different from Project Leader):

Organization Name: Ministry of Environment, Thompson-Nicola Region

Address: 1259 Dalhousie Drive

City: Kamloops Province: British Columbia Postal Code: V2C 5Z5

Email Address: Andy.Morris@gov.bc.ca

Phone: 250-371-6253 Cell: s.17 Fax: 250-828-4000

AMOUNT REQUESTED FROM HCTF FOR FUNDING CYCLE 2011-2012:
$ 65,000
Will this be a multi-year project? Y/N **Yes**
(If yes, please complete Budget Section 10.6)

Have you ever received HCTF funding for this project/location/species before? Y/N **Yes**

If yes, please list the HCTF Project #: 3-296

For continuing projects: Year 2 of Year 3 (e.g. 2 of 5 years). *Record only those years that HCTF has provided funding.*

Did this project receive SEED funding from HCTF? Y/N **No**
If yes, please list the HCTF Project #:

PROJECT INFORMATION

Project Name*:* Shuswap Lake Shoreline Habitat Restoration

Project Location: Shuswap Lake

Project Description: Restore high priority areas of sensitive fisheries habitat on Shuswap Lake to improve spawning habitat for lake char and rearing habitat for juvenile salmonids. This project will repair the damage caused by decades of unregulated residential and commercial foreshore development around the perimeter of Shuswap Lake.

UTM Coordinates: 696350, 5508546

Project Type: Habitat Improvement/Restoration

Foreshore Restoration Project Planning

Priority 2011 Foreshore Restoration Projects

- A preliminary list of priority foreshore restoration projects was endorsed for further analysis and review
- Projects were selected based on the following criteria:
    - Location in/impact on high-value Char spawning areas
    - Trespassing on crown land; will not involve work on private property
    - Low restoration costs
- Additional 2011 projects will be added to the list based on high-value Sockeye spawning areas (analysis in process)
- The restoration projects deal primarily with the removal of concrete boat launches and abandoned docks
- All restoration projects will involve safe and lasting solutions approved by engineers and relevant regulatory agencies

Process for Conducting Foreshore Restoration

The process will be project managed and implemented through SLIPP but will require the technical and enforcement input/support from regulatory agencies. Whenever possible, SLIPP resources will be used to minimize the capacity demands on agency staff.

- Finalize list of restoration projects (Ken Ashley)
- Identify agency partner for each project
    - DFO Fish Act Brian Levitt, Bob Harding, Bruce Runciman
    - IHA Courtney Hesketh
    - Lands Act Clint Zimmermann, Todd Smith, Keith Weir
    - Water- Duane Wells
    - TC Navigable Waters Roberta Dight
- Initiate informal/friendly contact (phone call or site visit) with each landowner (C&E staff)
    - Introduce project, discuss approach and solicit support for restoration actions
- Follow-up on initial conversation with letter (from regulatory agency)

s.13, s.15, s.16, s.17

Shuswap and Mara Lake Shorelines: 2011 SLIPP Habitat Restoration Plan

BC Conservation Foundation
200A - 1383 McGill Road
Kamloops BC
V2C 6K7

FINAL REPORT
July 25, 2011

nhc
northwest hydraulic consultants

EXECUTIVE SUMMARY

Shuswap Lake and Mara Lake are the focal point of the economic, social and environmental sustainability of the Shuswap watershed. However, in recent years the rate and magnitude of largely unregulated near-shore residential, commercial and industrial development, and upland activities in the Shuswap drainage has raised concerns among the public and threatened the long term environmental sustainability and recreational attractiveness of Shuswap Lake and Mara Lake. The Shuswap Lake Integrated Planning Process (SLIPP) was initiated in the spring of 2007 to address these concerns in the Shuswap watershed.

One of the first SLIPP actions was the creation of comprehensive foreshore and upland area site sensitivity map of the Shuswap watershed. This project, the Shuswap Watershed Mapping Project, was completed in 2009 for Shuswap Lake, Mara Lake, Little Shuswap Lake and Little River. This task utilized the Foreshore Inventory and Mapping (FIM) protocol to collect baseline information on the current condition of the shoreline, and used the FIM data to generate an Aquatic Habitat Index (AHI) to determine the relative aquatic habitat values of the shoreline.

Restoration of foreshore fisheries habitat is an integral component of SLIPP's coordinated Education, Compliance and Enforcement strategy and is designed to restore functional foreshore habitat for fish and wildlife, deter future foreshore violations, promote compliance and complement the SLIPP Education and Stakeholder Engagement Program. An initial sixteen (16) shoreline sites around Shuswap Lake and Mara Lake were selected for habitat restoration in 2011. Six sites are in the Main Arm (one site was deferred pending CSRD analysis of a community water intake structure), three sites are in Salmon Arm, three sites are in Anstey Arm, two sites are in Sicamous Arm, and one site is in Seymour Arm and Mara Lake respectively.

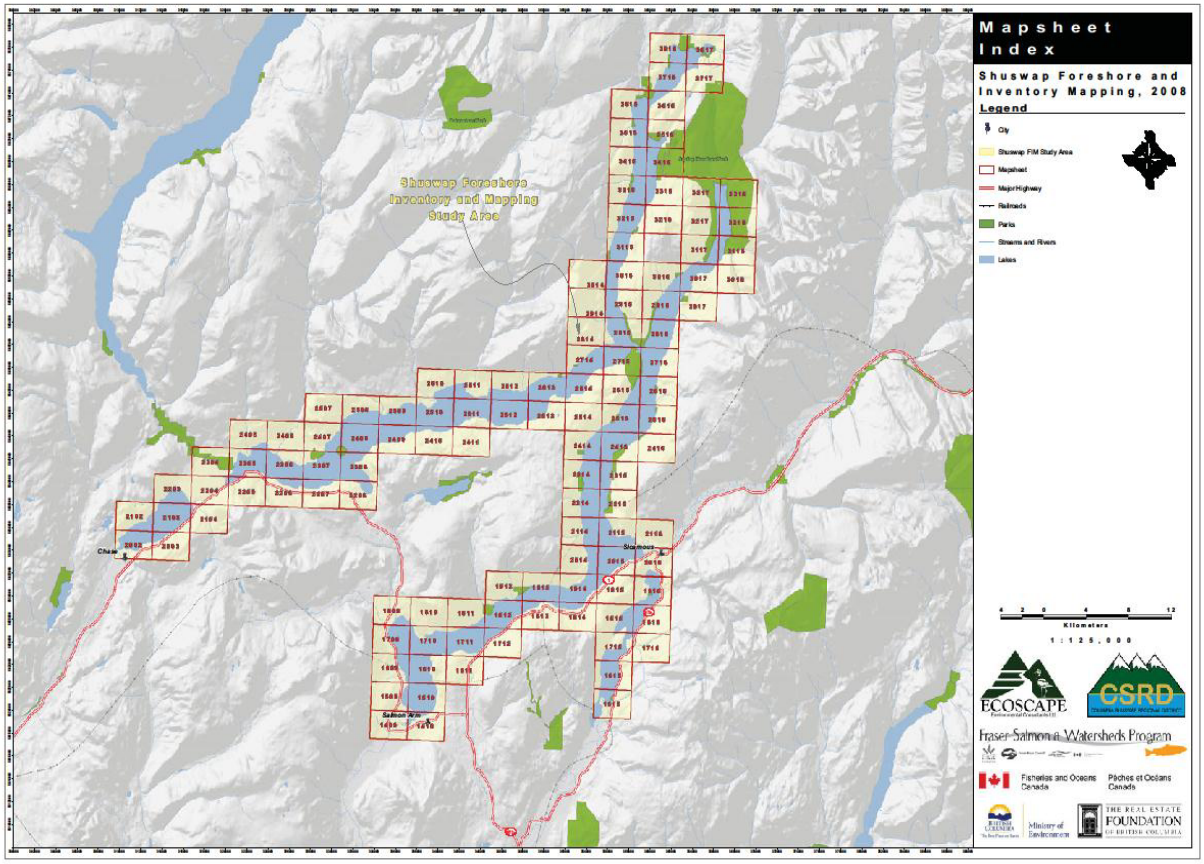
Each site was situated on Crown land, was a case of Crown trespass, was below the Mean Annual High Water Mark (MAHWM), had previously been identified as known or potential high value fish habitat, and was usually accessible by public road. No shoreline restoration sites above the MAHWM or on private property were selected. If a private structure was located below the MAHWM (i.e., Crown Land), through which removal could potentially cause failure of adjoining structures above the MAHWM or erosion onto private property, the site was deferred for future consideration.

The estimated total cost to restore all 15 of the initial 2011 shoreline sites (except deferred Sit S22 is $51,000. These Class D engineering cost estimates assume that Ministry of Forestry, Land and Natural Resource Operations will provide a vessel with crew member to conduct pre- and post-construction site inspections of the shoreline restoration sites on Shuswap and Mara lakes.

The Okanagan-Shuswap Forest District fisheries work window for Shuswap Lake is July 22 to April 1 for areas with no sockeye or char spawning, July 22 to Sept 15 for areas with sockeye and char spawning, and July 22 to September 30 for areas with no sockeye, but char spawning. Since 2011 is a sub-dominant Adams River sockeye year, the July 22 to Sept 30 work window work window will apply in char spawning areas, and July 22 to April 1 in non-char spawning areas. Therefore, legal Trespass and Seizure notices to various property owners for Crown trespass should be issued as soon as possible, and priority should be given to sites with known char spawning sites as the char work window closes on Sept 30.

One of the most frequently raised concerns throughout the SLIPP consultation process was the rate and scale of lakeshore and riparian habitat alteration that was occurring around the perimeter of Shuswap and Mara lakes. As a result, addressing foreshore development and foreshore habitat alteration emerged one of the three core SLIPP goals, the other two being water quality and waste management, and recreation management (Figure 1). One of the first SLIPP strategies within the foreshore development goals was the creation of comprehensive foreshore and upland area site sensitivity map for Shuswap and Mara lakes (Figure 2**).** This project, the Shuswap Watershed Mapping Project was completed in 2009 for Shuswap Lake, Mara Lake, Little Shuswap Lake and Little River (Schleppe, 2009). This task utilized the Foreshore Inventory and Mapping (FIM) protocol to collect baseline information on the current condition of the shoreline, which used the FIM data to generate an Aquatic Habitat Index (AHI) to determine the relative aquatic habitat values of the shoreline (Schleppe, 2009). The FIM and AHI were then used to develop Shoreline Management Guidelines and provide information to regulatory agencies, stakeholders and proponents to guide shoreline development that could potentially alter fish and wildlife habitat (Ecoscape, 2011).

Figure 2. Shuswap Watershed Mapping Project areas.

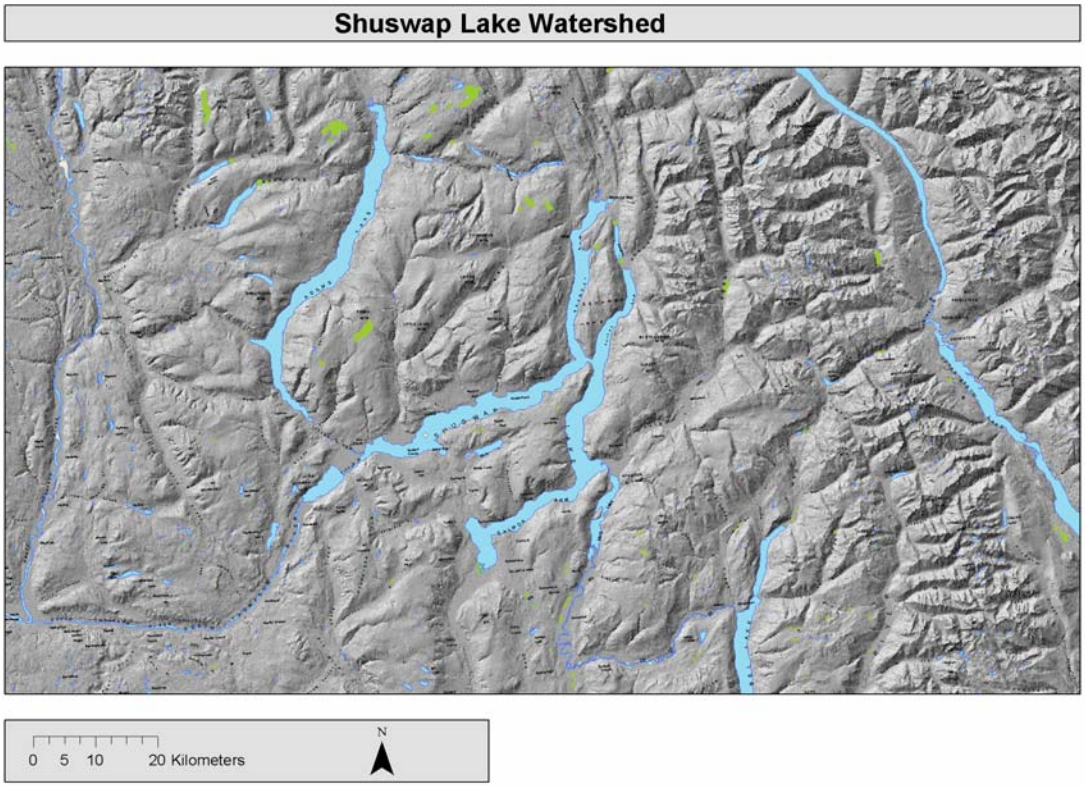


Strategic restoration of selected foreshore fisheries habitat violations was also adopted as a key element of SLIPP's coordinated Education, Compliance and Enforcement strategy. Restoration of selected foreshore habitat violations will restore functional foreshore habitat for fish and wildlife, deter future foreshore violations and promote compliance and complement the SLIPP Education and Stakeholder Engagement Program to be launched in 2011.

1.2 GENERAL CHARACTERISTICS

Shuswap Lake is a large (310 km^2) valley bottom lake located in the south eastern portion of the Fraser River drainage basin at an elevation of 347 masl. The lake has a complex shape; with four roughly 'H' shaped arms, several bays and a constrictive narrows (i.e., Cinnemosun Narrows) between Seymour Arm and Anstey Arm (Figure 3). The surrounding watershed is quite large, covering 15,354 km^2, and consists of middle elevation plateaus, several highlands (i.e., Columbia Highland) and the Monashee mountain range to the East and North. Shuswap Lake is the nursery lake for the famous Adams River sockeye salmon and associated rainbow trout and lake char fishery.

Figure 3. Shuswap and Mara lakes and surrounding watershed topography.



There are 18 major and numerous minor tributaries in the Shuswap Lake drainage basin, which is one of the few large lakes in BC without a dam or flow control structure on the main lake. The average volume Shuswap Lake is 19.13 x 10^9 m^3 (Stockner, 1994), resulting in natural water level fluctuations of 3-4 m each year.

As a result of these high runoff volumes, the residence time of water in Shuswap Lake is relatively low, with an average whole lake residence time of ~ 2 years. The land use in the Shuswap Lake watershed is dominated by forest, followed by pasture land, herbaceous vegetation and crop fields (Stockner, 1994). Most deep water quality monitoring stations in Shuswap Lake remain oligotrophic, with the exception of Salmon Arm/Tappen Bay, which has been mesotrophic/eutrophic since at least the 1970s (NHC, 2010).

2 SITES SELECTION CRITERIA AND LEGAL DEFINITIONS

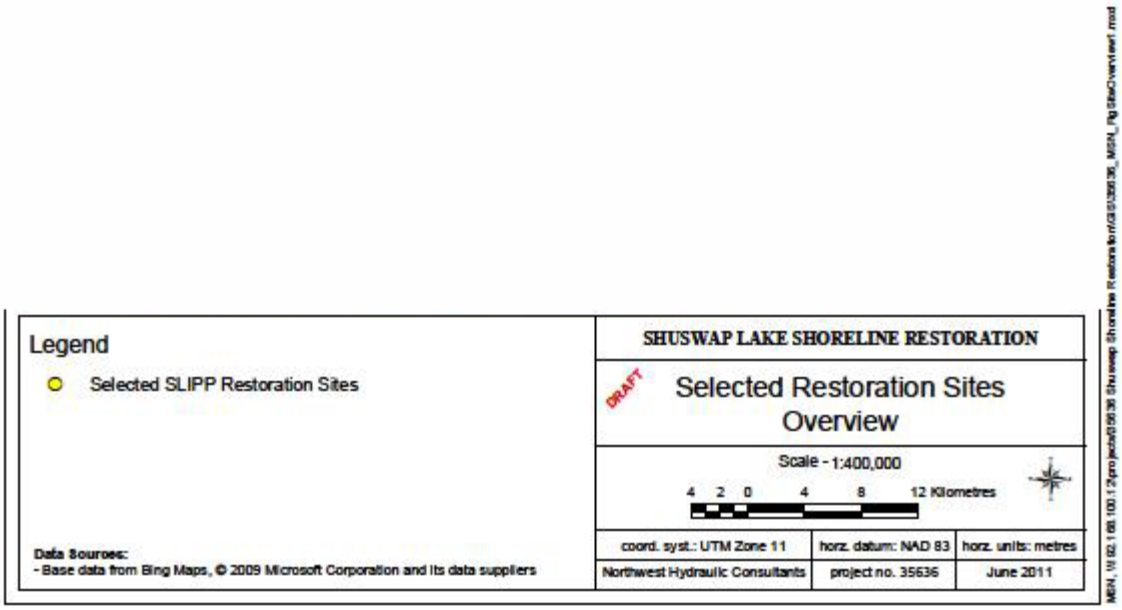
Preliminary shoreline restoration sites were identified in the Shuswap Lakes Foreshore Habitat Inventory Mapping project (Figure 4; Schleppe, 2009). More recently, the FIM and AHI databases were queried by Federal and Provincial agency staff to overlay a variety of selected criteria and develop a list of the most significant active or very recently completed non-compliant works in and about the Shuswap Lakes system that were observed during the October 2008 field portion of the FIM project. Fifty-five (55) sites from a master DFO list were reviewed, and sixteen (16) sites, based on selected criteria, were identified for strategic shoreline habitat restoration in 2011 (Figure 5 and Table 1). Five main criteria (discussed below) were used for site selection, including professional judgment.

Figure 4. Preliminary Shoreline Restoration site overview map for Shuswap Lakes.

S15, 22

Figure 5. Priority Shuswap Lake and Mara Lake Shoreline Restoration sites for 2011.

S15, S22



2.1 FISHERIES VALUES

Fisheries values were assigned using the Aquatic Habitat Index (AHI) that was generated from the Foreshore Inventory and Mapping (FIM) project (Schleppe, 2009). The FIM includes information on spatial extent of aquatic vegetation, substrate mapping, stream confluences, seepage area and other features of interest near the shoreline. Several fisheries fields were then added to the FIM data dictionary including sockeye shore spawning areas, char shore spawning areas, juvenile shoreline rearing areas, juvenile fish migration routes and adult staging areas (Schleppe, 2009). The AHI was then used to assess the habitat value or environmental sensitivity of a shoreline using a points based mathematical model to assign the relative habitat value to each different parameter. Additional details on the AHI methodology are described in the Shuswap Watershed Mapping Project report (Schleppe, 2009).

A boat tour of the Shuswap Lake shoreline was conducted on April 20, 2011 to inspect several of the shoreline restoration sites and to specifically assess the width and condition of the near shore lake char spawning habitat. The lake level was ~ 345.5 m at this time, and it was noted that most of the known high value char spawning sites along the south shore of the Main Arm of Shuswap Lake were located in a narrow (~ 4 m) littoral band of cobble, that rapidly transitioned from a narrow littoral shelf into a ~45 degree mud-sediment sloping substrate. It was obvious that the limited area of char habitat is particularly susceptible to infilling with fines due to beach sand placement, erosion from near shore and upland activities, and mechanical compacting from dock stranding at low lake levels.

For this report, shoreline sites identified as either known high value fish habitat, or potential high value fish habitat were selected for shoreline habitat restoration.

2.2 CROWN LAND

Aquatic Crown Land is defined as the land below the visible high water mark of a body of water, extending offshore to the recognized limit of provincial jurisdiction. In British Columbia, the Provincial Crown (with a few exceptions related to historical Crown granted water lots) owns most of the foreshore (i.e., the area between the low water level and the visible high water natural boundary). Shoreline property owners in BC under what is known as “common law” enjoy certain “riparian rights” as a function of their upland property ownership. These include:

1. “The right to unimpeded access to and from any point along the natural boundary of their property to deep water for the purpose of navigation. This also means that if someone constructs an improvement along their waterfront, it cannot interfere with the right of access of neighbouring properties;

2. The right to protect their property from erosion or flooding by installing protective structures on their own land. Extending structures below the current natural boundary requires the approval of the province;

2.5 CADASTRAL MAPPING

Cadastral maps from the Columbia Shuswap Regional District and Ecoscape were used to identify the property boundaries and ownership of land parcels and specific sites that were selected for shoreline restoration. Some cadastral maps provided additional details, such as survey district names, unique identifying numbers for parcels, certificate of title numbers, positions of existing structures, section or lot numbers and their respective areas, adjoining and adjacent street names, selected boundary dimensions and references to prior maps. The cadastral maps and site surveys were used to identify specific sites designated for shoreline restoration and to generate costs estimates for site restoration i.e., labour, materials and machine time. Properties are identified on these maps with parcel ID and roll number.

2.6 SITE ACCESS

Many sites around Shuswap Lake and Mara Lake are accessible by public road and shoreline access easements, however, some areas are accessible by water only. For this report, most of the selected shoreline restoration sites are accessible by public road. Five sites (Sites S22 were accessible by water only, in which case materials and equipment will need to be delivered by tug and barge if site restoration is to occur.

In summary, the sixteen sites selected for shoreline restoration in 2011 were all situated on Crown land, were clear cases of Crown trespass, were below the Mean Annual High Water Mark, had previously been identified as known or potential high value fish habitat, and mainly accessible by public road. Shoreline site restoration will not occur above the Mean Annual High Water Mark (i.e., Crown Land), or on private property. If an illegal private structure was located on Crown Land, through which removal could potentially cause failure of adjoining structures above the MAHWM or erosion onto private property, those sites were deferred for future consideration (Table 1).

3 SHORELINE RESTORATION IMPACT CATEGORIES

A variety of anthropogenic shoreline habitat alterations were observed around the perimeter of Shuswap Lake and Mara Lake. These habitat alterations can be classified into nine categories of disturbance.

3.1 BEACH SUBSTRATE MODIFICATIONS

In these situations, the beach substrate has been significantly modified by scraping native foreshore substrate into small piles, and often replacing the native substrate with imported sand or other material to create a swimming beach, or prevent erosion. Sit s.17, s.22 and Site s.17, s.22 are examples of this type of habitat alteration.

3.2 BOAT RAMPS

Boat ramps were a common feature around Shuswap and Mara Lakes, with over 180 identified sites. The trend has been to replace the historical narrow rail type of boat launch with large concrete pads extending from above the MAHWM across the Crown foreshore into the lake, so that vehicles can be used to launch and retrieve boats on trailers. Site s.17, s.22 , and Site s.17, s.22 re examples of this type of habitat alteration.

3.3 BUILT STRUCTURES

Built structures refer to structures that have been built on the Crown foreshore using native material to create level areas for patio or BBQ type sites, or actual engineered structures built for a variety of purposes. Site s.17, s.22 is an example of native material used to build a patio/BBQ type of structure, and Site s.17, s.22 is an engineered concrete structure S17, S22 n the s.17, s.22

3.4 BUOY ANCHORS

Buoy anchors refer to large concrete lock blocks used to secure a surface mooring buoy in position.

3.5 DOCKS

Docks were the most common foreshore habitat alteration observed in the Shuswap and Mara Lake Foreshore Inventory Mapping, with a total of 2,789 docks observed (Schleppe, 2009). Site s.17, s.22 s.17, s.22 is an example of a docking resting on foreshore habitat.

3.6 GROYNES

Groynes are large piles of native substrate scraped from the Crown foreshore and stacked into elongated mounds. Over 1,170 groynes were observed in the FIM mapping (Schleppe, 2009). Site s.17 and Site s.17, s.22 are examples of groynes.

3.7 HABITAT INFILLING

Habitat infilling is where native or imported material was used to fill in Crown foreshore habitat to create additional beach property, or create a beach front access road. Site s.17, s.22 s.17, s.22 is an example of habitat infilling. This site is accessible by water only, hence considerable efforts was required to transport material and equipment to this site.

3.8 RETAINING WALLS

Retaining walls are typically built to protect or landscape private property. A total of 1,529 retaining walls were observed in the FIM, many of which extend beyond the MAHWM (Schleppe, 2009). No retaining walls were selected for site restoration in 2011 due to concerns about structural connectivity to private structures above the MAHWM.

3.9 RIPARIAN HABITAT ALTERATIONS

Riparian habitat alterations occurred when private property owners removed emergent riparian vegetation or placed fill on top of emergent foreshore vegetation. Site s.17, s.22 s an example of fill being placed on top of emergent foreshore vegetation.

4 FRESHWATER SHORELINE FISH AND FISH HABITAT VALUES

The use of littoral and near shore habitat is important in the life history of anadromous and resident salmonids (Table 2). All anadromous salmonids use these habitat zones during their juvenile life history stage, although each species utilizes these areas in different ways, over different periods and to different extents (Groot and Margolis, 1991). Sub-adult and adult salmonids, both resident and anadromous, use the near shore habitat for spawning, rearing and refuge. Therefore, restoration of near shore fisheries habitat is a defensible management action to sustain salmonid stocks in Shuswap and Mara lakes.

Shuswap Lake is an important source of Thompson River sockeye salmon (Oncorhynchus nerka), chinook (O. tshawytscha), coho (O. kisutch), rainbow trout (O. mykiss), and lake char (Salvelinus namaycush). Juvenile chinook, coho and sockeye have been found to utilize the foreshore areas of Shuswap Lake for rearing and migration (Fedorenko and Pearce, 1982; Graham and Russell, 1979; Russell et al., 1980). Chinook juveniles were found most often at night on exposed sandy beaches. This strong nocturnal behavior is likely a response to avoiding predation, and possibly seeking out warmer near shore temperatures in early spring. Diet analysis of Shuswap Lake juvenile chinook salmon, collected in 1999 when riparian vegetation was flooded, included (by weight) 14.6% terrestrial items, 20.3% larval fish, and 42.2% benthic items. In 2000, when near shore vegetation was not flooded, their diet was comprised of 9.4% terrestrial items, 10.3% flying aquatic invertebrates, 0% larval fish and 73.1% benthic invertebrates. This seasonally variable diet demonstrates the importance of the near shore and littoral zones.

Sockeye fry upon emergence typically inhabit the near-shore littoral zone in lakes, and feed on dipteran larvae, pupae, copepods and cladocerans prior to moving offshore to feed in the pelagic zone. This initial early feeding occurs at a time when yearling sockeye are present in the pelagic zone, the littoral zone is warmer than offshore habitat, and when the spring pelagic zooplankton bloom is just occurring. It is likely that the littoral feeding strategy is an adaption to take advantage of the best initial growth and survival conditions for feeding, growth and survival (Groot and Margolis, 1991).

Rainbow trout, especially insectivorous strains, are heavily dependent on aquatic invertebrate production in the littoral zone from fry to adult phase of their life history. Johnston et. al. (1999) measured the productivity of littoral (i.e., < 6 m) and pelagic (> 6m) zones in a small BC lake, and found that the productivity of the littoral zone, in weight of emergent insects captured, was an order of magnitude greater than in the offshore zones, which underscores the importance of undisturbed functional littoral habitat for juvenile salmonids.

Lake trout in Shuswap Lake spawn in the narrow near shore cobble band that occurs in limited areas on the south shoreline of the Main Arm. The size range of the spawning substrate is quite coarse, and tends to be in the 50-95 mm diameter category. Lake trout are particularly sensitive to habitat alterations in the riparian and foreshore zones due to their tendency to spawn in shallow water and their requirement for silt-free rocky substrate for successful embryo development (Evans and Olver, 1995). The relatively open matrix of the cobble substrate makes lake trout eggs spawned in these sites rather easily available to predator species (Sly and Schneider, 1984) and vulnerable to lake level drawdown (Gunn et al., 1996). Small interstitial spaces which permit good water flow but protect eggs and fry from dislocation and buffeting from water currents and predation from most predators is important for egg and fry survival (Edsall et al., 1992). Therefore, any near shore activity which increases sediment deposition in the cobble interstitial spaces can have deleterious effects on lake trout egg incubation, fry emergence and littoral habitat utilization.

Lake trout do not excavate a redd and typically spawn in over cobble, rubble, boulders with abundant interstitial spaces (Foster, 1985). As a result, degradation of lake trout spawning habitat is particularly influenced by two major processes: (1) smothering and/or infilling with finer, mainly inorganic particulates and (2) degradation of organic matter trapped within the substrate. Trapped organic matter decomposes within the interstitial spaces, and releases ammonia, carbon dioxide, and hydrogen sulphide which are likely to retard or kill embryo development, although the reduced dissolved oxygen associated with decomposition of the organic material is usually the more lethal stressor (Sly, 1988). Lake trout spawning habitat can also be degraded by increased settlement of particulates related to increased primary production, and increased debris from aquatic plants (Sly and Widmer, 1984), which are emerging concerns in Shuswap and Mara lakes (NHC, 2010).

Lake trout eggs incubate for 4 to 5 months before hatching, and then spend another 1-2 months hidden in the substrate. Until they emerge, lake trout exhibit strong photophobia, and hide in dark or shadowed area during daylight hours (Balon, 1980). Young emerge from the substrate and migrate to the surface where they fill their swimbladders with air (Tait, 1960). The accumulation of waste products from the fry during their residence in the substrate is likely used as a chemosensory cue by spawning adults to re-locate successful spawning habitat, which demonstrates the importance of protecting lake trout habitat. Once this cycle is disrupted, it becomes increasingly difficult to reestablish spawning populations on traditional, but long un-unused sites where interstitial accumulations of waste products, once annually renewed, has dissipated (Foster, 1985).

The near shore area is also critical habitat for lake trout fry. Young-of-the-year lake trout may reside on or near the spawning area in relatively shallow water for 1-2 months after emergence if water temperatures do not exceed 15 ^{o}C for extended periods (Peck, 1982). Lake trout have been found to inhabit waters warmer than 15 ^{o}C at night, and may be preying on nightly off-shore movements of littoral forage-fish species (Sellers et al., 1998). In large lakes, it is hypothesized that the impact of littoral zone predators decreases with lake size, as the physical separation between inshore and offshore habitats would increase and create more predator-free space for young-of-the year and juvenile lake char (Evans and Olver, 1995). As a species, lake trout invest heavily in relatively few progeny, hence are not well adapted to high predation rates (Stauffer, 1984).

Table 2. Essential habitat functions and habitat parameters for near-shore salmonid use (adapted from Anchor Environmental, 2003).

Habitat Parameters	Freshwater Function	Details
Shoreline slope	A, P, M	Shallow-gradient littoral slopes provide refuge from deeper-water predators and opportunities for feeding and migration.
Stream location and type	A, Ph, M	Juvenile salmonids exiting Shuswap and Mara lakes may seek tributary mouths because they provide refuge from high temperatures. Terrestrially-derived prey resources may occur here. Adult salmonids pass tributary mouths to migrate to spawn; juvenile salmonids migrate from tributary mouths to Shuswap and Mara lakes
Substrate	A,P	In lakes, fine substrates support the production of insect and forage fish prey resources. Organic substrates support higher densities of certain abundant chinook prey. In near shore areas, cobble substrate provide predation refuge habitat.
Vegetation cover, percent and type	A, P, Ph, M	Overhead vegetative cover supports the production of insect and forage fish prey resources. Overhanging vegetation provides temperature and predator refuge, especially important for feeding and migration opportunities.
LWD numbers and depth	A, P, Ph	In freshwater, LWD provides temperature and predator refuge, up to a certain depth, after which predation by piscivorous fish occurs. Fish return to LWD for refuge during foraging.
Presence and size of overwater structures	A, P, M	Docks and piers in Shuswap and Mara lakes can act as barriers to migration, and alter feeding behaviour (Figure 6)
Shoreline armouring presence, type and depth	A, P, E	Armoured shorelines are crucial to prey production and fish spawning and rearing; armouring contributes to the loss of beach substrates supporting these activities. Riprap contributes to increased energy expenditures by increasing velocities, depth and steepness of shoreline slopes.

Notes:

A = parameters which affect prey availability; P = parameters which affect predator refuge; Ph = parameters which affect physiological refuge; E = parameters which affect high energy refuge; M = parameters which affect migration corridors.

Figure 6. Photograph of dock acting as a barrier to migrating Shuswap sockeye (B. Harding, DFO photo).

S15, S22

5 PROPOSED SHORELINE RESTORATION WORKS

5.1 CONCEPTUAL SHORELINE RESTORATION OPTIONS

A variety of shoreline restoration options are available to restore degraded fish habitat. These include simple prescriptions such as removing concrete buoy anchor blocks or abandoned docks which are covering fish habitat, to more complex prescriptions involving destruction and removal of concrete boat ramps and re-contouring the shoreline with the appropriate size and composition of substrate.

Each prescription is designed to restore the ecological form and function to the site for the life history stage of the fish species that frequents that particular habitat. In some sites, the focus may be on restoring juvenile sockeye and rainbow trout rearing habitat, and in other sites the focus may be on restoring adult lake char spawning habitat. The emphasis on restoring juvenile rearing habitat requires re-establishing the habitat structure that encourages growth of periphyton and aquatic invertebrates to provide food items (and cover) for the juvenile salmonids. The emphasis on restoring spawning habitat is to ensure the appropriate size substrate is present to allow adult lake char (i.e., cobble) or sockeye (i.e., gravel) to naturally spawn in the substrate, and ensure that intra-gravel water and oxygen permeability are adequate to permit natural egg incubation and fry emergence.

5.2 SHORELINE RESTORATION LOCATION, MATERIALS, EQUIPMENT AND COST ESTIMATES

Sixteen shoreline sites around Shuswap Lake and Mara Lake were selected for habitat restoration in 2011. Six sites are located in the Main Arm (one site was deferred pending CSRD analysis of a community water intake structure), three sites are in Salmon Arm, three sites are in Anstey Arm, two sites are in Sicamous Arm, and one site is in Seymour Arm and Mara Lake respectively (Figure 5). The detailed materials, equipment and Class D engineering estimates to restore each site are shown in Appendix 1. A summary of the restoration site location and costs is shown Table 1.

The estimated total cost to restore all 15 of the initial 2011 shoreline sites (except deferred Site S22 is $51,000. These Class D (±50%) engineering cost estimates assume that Ministry of Forestry, Land and Natural Resource Operations will provide a vessel with crew member to conduct pre- and post-construction site inspections of the shoreline restoration sites on Shuswap and Mara lakes.

1:2,000 scale, and a 1:1,000 or 1:500 scale photograph is shown for each of the seventeen sites with cadastral information overlaid to identify individual property boundaries. Property boundaries are labelled with Parcel ID and Roll Numbers and attached to the report as appendices.

5.3 SITE PRESCRIPTIONS

Each shoreline site has a prescription that involves a single habitat manipulation or combination of habitat manipulations aimed at removing the anthropogenic shoreline modifications that have degraded the natural fish habitat and restoring natural habitat form and function.

5.4 INSTREAM WORK WINDOWS

The shoreline restoration will occur during the permitted Thompson Region Timing Window. In Shuswap Lake, in areas with no sockeye or char spawning activity, the work window is from July 22 to April 1. In areas with no sockeye spawning, but char spawning, the work window is from July 22 to September 30. In areas with both sockeye and char spawning, the work window is from July 22 to September 15 (during sockeye cycle years) (Table 3). These timing windows of least risk are designed to protect fish species present in Shuswap Lake. Since 2011 is not a dominant sockeye year in Shuswap Lake, the fisheries work window to conduct shoreline restoration activities will be from July 22 to September 30, 2011.

Table 3. Thompson Region Timing Windows for Shuswap Lake.

Fish Species	Work Window
Areas with no sockeye or char spawning	July 22 to April 1
Areas with no sockeye but char spawning	July 22 to September 30
Areas with sockeye and char spawning	July 22 to September 15 (sockeye cycle years)

If the restoration work sites in Shuswap Lake are in proximity to char and kokanee shore spawning habitat and proximity to the mouth of a spawning stream, additional work protection distances need to be considered. As a best management practice, a 500m buffer should be maintained on either side of a spawning creek or shore spawning areas (as determined by a Qualified Professional) to ensure habitat features (e.g. fetch, wave action, sediment etc.) are not compromised.

5.5 SECTION 9 WATER ACT NOTIFICATIONS

In British Columbia, Section 9 of the Water Act requires an Approval or Notification for works "in and about a stream". Under the Water Act, a "stream" is defined as "*includes a natural watercourse or source of water supply, whether usually containing water or not, and a lake, river, creek, spring, ravine, swamp and gulch*." Under the *Water Act*, "changes in and about a stream" means

a) *any modification to the nature of the stream including the land, vegetation, natural environment or flow of water within the stream, or*

b) *any activity or construction within the stream channel that has or may have an impact on a stream*

Notifications are typically used for works that do not involve any diversion of water, may be completed within a short period of time and will have minimal impact on the environment or third parties. Notifications are the responsibility of the Environmental Stewardship Division of the Ministry of Forests, Lands and Natural Resource Operations. The applicant must notify a Habitat officer of MFLNRO with the details of the proposed 'works' at least 45 days prior to commencing activity. Given that the work window commences on July 22, and 45 days are required for Notifications approval, it is important Section 9 applications are submitted by the early June, 2011.

Columbia Shuswap Regional District
781 Marine Park Dr NE, Salmon Arm, BC V1E 4P1
Phone: 250.832.8194 Fax: 250.832.3375
Web: www.csrd.bc.ca E-Mail: enquiries@csrd.bc.ca

SITE S22

Parcel Report

June 27, 2011

BCAA Legal Information

s.17, s.15, s.22

Site

Columbia Shuswap Regional District
781 Marine Park Dr NE, Salmon Arm, BC V1E 4P1
Phone: 250.832.8194 Fax: 250.832.3375
Web: www.csrd.bc.ca E-Mail: enquiries@csrd.bc.ca

Parcel Report

June 27, 2011

BCAA Legal Information

s.15, s.17, s.22

No Phone # available

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SITE

S22

Parcel Report

June 27, 2011

BCAA Legal Information

s.15, s.17, s.22

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SITE S22

Parcel Report

June 27, 2011

s.15, s.17, s.22

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SITE S22

Parcel Report

July 18, 2011

BCAA Legal Information

s.15, s.17, s.22

Columbia Shuswap Regional District
781 Marine Park Dr NE, Salmon Arm, BC V1E 4P1
Phone: 250.832.8194 Fax: 250.832.3375
Web: www.csrd.bc.ca E-Mail: enquiries@csrd.bc.ca

SITE S22

Parcel Report

June 27, 2011

BCAA Legal Information

s.15, s.17, s.22

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Phone: 250.832.8194 Fax: 250.832.3375
Web: www.csrd.bc.ca E-Mail: enquiries@csrd.bc.ca

SITE

S22

Parcel Report

June 27, 2011

BCAA Legal Information

s.16, s.17, s.22

Columbia Shuswap Regional District
781 Marine Park Dr NE, Salmon Arm, BC V1E 4P1
Phone: 250.832.8194 Fax: 250.832.3375
Web: www.csrd.bc.ca E-Mail: enquiries@csrd.bc.ca

S22

Parcel Report

June 27, 2011

s.15, s.17, s.22

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SITE

S22

Parcel Report

June 27, 2011

s.15, s.17, s.22

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s.15, s.17, s.22

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SITE

S22

Parcel Report

June 27, 2011

s.15, s.17, s.22

HABITAT CONSERVATION TRUST FOUNDATION

Enhancement Project Application: CONTINUING Project
Funding Year: 2012-2013

[HCTF to complete] Project File #: _____

PROJECT OVERVIEW

Project Name: *(Maximum 1 line. If previously funded by HCTF, please use the same project name)*
Shuswap Lake Shoreline Habitat Restoration

AMOUNT REQUESTED FROM HCTF FOR FUNDING YEAR 2012-2013: *(Ensure that this amount matches the total amount identified in the Budget.)* $95,000.00

Proponent Name: *(Identify who is submitting this proposal.)*
Andy Morris

Organization Name: *(Provide the name of the proponent's organization.)*
Ministry of Forests, Lands and Natural Resource Operations - Kamloops office

Author of Proposal: *(If different from proponent submitting proposal.)*
Ian McGregor

This is Year 3 **of** 3 **Years. You must fill out the multi-year budget table below.**

MULTI-YEAR BUDGET SUMMARY *(Click on Year of Project button to highlight the year of this proposal.)*

Year of Project	Funding Year (e.g. 2012-2013)	HCTF $ Requested/Projected	HCTF $ Approved (to-date)	Total Other Funding	Total $
1	2010-2011	$35,000.00	$35,000.00		$35,000.00
2	2011-2012	$65,000.00	$65,000.00	$35,000.00	$100,000.00
3	2012-2013	$95,000.00		$35,000.00	$130,000.00
4					
5					
Totals		$195,000.00	$100,000.00	$70,000.00	$265,000.00

Multi-year Budget Comments:

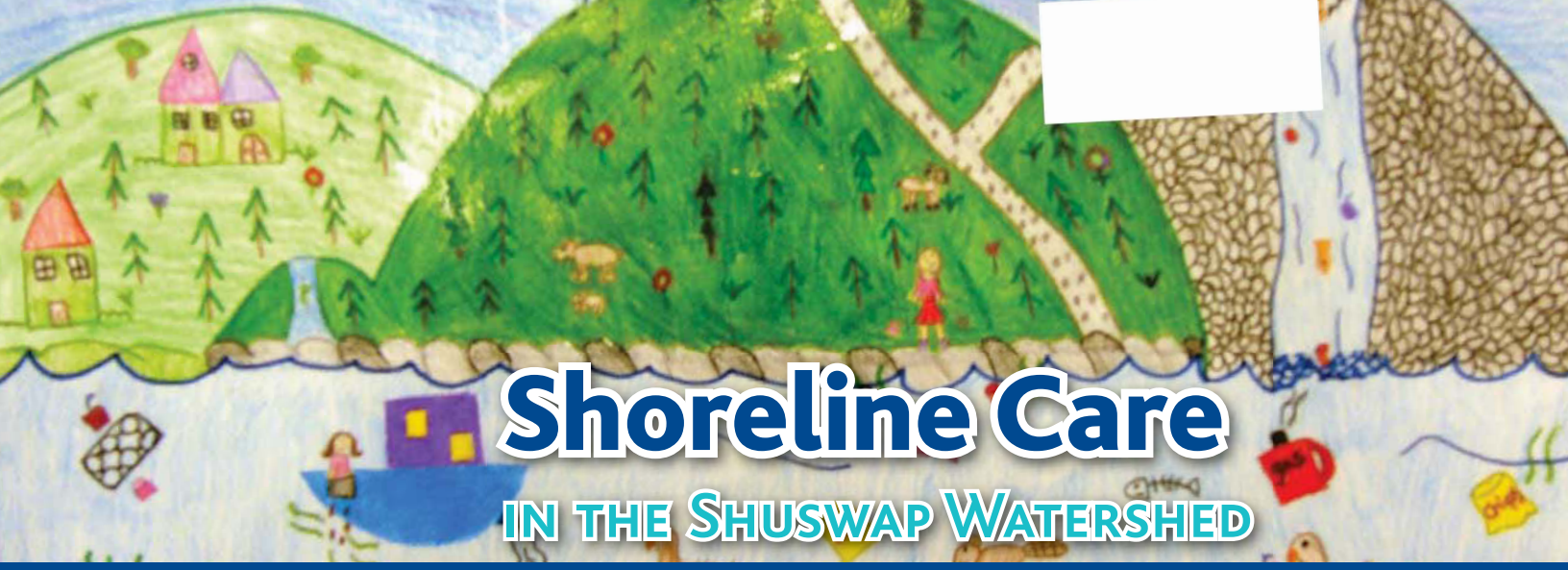
Project Description: *(Describe what your project will accomplish. Revise description annually to reflect current proposal. Maximum 3 lines)*
Restore high priority areas of sensitive fisheries habitat on Shuswap Lake to improve spawning habitat for lake char and rearing habitat for juvenile salmonids. This project will repair the damage caused by decades of unregulated residential and commercial foreshore development around the perimeter of Shuswap Lake.

Project Location: *(Provide a one-line description that includes distance to the nearest town or other known feature.)*
Entire shoreline perimeter of Shuswap Lake

UTM Coordinates: *(Coordinates will be used to locate HCTF projects on a map.)*
696350, 5508546

Project Type: *(Project Type codes can be found at http://www.hctf.ca/Application/attachmenta.htm)*
Habitat Improvement/Restoration

Species to be enhanced: *(Maximum 4. Species codes can be found on the BC Species and Ecosystem Explore website at http://a100.gov.bc.ca/pub/eswp/search.do)*
F-ONMY, F-SANA; F-ONNEK; F-ONNE



Shoreline Care
IN THE SHUSWAP WATERSHED

Artwork provided by *Celebrate the Shuswap* poster contest winners.

shuswapwatershed.ca

The shoreline areas of the Shuswap watershed are critical to a sustainable environment, the water quality we depend on for drinking and recreation and the world-famous fish runs we enjoy. As landowners, residents, businesses and visitors, we share the responsibility for keeping our shorelines healthy.

The Shuswap Lake Integrated Planning Process (SLIPP) brings together communities, First Nations, and public agencies to ensure the Shuswap watershed remains a great place to live, work, and play. Working in partnership on innovative approaches and projects, SLIPP aims to increase public safety on the water, ensure a healthy environment and create a diversity of recreational experiences and economic opportunities that can be enjoyed by all.

SLIPP
Shuswap Lake Integrated Planning Process

What is the Shoreline Area?

The shoreline is the most sensitive part of the lake and is important for maintaining healthy water quality and fish and wildlife habitat. It extends from the lake high water mark to below the low water mark. This area is the property of the Crown and is a public resource. Vegetation within 30 meters of the high water mark is also key to a healthy lake environment.

Why take care of shorelines?

Shorelines are unique ecosystems that have developed over thousands of years. They support fish, wildlife and vegetation around the lakes, the quality of our recreational experiences and many of the businesses where we work.

While high quality drinking water is important to our day-to-day health, the many year round recreational experiences that the lakes provide are significant to our wellbeing.

Much of the region's economy is based on Shuswap Lake. Businesses rely on people who come to enjoy the fishing, houseboating and water skiing. All of these are enhanced by the quality of the lakes.

How does the shoreline contribute to water quality?

Stable and healthy shorelines filter contaminants and retain unwanted sediments from the groundwater and runoff that can drain from the watershed into the lakes.

Why is the shoreline important to Shuswap fish?

Important fish populations such as the Adams River sockeye salmon, chinook, coho, rainbow trout and lake char rely on high quality habitat along the shoreline for spawning, rearing and safety.

Shorelines also provide shade and food to marine animals.

Sockeye salmon and lake char lay their eggs in the coarse gravel and stones in the shallow waters around the lakes. Young Shuswap fish require good shoreline habitat as they mature through this critical phase of their lifecycle.

What can I do to protect the shoreline?

Always consider your impact on the shoreline when making decisions about your property. Contact your local government and FrontCounter BC (1-877-855-3222) before starting any project as they can inform you of relevant by-laws and regulations. Then ask a Qualified Environmental Professional for advice. Any modification of Crown Land requires approval.

You can become a shoreline advocate by:

- Participating in community shoreline improvement programs
- Improving the condition of your property
- Educating your family, friends and neighbours about the importance of healthy shorelines
- Reporting illegal or noncompliant activities to the RAPP Line (Report All Poachers and Polluters) 1 877 952 7277

By following the tips on the next page you will make a positive contribution to the long-term health of our shorelines

Healthy Shoreline Management Tips

Whether you live on the waterfront or in the uplands of the watershed, each of us has a responsibility to our lakes. By following these tips when living or working near the shoreline, you can help keep it healthy for future generations, make the lakes a more enjoyable place to live, work and play and ensure property values continue to increase over time.

1. Consult your local government and FrontCounter BC **before starting any project** as bylaws and regulations apply. Also, any modification of Crown Land requires approval.
2. **Plant native trees and shrubs.** Planting native vegetation helps with filter out contaminants and sediments before they enter the lakes, creating shade and cover, providing food for fish and wildlife. Even small improvements in vegetation will increase the natural condition of the shoreline. Start by planting native plants in grassed areas and avoiding the use of pesticides, herbicides and fertilizers within 30 meters of the shore.
3. Keep your personal water access through shorelines **as small as possible.**
4. **Use dock maintenance methods** appropriate to the season. Floating docks should be kept in at least 1.5 meters of water and moved well above the high water level in fall when fish are spawning. Docks should not "ground" on the shore as this can destroy vegetation, create erosion or crush fish eggs in the rocks and gravel below.
5. **Keep your boat speed down** as the wake can negatively impact vegetation and shallow water areas which are important to spawning and rearing fish.
6. **Ensure that your septic field is functioning properly** and set as far back from the shoreline as possible. Have it checked regularly so chemicals and nutrients do not leach onto the shoreline and use only phosphate-free soaps and detergents.
7. **Maintain natural shorelines** or return modified beaches to a more natural state. Importing sand and removing boulders and stones from the shoreline impacts environmental and lake health. These changes increase erosion and sediment deposits leading to the loss of important contaminant-filtering plants.
8. **Restore the natural shoreline** instead of building a retaining wall. If your property requires shoreline stabilization, use an environmental professional to design a system using native plants and materials. If vertical concrete walls are in place, look at options available to remove and replace them with sustainable alternatives.
9. **Do not move or alter steams** that flow into the lakes as they have a major impact on ecosystem health and the shoreline.
10. **Avoid large scale excavations** or land clearings that may alter ground water flowing into the lakes.
11. Visit **slippbc.com** for links to regulatory agencies, tools to assist you in your projects and information about restoration initiatives.

SLIPP
Shuswap Lake Integrated Planning Process

Working together to sustain our watershed
slippbc.com

BRITISH COLUMBIA
The Best Place on Earth

Working together to sustain our watershed

SLIPP Shoreline Protection and Restoration Planning Meeting Notes – May 24, 2012

s.13, s.17

Meeting Summary (Action Items Highlighted in Yellow)

1. Shoreline Compliance / Restoration Initiative

s.13, s.17

- **3 Streams to follow**
- Stream 1 smaller structures on Crown Land incl groynes ,boat launches, substrate modifications. This was the focus of the meeting discussions
- Stream 2 and 3 larger structures and larger investment to remedy such as retaining walls - limited value in terms of habitat gains

Site Prioritization Criteria – refer to Activity A

- 2 components inventory (identify issues) and framework for prioritizing
- Key criteria
  - Biological values/impacts - FIM key to identifying sensitive sites need to revisit utilizing Ok approach as template estuaries are key
  - Locations of structures logistics / efficiencies / visibility
  - Magnitude - Priority should be smaller foreshore structures such as groynes, substate and boat launches
  - Multiple species

s.13, s.16, s.17

SLIPP Foreshore Restoration Prioritization Tool

Agenda

- Activities
- Criteria
- Weighting
- Long Term Plan or Vision

Activities

1) Groynes (Over 1100)
2) Docks and Moorage (2700+)
3) Retaining Walls (>1500 retainer walls - 13% of shoreline converted.)
4) Boat Launch (200)
5) Removal of Riparian and Foreshore Veg and LWD
6) Foreshore Fill
7) Log Handling
8) Abandoned Vessels

Prioritization Criteria

- Biological
  - AHI
  - Scale of Negative Affect
  - Multi Species
  - Multi Life Stages
  - Emergent Vegetation
  - Rare Ecotype
- Social/Political
  - Public Support
  - Agency Support
  - First Nations
  - Funding
- Operational
  - Cost-Benefit
  - Engineering Required
  - Access/Disposal
  - Regulatory

Example of Criteria Weighting

- Hard
  - Public Support (supportive and non-supportive landowners and general public)
  - First Nations Support
- Easy
  - AHI values (low to very high, 1-5)
  - Eng Required (yes or no, assign numerical value)

Lake Location Weighting Cont

- Areas of Shuswap and Mara
  - 4 for Shuswap Lake
    - Salmon Arm
    - Ansty Arm
    - Seymour Arm
    - Main Arm

    Little River/Little Shuswap Lake
  - Mara Lake
  - Adams Lake?

HABITAT CONSERVATION TRUST FOUNDATION

Enhancement Project Application
Funding Cycle 2011-2012

[HCTF to complete] Project File #:_____

PROPONENT INFORMATION

Project Leader & Title: Andy Morris

Author of Proposal (if different from Project Leader):

Organization Name: Ministry of Environment, Thompson-Nicola Region

Address: 1259 Dalhousie Drive

City: Kamloops Province: British Columbia Postal Code: V2C 5Z5

Email Address: Andy.Morris@gov.bc.ca

Phone: 250-371-6253 Cell: s.17 Fax: 250-828-4000

AMOUNT REQUESTED FROM HCTF FOR FUNDING CYCLE 2011-2012:
$ 65,000
Will this be a multi-year project? Y/N **Yes**
(If yes, please complete Budget Section 10.6)

Have you ever received HCTF funding for this project/location/species before? Y/N **Yes**

If yes, please list the HCTF Project #: 3-296

For continuing projects: Year 2 of Year 3 (e.g. 2 of 5 years). *Record only those years that HCTF has provided funding.*

Did this project receive SEED funding from HCTF? Y/N **No**
If yes, please list the HCTF Project #:

PROJECT INFORMATION

Project Name*:* Shuswap Lake Shoreline Habitat Restoration

Project Location: Shuswap Lake

Project Description: Restore high priority areas of sensitive fisheries habitat on Shuswap Lake to improve spawning habitat for lake char and rearing habitat for juvenile salmonids. This project will repair the damage caused by decades of unregulated residential and commercial foreshore development around the perimeter of Shuswap Lake.

UTM Coordinates: 696350, 5508546

Project Type: Habitat Improvement/Restoration

Species to be enhanced**:** F-ONMY; F-SANA; F-ONNEK; F-ONNE

DETAILED PROJECT PROPOSAL OUTLINE

1. EXECUTIVE SUMMARY (~500 words or less)

Shuswap Lake is the nursery lake for the world famous Adams River sockeye salmon, and supports a regionally and provincially important recreational fishery for rainbow trout, kokanee and lake char. A special angling license fee is charged for Shuswap Lake rainbow trout and lake char, reflecting the high ecological and economic importance of recreational angling in Shuswap Lake. The current unprecedented pace and scale of largely unregulated near-shore residential, commercial and industrial development has damaged extensive sections of near-shore seasonally inundated areas of Shuswap Lake. Shuswap Lake fluctuates approx. 2.5 annually, and numerous area residents and businesses have negatively altered the foreshore area during winter low water periods by removing native vegetation, drainage patterns and habitat structure, and replaced these with sand beaches, concrete retaining walls, boat launches, shoreline infills, rock groins, moorage docks and general landscaping.

In response to this problem, and additional concerns about declining water quality, inadequate septic disposal, unregulated property development and the unprecedented expansion of the houseboat industry, Region 3 MoE lead the formation of the Shuswap Lake Integrated Planning Process (SLIPP) in 2007 to identify cross-cutting issues that were better addressed through collaboration and focused on working with and improving existing public agency coordinating mechanisms and working practices to make them more effective. The motivation for SLIPP was to simplify a complicated regulatory environment, where fourteen public agencies from every level of government had legal jurisdiction over some aspect of the lake. The SLIPP process has been exceptionally well received by MoE, DFO, the two key regional districts (CSRD and TNRD), and area residents.

A series of SLIPP public workshops and information sessions in 2007 and 2008 identified three high priority areas of concern; one of which was to develop a Site Sensitivity Map for the foreshore and upland areas of Shuswap Lake that classified each area into high, medium or low sensitivity status levels. All relevant scientific research, monitoring data and mapping information was utilized to create the maps via the DFO led Shuswap Lake Watershed and Foreshore Mapping Project. The Foreshore Habitat Information mapping (FHIM) started in 2007 with 100K funding from Fraser Salmon and Watersheds Program, the Real Estate Foundation, and DFO, while MoE provided in-kind support. FHIM obtained 30 cm ortho photography of the entire lake, 20 cm ortho tributary photography, digital GPS stamped photographs of the lake, 270 biophysical mappings of sensitive lake habitat, and is completed. FHIM identified thousands of harmful alterations within known sensitive habitat zones that represent significant non-compliance with Best Management Practices and Riparian Area Regulations. Land ownership of affected areas includes private land, commercial land, Indian Reserves, and extensive unauthorized use and trespass of Crown foreshore.

It is now possible to prioritize sensitive areas, and initiate habitat restoration of degraded near-shore fisheries habitat using the state-of-the-art FHIM digital reference mapping file. This will be a three year HCTF project: 35K in year 1 for planning, 65K pilot implementation in Year 2, and 95K in Year 3 for full restoration works and project evaluation.

2. ISSUE (~250 words or less)

The Shuswap Lake Foreshore Habitat Information Mapping (FHIM) project identified thousands of harmful alterations within known fisheries sensitive habitat zones that represent significant non-compliance with Best Management Practices and Riparian Area Regulations. This includes 1,500 retaining walls with greater than 50% of these built below the maximum annual high water mark (i.e. Crown Foreshore); > 2,700 boat docks, many of which were abandoned, numerous boat launches, erosion of emergent vegetation, extensive removal of riparian vegetation for infill for property development, and considerable upland drainage modifications to natural stream courses.

Now that the entire lake has been digitally photographed and ortho referenced at 20 and 30 cm scales, and SLIPP has been endorsed by all levels of government (Federal, Provincial and Regional District), it is possible to initiate restoration of degraded foreshore areas of Shuswap Lake that were identified as being within fisheries sensitive zones. The FHIM maps contain multiple layers of geospatial information including First Nations' archeological and cultural areas of interest, fish spawning and habitat grounds, navigational considerations, historical flood information, public recreational areas and uses, and infrastructure such as water intakes, discharge facilities and jurisdictional boundaries. To increase the ease of access, analysis and restoration works, the various layers are available in separate maps (i.e. recreation activity map, foreshore development map etc.).

This represents an unprecedented opportunity to restore sensitive fisheries habitat in Shuswap Lake using state-of-the-art geo-referenced imagery to document and monitor the success of the restoration efforts and track the performance of restoration works through time.

3. PROJECT OBJECTIVES

The project objective is to (1) priorize the sensitive fisheries habitat identified from the Shuswap Lake Foreshore Habitat Information Mapping (FHIM) project; (2) develop a restoration plan, and (3) implement the restoration works over a 2 year construction program (I year pilot scale and 1 year full scale).

Year 1 is the planning phase of this project, which will involve developing and priorizing potential projects identified from FHIM and obtaining necessary Federal (DFO and Transport Canada), Provincial (MoE and ILMB) and Columbia-Shuswap Regional District construction permits, and preparing construction-ready drawings;

Year 2 is the pilot habitat restoration phase of this project, in which innovative and cost effective restoration techniques will be developed and implemented, including trial use of dedicated barge-mounted mobile restoration units to minimize shoreline access impacts from heavy machinery;

Year 3 is an acceleration of priority habitat restoration plus evaluation of habitat restoration projects completed in Year 2 to facilitate adaptive learning of innovative and cost-effective foreshore habitat restoration techniques.

The overall objective is to restore high priority sensitive fish habitat in the Shuswap Lake foreshore, riparian and near upland areas that have been degraded by deleterious past land use activities, and widely publicize the project to prevent future habitat degradation and illustrate HCTF's leadership role in habitat restoration.

4. ACTIVITIES/METHODOLOGY

In Year 1 a small expert technical team with Kamloops region DFO and MoE staff was formed to develop a priorized list of sites to be restored within the high sensitivity status classification using the state-of-the-art image data base. The priorized site list is currently being completed and engineered drawings of each restoration site will be prepared. Tenders will be issued for contractors with adequate restoration experience to bid on prepare engineered blueprint drawings of individual or multiple site projects.

Year 2 is the pilot habitat restoration phase of this project, where restoration techniques will be developed and implemented. Although the priorized list is currently being finalized, restoration works are expected to focus on restoring the following (by %):

1. groynes where lake-bed rocks and boulders were cleared from both below and above the high water mark to provide "recreational beaches", and directly impact emergent vegetation and fish shore spawning areas (40%)
2. retaining walls which extend beyond the high water level of the lake, and construction practices were not compliant with Best Management Practices and are where critical char spawning and juvenile rearing are impacted (30%),
3. abandoned dock removal on key klake char spawning habitat (20%)
4. concrete boat launch removal as identified by Land Management Branch(10%)

The project activities in Year 2 to restore fisheries sensitive habitat will use several innovative and cost effective techniques.

a. Dock removal - barge-mounted mobile restoration units
b. Retaining walls – land based removal
c. Groynes - barge-mounted mobile restoration units
d. Boat launches - land based removal

Project Objective	Activities/Methods	Timeline
Restore high priority sensitive fish habitat in the Shuswap Lake foreshore	Removal of abandoned docks, retaining walls, boat launches; deconstruction of groynes and replacement of natural substrates	Nov 30, 2011
Project achievements reported out to SLIPP	Technical and public meetings	March, 2012

5. BENEFITS/RISK

- There is minimal identifiable risk from this project;
- All access and construction work window permits will be approved in advance;
- There are minimal liability concerns as all project drawings will be by BC Registered Professional Engineers and Geoscientists, and project site-supervision will include on-site engineering staff;

- Project benefits will include restoration of foreshore and riparian habitat, reduced siltation of near-shore salmonid spawning and rearing areas, reduced egg and incubation mortality of salmonids, and increased abundance of juvenile salmonids;

- Project benefits will also include heightened public and agency awareness of the requirement to preserve and protect sensitive fisheries habitat in foreshore, riparian and upland areas of Shuswap Lake.

6. EVALUATION/MEASURES OF SUCCESS

Year 2 of the restoration of sensitive fisheries habitat project will be evaluated upon achieving the successful completion and restoration of the priorized high priority fisheries sensitive areas in Shuswap Lake that were identified as being damaged or degraded via the FHIM digital imaging project.

Project benefits will include restoration of foreshore and riparian habitat, reduced siltation of near-shore salmonid spawning and rearing areas, reduced egg and incubation mortality of salmonids, and increased abundance of juvenile salmonids, and increased public and agency awareness of the requirement to protect foreshore, riparian and near-upland habitat.

We do not expect any problems with this project given the habitat restoration expertise available in BC and the straightforward nature of this project.

7. COMMUNICATION/OUTREACH

SLIPP will print an information brochure and circulate it to the general public, contractors and developers through CSRD, DFO and Front Counter BC which will explain the HCTF foreshore fish habitat restoration project, and caution developers and the public on the risk of conducting harmful alternation and/or destruction of fish habitat in foreshore, riparian and near upland areas of Shuswap Lake. HCTF funding support will be acknowledged on this brochure.

SLIPP will develop a web-site and conduct a series of annual public meetings in the Shuswap Lake area in 2011-2012 as part of the annual SLIPP implementation reporting progress. SLIPP will also create and maintain a web-site which will be linked to MoE, DFO, TNRD and CSRD websites.

SLIPP, MoE, DFO and CSRD will acknowledge HCTF support in all meetings, presentations and communications it provides on the shoreline fisheries habitat restoration project.

LITERATURE CITED

8.

Shuswap Lake Integrated Planning process: Strategic Plan for Shuswap and Mara lakes. 2009. Deloitte. 35 p.

Shuswap Lake Watershed Mapping Project: Foreshore Inventory and Mapping, Shuswap and Mara Lakes. 2009. Ecoscape Environmental Consultants Ltd. 51 p.

9. MAP

Map of Shuswap Lake. Various fisheries sensitive zones around the perimeter of Shuswap Lake will be the project site, and are concentrated in the Main Arm, Salmon Arm and Sicamous Arm.

5					
Totals		$195,000	$	$	$

Multi-year projects in Years 2-5 must demonstrate the same 5 year budget plan as indicated in the Year 1 approved budget. Any proposed variances must be supported by a detailed rationale. Insert rationale here if applicable:

11. CONTINUING PROJECT SUMMARY

This section must not exceed two pages when complete. This section is for Continuing Projects only. If you are applying for a NEW HCTF Enhancement Project, completion of this section is not required.

a) Project Update

In Year 1 a small expert technical team with Kamloops region DFO and MoE staff was formed to develop a priorized list of sites to be restored within the high sensitivity status classification using the state-of-the-art Shuswap Lake Foreshore Habitat Information Mapping (FHIM) digital reference mapping file. The FHIM project identified thousands of harmful alterations within known fisheries sensitive habitat zones that represent significant non-compliance with Best Management Practices and Riparian Area Regulations. This includes 1,500 retaining walls with greater than 50% of these built below the maximum annual high water mark (i.e. Crown Foreshore); > 2,700 boat docks, many of which were abandoned, numerous boat launches, erosion of emergent vegetation, extensive removal of riparian vegetation for infill for property development, and considerable upland drainage modifications to natural stream courses.

From this dataset a priorized site list is being completed, including field-truthing, and engineered drawings of each restoration site will be prepared. Tenders will be issued for contractors with adequate restoration experience to bid on prepare engineered blueprint drawings of individual or multiple site projects. These drawings will guide the pilot habitat restoration phase of this project in Year 2.

BRITISH COLUMBIA

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SLIPP Site S22

August 22, 2011

s.22

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Your participation in this shoreline restoration project will contribute to the success of SLIPP which is critical to the future health of our lakes, fish populations and the water quality we all depend upon.

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As part of the mapping process, thousands of incidents of foreshore damage were observed and 55 sites were prioritized for action based on the highest threats to fish populations and water quality. Your property lies behind one of these areas which is why we asked for the meeting with you.

One of the factors that will increase the health of our lakes and its fish population is the removal of concrete boat ramps, docks and groynes that are located in high value fish

Ministry of Forests, Lands and Natural Resource Operations

Thompson / Okanagan Region

Mailing/Location Address:
441 Columbia Steet
Kamloops, BC V2C 2T3

Telephone: 250-828-4131
Facsimile: 250-828-4442

Web Address:
http://www.gov.bc.ca

habitat areas along the shoreline. We are asking for your cooperation to remove the groynes from the front of your property as it is an unauthorized structure on Crown Land and is in one of the sensitive fish habitats, and to restore the Crown shoreline to a natural substrate condition.

Each year between October and December, Lake Char (a sub–species of Salmonid) may use the beach in front of your property to lay their eggs in the gravel and cobbles located in the shallow waters next to your groynes. Foreshore modifications such as yours negatively impacts their spawning grounds while beach clearing results in more sediment which affects egg incubation and the emergence of char fry. In addition, sockeye fry use habitat close to the shore in the first few weeks after they emerge from the gravel and before they move offshore to feed. For both of these important fish populations, it is critical to maintain high quality habitat along the shoreline.

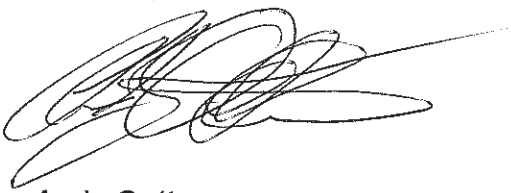
s.17, s.22

Your support will help maintain a healthy fish population, raise awareness of best practises and build a culture of environmental stewardship in the community.

If you are in agreement with this offer to restore your shoreline to a naturalized condition as described above, **please sign the accompanying letter of consent, and return the letter to me by September 12th, 2011**.

For more information regarding the restoration, please contact Project Manager Dr. Ken Ashley of Northwest Hydraulic Consultants at 604-980-6011 or kashley@nhc-van.com or me at the number below.

Sincerely,



Andy Oetter
Manager of Authorizations
250-828-4413

Attn: Andy Oetter, Manager of Authorizations

Ministry of Forests, Lands and Natural Resource Operations
441 Columbia Street
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To whom it may concern:

Re:

s.22, s.17

We are the owners of the above noted property and the current owners of the groynes, located adjacent to the above noted property, which occupies Crown Land forming the bed of Shuswap Lake, as shown in the attached photo and map.

With respect to the above noted groynes, we hereby consent to the removal of the groynes and/or restoration of natural foreshore substrate by the Ministry of Forests, Lands and Natural Resource Operations. Any chattels or personal property remaining on the Crown Land site after August 31, 2011 will be deemed abandoned and subject to removal and disposal in conjunction with the site restoration.

In addition, we will allow access to the above referenced Crown Land site through our private property, for the purposes of removing the groynes and imported substrate, completing the foreshore site restoration and disposing of materials.

Dated this _____ day of _____, 2011 at _____

s.22

_____

Witness
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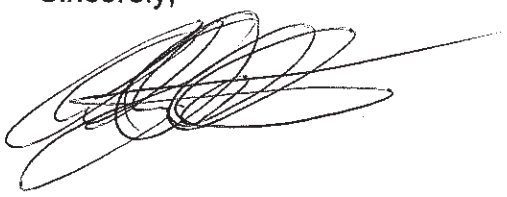

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250-828-4413

Attn: Andy Oetter, Manager of Authorizations

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To whom it may concern:

Re:

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I am the owner of the above noted property and the current owner of the concrete boat launch, located adjacent to the above noted property, which occupies Crown Land forming the bed of Shuswap Lake, as shown in the attached photo and map.

With respect to the above noted concrete boat launch, I hereby consent to the removal of the concrete boat launch and/or restoration of natural foreshore substrate by the Ministry of Forests, Lands and Natural Resource Operations. Any chattels or personal property remaining on the Crown Land site after August 31, 2011 will be deemed abandoned and subject to removal and disposal in conjunction with the site restoration.

In addition, I will allow access to the above referenced Crown Land site through my private property, for the purposes of removing the concrete boat launch and imported substrate, completing the foreshore site restoration and disposing of materials.

Dated this _____ day of _____, 2011 at _____

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habitat areas along the shoreline. We are asking for your cooperation to remove any imported substrate associated with your boat launch from the front of your property as it is in one of the sensitive fish habitats, and to restore the Crown shoreline to a natural substrate condition.

Each year between October and December, Lake Char (a sub–species of Salmonid) may use the beach in front of your property to lay their eggs in the gravel and cobbles located in the shallow waters next to your groynes. Foreshore modifications such as yours negatively impacts their spawning grounds while beach clearing results in more sediment which affects egg incubation and the emergence of char fry. In addition, sockeye fry use habitat close to the shore in the first few weeks after they emerge from the gravel and before they move offshore to feed. For both of these important fish populations, it is critical to maintain high quality habitat along the shoreline.

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441 Columbia Street
Kamloops, BC V2C 2T3

To whom it may concern:

Re:

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We are the owners of the above noted property and the current owners of the imported foreshore fill, located adjacent to the above noted property, which occupies Crown Land forming the bed of Shuswap Lake, as shown in the attached photo and map.

With respect to the above noted imported foreshore fill, we hereby consent to the removal of the imported foreshore fill and/or restoration of natural foreshore substrate by the Ministry of Forests, Lands and Natural Resource Operations. Any chattels or personal property remaining on the Crown Land site after August 31, 2011 will be deemed abandoned and subject to removal and disposal in conjunction with the site restoration.

In addition, we will allow access to the above referenced Crown Land site through our private property, for the purposes of removing the imported foreshore fill and any other imported substrate, completing the foreshore site restoration and disposing of materials.

Dated this _____ day of _____, 2011 at _____

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Dated this _____ day of _____, 2011 at _____

s.22, s.21

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As part of the mapping process, thousands of incidents of foreshore damage were observed and 55 sites were prioritized for action based on the highest threats to fish populations and water quality. Your property lies behind one of these areas which is why we asked for the meeting with you.

One of the factors that will increase the health of our lakes and its fish population is the removal of concrete boat ramps, docks and groynes that are located in high value fish

Ministry of Forests, Lands and Natural Resource Operations

Thompson / Okanagan Region

Mailing/Location Address:
441 Columbia Street
Kamloops, BC V2C 2T3

Telephone: 250-828-4131
Facsimile: 250-828-4442

Web Address:
http://www.gov.bc.ca

habitat areas along the shoreline. We are asking for your cooperation to remove the imported beach material from the front of your property as it is an unauthorized modification of Crown Land and is in one of the sensitive fish habitats, and to restore the Crown shoreline to a natural substrate condition.

Each year between October and December, Lake Char (a sub–species of Salmonid) may use the beach in front of your property to lay their eggs in the gravel and cobbles located in the shallow waters next to your groynes. Foreshore modifications such as yours negatively impacts their spawning grounds while beach clearing results in more sediment which affects egg incubation and the emergence of char fry. In addition, sockeye fry use habitat close to the shore in the first few weeks after they emerge from the gravel and before they move offshore to feed. For both of these important fish populations, it is critical to maintain high quality habitat along the shoreline.

s.17, s.22

Your support will help maintain a healthy fish population, raise awareness of best practises and build a culture of environmental stewardship in the community.

If you are in agreement with this offer to restore your shoreline to a naturalized condition as described above, **please sign the accompanying letter of consent, and return the letter to me by September 12th, 2011**.

For more information regarding the restoration, please contact Project Manager Dr. Ken Ashley of Northwest Hydraulic Consultants at 604-980-6011 or kashley@nhc-van.com or me at the number below.

Sincerely,

Andy Oetter
Manager of Authorizations
250-828-4413

Attn: Andy Oetter, Manager of Authorizations

Ministry of Forests, Lands and Natural Resource Operations
441 Columbia Street
Kamloops, BC V2C 2T3

To whom it may concern:

Re:

s.17, s.22

I am the owner of the above noted property and the current owner of the groynes, located adjacent to the above noted property, which occupies Crown Land forming the bed of Shuswap Lake, as shown in the attached photo and map.

With respect to the above noted groynes, I hereby consent to the removal of the groynes and/or restoration of natural foreshore substrate by the Ministry of Forests, Lands and Natural Resource Operations. Any chattels or personal property remaining on the Crown Land site after August 31, 2011 will be deemed abandoned and subject to removal and disposal in conjunction with the site restoration.

In addition, I will allow access to the above referenced Crown Land site through my private property, for the purposes of removing the groynes and imported substrate, completing the foreshore site restoration and disposing of materials.

Dated this _____ day of _____, 2011 at _____.

_____

s.22

Witness
Name:
Address:

BRITISH COLUMBIA

SLIPP Shuswap Lake Integrated Planning Process

Working together to sustain our watershed

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SLIPP Site S22

August 22, 2011

s.22

This letter explains the interest that the Shuswap Lake Integrated Planning Process (SLIPP) agency partners have regarding your Shuswap property (Roll No. s.22

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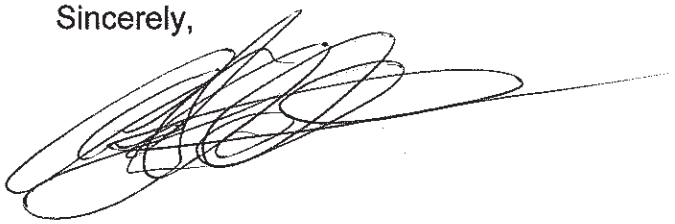

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Attn: Andy Oetter, Manager of Authorizations

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Re:

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With respect to the above noted wooden dock, we hereby consent to the removal of the wooden dock and/or restoration of natural foreshore substrate by the Ministry of Forests, Lands and Natural Resource Operations. Any chattels or personal property remaining on the Crown Land site after August 31, 2011 will be deemed abandoned and subject to removal and disposal in conjunction with the site restoration.

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Dated this _____ day of _____, 2011 at _____

s.22

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Witness
Name:
Address:

BRITISH COLUMBIA

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SLIPP Site S22

August 22, 2011

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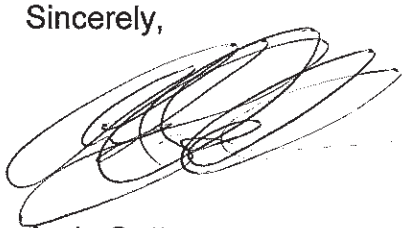

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Re:
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Witness
Name:
Address:

BRITISH COLUMBIA

SLIPP Shuswap Lake Integrated Planning Process

Working together to sustain our watershed

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SLIPP Site S22

August 22, 2011

s.22, s.21

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s.17, s.22, s.21

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To whom it may concern:

Re:

s.17, s.22, s.21

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With respect to the above noted groynes and foreshore modifications, I hereby consent to the removal of the groynes and foreshore modifications and/or restoration of natural foreshore substrate by the Ministry of Forests, Lands and Natural Resource Operations. Any chattels or personal property remaining on the Crown Land site after August 31, 2011 will be deemed abandoned and subject to removal and disposal in conjunction with the site restoration.

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Dated this _____ day of _____, 2011 at _____

s.22, s.21

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Witness
Name:
Address:

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Working together to sustain our watershed

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SLIPP Site S22

August 22, 2011

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Attn: Andy Oetter, Manager of Authorizations

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To whom it may concern:

Re:
s.17, s.22

I am the owner of the above noted property and the current owner of the dock and groynes, located adjacent to the above noted property, which occupies Crown Land forming the bed of Mara Lake, as shown in the attached photo and map.

With respect to the above noted dock and groynes, I hereby consent to the removal of the dock and groynes and/or restoration of natural foreshore substrate by the Ministry of Forests, Lands and Natural Resource Operations. Any chattels or personal property remaining on the Crown Land site after August 31, 2011 will be deemed abandoned and subject to removal and disposal in conjunction with the site restoration.

In addition, I will allow access to the above referenced Crown Land site through my private property, for the purposes of removing the dock and groynes and imported substrate, completing the foreshore site restoration and disposing of materials.

Dated this _____ day of _____, 2011 at _____

s.22

_____

Witness
Name:
Address:

Two of the identified SLIPP addresses were the wrong property.

Could you please send me a different CSRD parcel report for Site S22 and Site S22

s.17, s.22

s.15, s.17, s.22

s.17, s.22

As usual, will keep these confidential.

Thanks,

s.13

From: Marcin Pachcinski <mpachcinski@csrd.bc.ca>

To: Marcin Pachcinski <mpachcinski@csrd.bc.ca>, Hamish Kassa <hkassa@csrd.bc.ca>, Sarah Evanetz s.22 '"Morris, Andy R FLNR:EX"' <Andy.Morris@gov.bc.ca>, '"Zimmerman, Clint FLNR:EX"' <Clint.Zimmerman@gov.bc.ca>, '"Weir, Keith FLNR:EX"' <Keith.Weir@gov.bc.ca>, '"Harding, Bob"' <Bob.Harding@dfo mpo.gc.ca>

Cc: '"McGregor, Ian FLNR:EX"' <Ian.Mcgregor@gov.bc.ca>, "kashley@nhc van.com" <kashley@nhc van.com>

Date: 06/27/2011 04:49 PM

Subject: RE: Shuswap and Mara lakes Shoreline Restoration Project

Not Responsive

30 Gostick Place | North Vancouver, BC V7M 3G3 | 604.980.6011 | www.nhcweb.com

nhc
northwest hydraulic consultants

MEMORANDUM / TRANSMITTAL

TO:	Ian McGregor, MFLNRO	**DATE:**	September 19, 2011
FROM:	Ken Ashley (NHC)	**NO. PAGES:**	
CC:	B. Chilibeck	**PROJECT NO.:**	35636
		REF. NO.:	

RE: **Site visit trip report – SLIPP Foreshore Restoration Project – Aug 23-24 and 26, 2011**
Shuswap Shoreline Restoration

Todd Smith, MFLNRO Resource Compliance Technologist (Salmon Arm Field Office) and Ken Ashley, Northwest Hydraulic Consultants, visited several residences in the Shuswap Lake area on August 23-24 and 26, 2011 to meet and discuss with lakefront property owners their willingness to participate in a SLIIP funded voluntary restoration of their Crown foreshore violations. This memorandum outlines each site visit, provides comments and reactions of the property owner(s) and identifies several habitat restoration policy decisions for MFLNRO and DFO that are required in order to proceed with the SLIPP Shoreline Restoration project.

Tuesday, August 23, 2011

SLIPP Site s.22

s.22, s.17

The corrected contact information for this site is as follows:

Owners: s.22

Shuswap property address: s.22

Home address: s.22

Phone: s.22

Cell s.22

E-mail: S22

CSRD Parcel Rollx s.22

The format of the discussion was to explain that the property owner was (1) in violation of the Provincial Land Act Crown Foreshore tenure by either building on it, forming groynes, infilling with sand or substantially altering the nature of the substrate, (2) that this site had been identified as a priority infraction site by the FHIS foreshore mapping project, (3) that the alternations were deleterious to fish and fish habitat, and (4) that SLIPP was prepared to cover the cost of restoring the site to natural conditions for this year only i.e., a one-time offer.

If the property owner(s) were willing to cooperate, they were provided a letter from MFLNRO's Manager of Authorizations (Andy Oetter) which explained the SLIPP process and the nature of their Crown foreshore violation. They were then given a second letter of consent to sign and mail in to MFLNRO by Sept 12, 2011 which authorized SLIPP funded restoration of their site in 2011, and granted access to their private property for SLIPP restoration contractors. In this case (Site S22 the

S15, S22

s.17, s.22

This site is suitable for SLIPP foreshore restoration.

Required actions: conceptual drawing, agreement on percentage of restored foreshore, mailing out and receipt of signed letter of consent.

Figure 1. SLIPP Site S22

s.22, s.15

Figure 2. SLIPP Site

s.22, s.15

Figure 3. SLIPP Site S.15, 22

Figure 4. SLIPP Site S22 groynes on property boundary).

Wednesday, August 24, 2011

SLIPP Site S22 The owners of this site were contacted by S22 on August 10, 2011.

The contact information for this site is as follows:

Owners s.22

Shuswap property address s.22

Home address: n/a

Phone: s.22

Cell: s.22

s.22

CSRD Parcel Rollx: s.22

s.22

S15, S22 The inspection of the property indicated that the native material on the foreshore consisted mainly of small flattened rocks, 2 to 10 cm in diameter, which shifts easily when walked on, and is moved about by long shore currents and wave action. As a result

S15, S22

S15, S22

The concrete boat ramp has been undermined by the shifting native substrate, and gabions and riprap have been placed around the east side and lower sections of the boat launch to prevent further erosion (**Figures 7 and 8**).

S15, S22

S15, S22

he foreshore to the west of this property is in a natural state, and because of the reduced slope, does not appear to be experiencing the same degree of erosion as the steeper foreshore property on which the house and boat launch have been constructed (**Figures 10 and 11**).

In this situation, I believe the erosion is due to the erodible native substrate and the location and slope of the development on the property relative to long shore currents and wave action. s.22

have permission to occupy the Crown foreshore for private mooring purposes, and are granted rights under the BC Land Act to protect their property from erosion by installing protective structures on their own land. This property has several small groynes that likely intrude onto Crown foreshore, however these are small in nature, and if they were removed it could lead to accelerated foreshore erosion and possibly undermine the gabion baskets which form the vertical retaining wall of the property line, which could lead to failure of the gabion retaining wall and slumping of a portion of the property into the lake.

s.22

This site is not suitable for SLIPP foreshore restoration due to the natural erodibility of the substrate, and possibility of property damage. s.17, s.22

s.17, s.22

Figure 5. SLIPP Site S22

s.22, s.15

Figure 6. SLIPP Site S22 abion retaining wall and groynes).

S15, S22

Figure 7. SLIPP Site S22 boat launch and gabion retaining wall).

s.22, s.15

Figure 8. SLIPP Site S15, S22

s.22, s.15

Figure 9. SLIPP Site S15, 22

S15, S22

Figure 10. SLIPP Site S.15, 22

S15, S22

Figure 11. SLIPP Site S22 ative Crown foreshore to west of property).

S15, S22

SLIPP Site S22 The owners of this site were contacted by S22 on August 11, 2011.

The contact information for this site is as follows:

Owners s.22

Shuswap property address: s.22

s.22

Home address: s.22

Phone: s.22

Cell: s.22

E-mail: s.22

CSRD Parcel Rollx s.22

s.22

S15, S22 The owners have modified the foreshore by collecting larger native substrate to form a sandy beach, and piling it into large groynes on the property (**Figure 12**). The Crown foreshore alterations have been in place for decades, and no recent activity was noted from the photographs, however, a detailed on-site visit has not been conducted.

s.17, s.22

s.17, s.22

This site is suitable for SLIPP foreshore restoration.

Required actions: Site visit, conceptual drawing, agreement on percentage of restored foreshore, mailing out and receipt of signed letter of consent.

Figure 12. SLIPP Site S22 groyne).

s.22, s.15

SLIPP Site S22 The owners of this site have not been contacted. This site was originally identified from

S17, S22 o s.17, s.22

The corrected contact information for this site is as follows:

Owners: s.22

Shuswap property address s.22

Home address: s.22

Phone: n.a

Cell: n/a

E-mail: n/a

CSRD Parcel Rollx: s.22

This site has a large and steep concrete boat ramp which extends from the property line retaining wall across Crown foreshore into the lake (**Figures 13 and 14**). Large boulders are placed in front of the property retaining wall and on either side of the boat launch to prevent erosion (**Figures 15 and 16**).

s.17, s.22

s.17, s.22

Sites S22 and s.17, s.22 are suitable for SLIPP foreshore restoration.

s.17, s.22

Figure 13. SLIPP Sit S22

s.22, s.15

Figure 14. SLIPP Site S22

s.22, s.15

Figure 15. SLIPP Site S22 boulders beside boat ramp and retaining wall east side)

s.22

Figure 16. SLIPP Sit S22 oulders beside boat ramp west side).

s.22, s.15

Figure 17. Multiple groynes and foreshore modifications to the east of SLIPP Sit S22

s.22, s.15

Figure 18. Multiple groynes and foreshore modifications to the west of SLIPP Site S22

s.22, s.15

SLIPP Sit S22 he owners of this site were not contacted by phone.

The contact information for this site is as follows:

Owner s.22

Shuswap property address: s.22

Home address: s.22

Phone: n/a

Cell: n/a

E-mail: n/a

CSRD Parcel Rollx: s.22

s.22 This site has a large boat ramp, originally designed S22 (**Figures 19 to 22**). The ramp extends from the retaining wall on their property line into the lake, and is approx. 9 m wide x 30 m long by 0.1 m in depth.

s.17, s.22

This site is suitable for SLIPP foreshore restoration.

Required actions: conceptual drawing, s.17, s.22

Figure 19. SLIPP Site S22

s.22, s.15

Figure 20. SLIPP Site S22

s.22, s.15

Figure 21. SLIPP Sit S22

s.22, s.15

Figure 22. SLIPP Sit S22

s.22, s.15

Friday, August 26, 2011

SLIPP Sit S22 he owners of this site were contacted by S.22 n August 11, 2011.

The contact information for this site is as follows:

Owners: s.22

Shuswap property address: s.22

Home address: s.22

Phone: s.22

Cell: s.22

E-mail s.22

CSRD Parcel Rollx s.22

This site is a large, low slope property s.22, s.17 hat has been covered from above the property boundary to the shore line with several cms of pea gravel (**Figure 23 and 24**), and built a large retaining wall of rocks that the owner indicated was on his property line (**Figure 25**) s.17, s.22

s.17, s.22

S.17,22 The coarser native substrate has been either buried, or piled in small groynes at either side of his property boundary (**Figure 26 and 27**). The shoreline to the west appeared to be in its natural state (**Figure 28**). A small stream discharges onto the east section of the foreshore from a ditch which runs along the road above the property, which apparently has increased in discharge due to upland land development and subsequent alterations to the natural watercourse (**Figures 29 and 30**). s.17, s.22

s.17, s.22

This site is suitable for SLIPP foreshore restoration.

Required actions: conceptual drawing, agreement on percentage of beach restoration, receipt of signed letter of consent.

Figure 23. SLIPP Site S22

s.22, s.15

Figure 24. SLIPP Site S22 pea gravel on foreshore).

s.22, s.15

Figure 25. SLIPP Site S22 ock retaining wall).

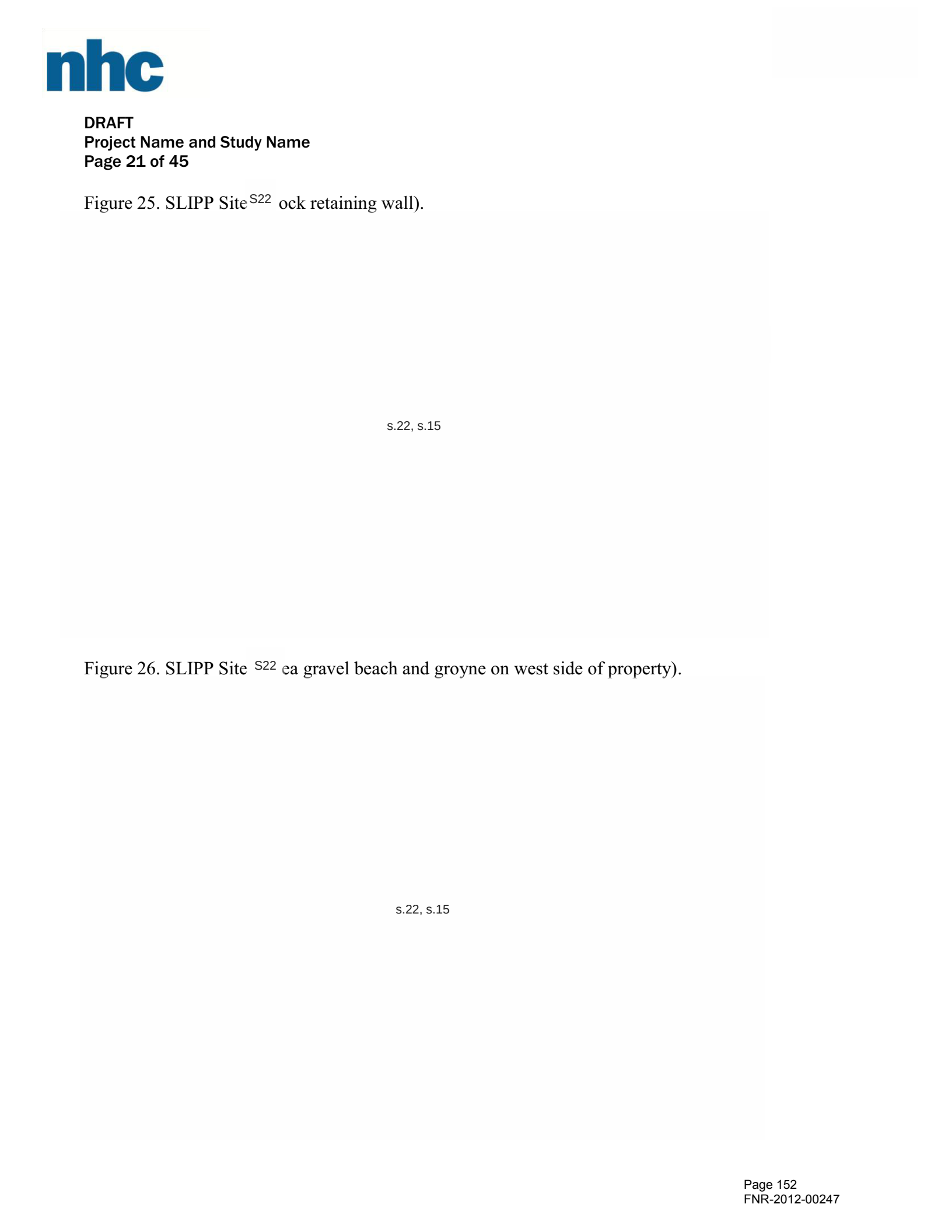
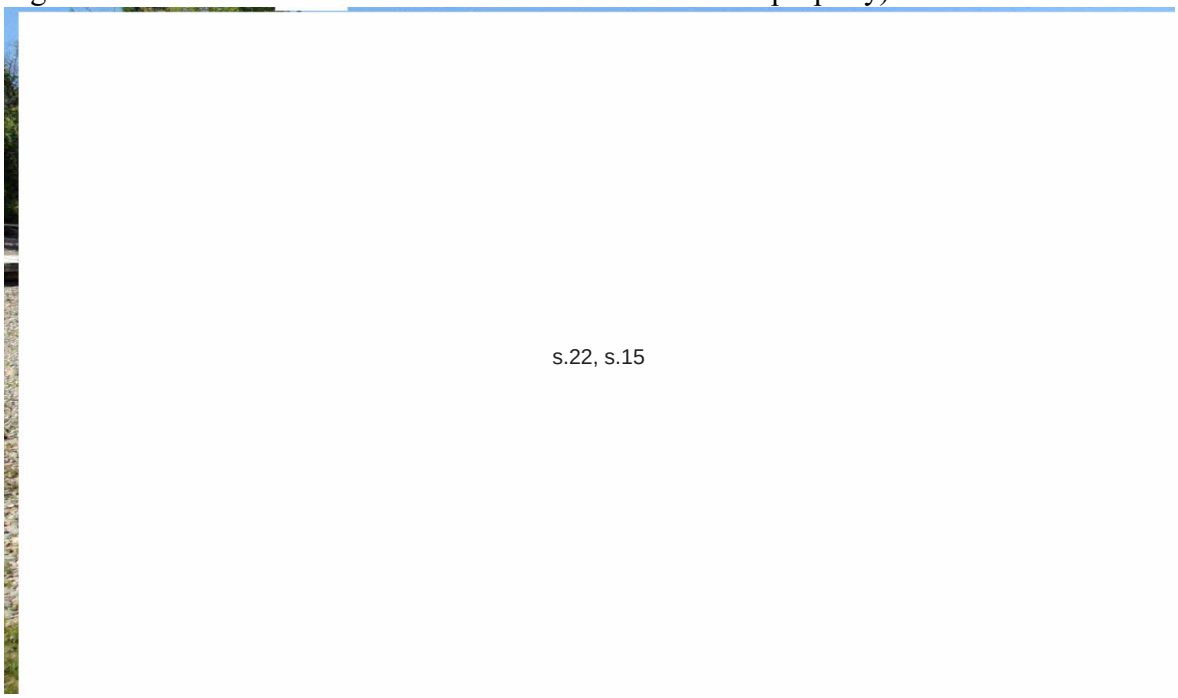


Figure 26. SLIPP Site S22 ea gravel beach and groyne on west side of property).

Figure 27. SLIPP Sit S22 royne on west side of property).

s.22, s.15

Figure 28. SLIPP Sit S22 ative Crown foreshore to west of property).



s.22, s.15

Figure 29. SLIPP Sit S22

s.22, s.15

Figure 30. SLIPP Site S.15,22

s.22, s.15

SLIPP Site s.17, s.22

SLIPP Site S22 The owners of this site were contacted by S.22 on August 11, 2011 by S15, S22

The contact information for this site is as follows:

Owners s.22

Shuswap property address: s.22

Home address: s.22

Phone: s.22

Cell: s.22

E-mail: s.22

CSRD Parcel Rollx s.22

This site has a large concrete boat ramp with rails extending from a boat house above the property line

s.17, s.22

s.17, s.22

Figure 31. SLIPP Site S22

s.15

Additional phone contacts:

SLIPP Site S22 owner of this site was contacted by s.22 on August 11 and 30, 2011 and

The contact information for this site is as follows:

Owners: s.22

Shuswap property address: s.22

Home address s.22

Phone s.22

Cell: s.22

E-mail s.22

CSRD Parcel Rollx: s.22

s.17, s.22

S17, S22 his site has modified the Crown foreshore by placing material on top of the native foreshore substrate to create a beach (**Figure 32**). s.17, s.22

s.17, s.22

This site is suitable for SLIPP foreshore restoration.

Required actions: Site visit, mailing out and receipt of signed letter of consent.

Figure 32. SLIPP Site S22

s.22, s.15

SLIPP Sit S22 he owner of this site was contacted b s.22 on August 10, 2011 an S.22 s.17, s.22

The contact information for this site is as follows:

Owners: s.22

Shuswap property address s.22

Home address: s.22

Phone:

Cell: s.22

E-mail: s.22

CSRD Parcel Rollx: s.22

s.17, s.22 This site has an abandoned dock on the Crown foreshore and some upland vegetation clearing (**Figure 33**). S.22

s.17, s.22

This site is potentially suitable for SLIPP foreshore restoration.

Required actions: Site visit to s.17, s.22 to determine if any restoration works are required, mailing out and receipt of signed letter of consent.

Figure 33. SLIPP Site S22

s.22, s.15

SLIPP Sit S22 The owner of this site was contacted by s.22 on August 11, 2011 and S.22 S15, S22

The contact information for this site is as follows:

Owners: s.22

Shuswap property address s.22

Home address s.22

Phone: s.22

Cell: s.22

E-mail: s.22

CSRD Parcel Rollx: s.22

This site is a concrete boat ramp s.22

s, 15 s.17, s.22

Figure 34. SLIPP Sit S22

S15, S22

SLIPP Site S22 The owner of this site was contacted by S.22 on August 10, 2011, and S.22 S22 on August 22, 2011.

The contact information for this site is as follows:

Owners s.22

Shuswap property address s.22

Home address s.22

Phone: s.22

Cell:

E-mail: n/a

CSRD Parcel Rollx s.22

This site is a concrete boat ramp in an undisturbed reach of Shuswap Lake s.22 s.22 **Figure 35**). s.17, s.22,

s.17, s.22

Figure 35. SLIPP Site S22

s.22, s.15

SLIPP Site S22 e owner of this site on Mara Lake has not been contacted s.17, s.22, Not Responsive s.17, s.22 **and 37**).

The contact information for this site is as follows:

Owner: s.22

Mara property address s.22

Home address: s.22

Phone: n/a

Cell: n/a

E-mail: n/a

Property ID No: s.22

This site is suitable for SLIPP foreshore restoration, S15, S22

Required actions
S.17, 22 s.17, s.22

Figure 36. SLIPP Sit S22

s.15, s.22

Figure 37. SLIPP Site S22

s.15, s.22

SLIPP Site S22

This site involves a concrete boat launch across Crown foreshore S15 S15 (**Figure 38 and 39**). To date, we have not been able to determine the owner.

The contact information for this site is as follows: unknown

Owner: Unknown

Shuswap property address:

Home address:

Phone: n/a

Cell: n/a

E-mail: n/a

CSRD Parcel Rollx:

This site is suitable for SLIPP foreshore restoration.

Required actions: Determine property owner and contact, mailing out and receipt of signed letter of consent.

Figure 38. SLIPP Site S22

s.22, s.15

Figure 39. SLIPP Site S22

s.22, s.15

SLIPP Site S22

This site involves considerable alteration of the Crown foreshore, importation of sand and formation of groynes from native substrate collected from the foreshore (**Figures 40 to 43**).

The contact information for this site is as follows:

Owner s.22

Shuswap property address s.22

Home address: s.22

Phone: s.22

Cell: n/a

E-mail: n/a

CSRD Parcel Rollx: s.22

This site is suitable for SLIPP foreshore restoration.

Required actions: Site visit, contact property owner, mailing out and receipt of signed letter of consent.

Figure 40. SLIPP Site S22

s.22, s.15

Figure 41. SLIPP Site S22

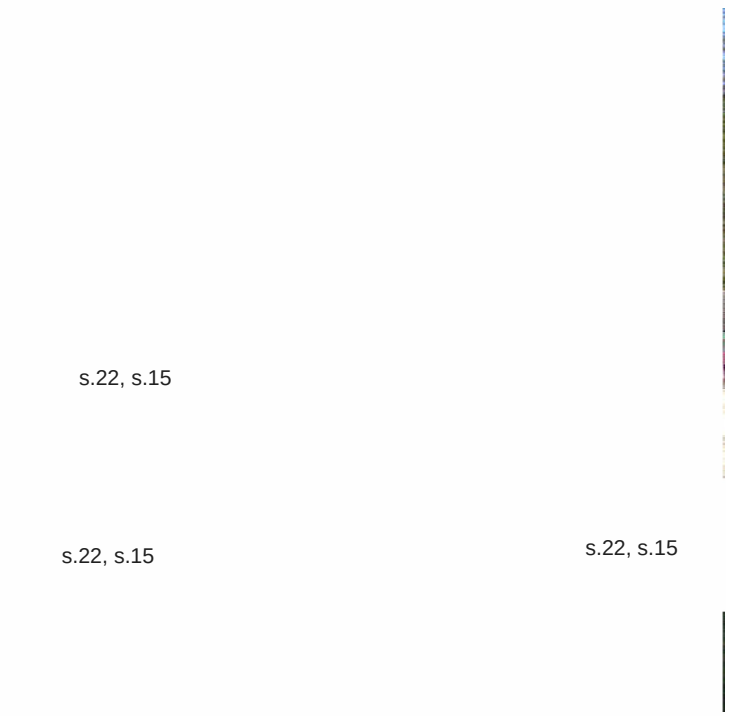
s.22, s.15

Figure 42. SLIPP Site S22

s.22, s.15

s.22, s.15

Figure 43. SLIPP Sit S22



SLIPP Site S22

This site has modified the Crown foreshore and created a small access road (**Figures 44 to 46**).

The contact information for this site is as follows:

Owne s.22

Shuswap property address s.22

Home address: s.22

Phone: n/a

Cell: n/a

E-mail: n/a

CSRD Parcel Rollx: s.22

This site is suitable for SLIPP foreshore restoration.

Required actions: Contact property owner, mailing out and receipt of signed letter of consent.

Figure 44. SLIPP Site S22

s.22, s.15

Figure 45. SLIPP Site S22

s.22, s.14

Figure 46. SLIPP Sit S22

s.22, s.15

SLIPP Site: No SLIPP identification to date.

This site has modified the Crown foreshore since the FHIS mapping occurred (**Figure 47**).

The contact information for this site is as follows:

Owner:

Shuswap property address:

Home address:

Phone: n/a

Cell: n/a

E-mail: n/a

CSRD Parcel Rollx:

This site is suitable for SLIPP foreshore restoration.

Required actions: Determine property owner, mailing out and receipt of signed letter of consent.

Figure 47. Unknown SLIPP Site S15

S.15

SLIPP Policy Items for Discussion/Decision

s.13, s.16, s.17

SLIPP Sit S22

August 22, 2011

s.22

This letter explains the interest that the Shuswap Lake Integrated Planning Process (SLIPP) agency partners have regarding your Shuswap property (Roll No. s.22

Your participation in this shoreline restoration project will contribute to the success of SLIPP which is critical to the future health of our lakes, fish populations and the water quality we all depend upon.

SLIPP brings together communities, First Nations and public agencies to make the Shuswap watershed a great place to live, work and play. SLIPP was launched in 2007 in response to pressures from conflicting demands on recreational resources, increased development and contaminants flowing into the lakes. Working in partnership on innovative approaches and projects, SLIPP aims to increase public safety on the lakes, ensure a healthy lake and create an environment where a diversity of recreational experiences and economic opportunities can be enjoyed by all. More complete details of SLIPP's vision and goals are available at www.slippbc.com.

SLIPP has begun to act on the Foreshore Restoration Project as an important step in the rehabilitation of fish habitat. This Project flows from the 2008 Foreshore Inventory and Mapping study which documented the entire shorelines of the Shuswap and Mara Lakes.

As part of the mapping process, thousands of incidents of foreshore damage were observed and 55 sites were prioritized for action based on the highest threats to fish populations and water quality. Your property lies behind one of these areas which is why we asked for the meeting with you.

One of the factors that will increase the health of our lakes and its fish population is the removal of concrete boat ramps, docks and groynes that are located in high value fish habitat areas along the shoreline. We are asking for your cooperation to remove the

Ministry of Forests, Lands and Natural Resource Operations

Thompson / Okanagan Region

Mailing/Location Address:
441 Columbia Street
Kamloops, BC V2C 2T3

Telephone: 250 828 4131
Facsimile: 250 828 4442

Web Address:
http://www.gov.bc.ca

concrete boat launch from the front of your property as it is a modification of Crown Land and is in one of the sensitive fish habitats, and to restore the Crown shoreline to a natural substrate condition.

Each year between October and December, Lake Char (a sub–species of Salmonid) may use the beach in front of your property to lay their eggs in the gravel and cobbles located in the shallow waters next to your groynes. Foreshore modifications such as yours negatively impacts their spawning grounds while beach clearing results in more sediment which affects egg incubation and the emergence of char fry. In addition, sockeye fry use habitat close to the shore in the first few weeks after they emerge from the gravel and before they move offshore to feed. For both of these important fish populations, it is critical to maintain high quality habitat along the shoreline.

s.17, s.22

Your support will help maintain a healthy fish population, raise awareness of best practises and build a culture of environmental stewardship in the community.

If you are in agreement with this offer to restore your shoreline to a naturalized condition as described above, **please sign the accompanying letter of consent, and return the letter to me by September 12th, 2011**.

For more information regarding the restoration, please contact Project Manager Dr. Ken Ashley of Northwest Hydraulic Consultants at 604-980-6011 or kashley@nhc-van.com or me at the number below.

Sincerely,

Andy Oetter
Manager of Authorizations
250-828-4413

Attn: Andy Oetter, Manager of Authorizations

Ministry of Forests, Lands and Natural Resource Operations
441 Columbia Street
Kamloops, BC V2C 2T3

To whom it may concern:

Re:

s.17, s.22

I am the owner of the above noted property and the current owner of the concrete boat ramp, located adjacent to the above noted property, which occupies Crown Land forming the bed of Shuswap Lake, as shown in the attached photo and map.

With respect to the above noted concrete boat ramp, I hereby consent to the removal of the concrete boat ramp and/or restoration of natural foreshore substrate by the Ministry of Forests, Lands and Natural Resource Operations. Any chattels or personal property remaining on the Crown Land site after August 31, 2011 will be deemed abandoned and subject to removal and disposal in conjunction with the site restoration.

In addition, I will allow access to the above referenced Crown Land site through my private property, for the purposes of removing the concrete boat ramp and imported substrate, completing the foreshore site restoration and disposing of materials.

Dated this day of , 2011 at

s.22

Witness
Name:
Address:

Working together to sustain our watershed

Visit slippbc.com

SLIPP Site S22

August 22, 2011

s.22

This letter explains the interest that the Shuswap Lake Integrated Planning Process (SLIPP) agency partners have regarding your Shuswap property (Roll No. s.22

Your participation in this shoreline restoration project will contribute to the success of SLIPP which is critical to the future health of our lakes, fish populations and the water quality we all depend upon.

SLIPP brings together communities, First Nations and public agencies to make the Shuswap watershed a great place to live, work and play. SLIPP was launched in 2007 in response to pressures from conflicting demands on recreational resources, increased development and contaminants flowing into the lakes. Working in partnership on innovative approaches and projects, SLIPP aims to increase public safety on the lakes, ensure a healthy lake and create an environment where a diversity of recreational experiences and economic opportunities can be enjoyed by all. More complete details of SLIPP's vision and goals are available at www.slippbc.com.

SLIPP has begun to act on the Foreshore Restoration Project as an important step in the rehabilitation of fish habitat. This Project flows from the 2008 Foreshore Inventory and Mapping study which documented the entire shorelines of the Shuswap and Mara Lakes.

As part of the mapping process, thousands of incidents of foreshore damage were observed and 55 sites were prioritized for action based on the highest threats to fish populations and water quality. Your property lies behind one of these areas which is why we asked for the meeting with you.

One of the factors that will increase the health of our lakes and its fish population is the removal of concrete boat ramps, docks and groynes that are located in high value fish habitat areas along the shoreline. We are asking for your cooperation to remove the

Ministry of Forests, Lands and Natural Resource Operations

Thompson / Okanagan Region

Mailing/Location Address:
441 Columbia Street
Kamloops, BC V2C 2T3

Telephone: 250 828 4131
Facsimile: 250 828 4442

Web Address:
http://www.gov.bc.ca

groynes from the front of your property as it is an unauthorized structure on Crown Land and is in one of the sensitive fish habitats, and to restore the Crown shoreline to a natural substrate condition.

Each year between October and December, Lake Char (a sub–species of Salmonid) may use the beach in front of your property to lay their eggs in the gravel and cobbles located in the shallow waters next to your groynes. Foreshore modifications such as yours negatively impacts their spawning grounds while beach clearing results in more sediment which affects egg incubation and the emergence of char fry. In addition, sockeye fry use habitat close to the shore in the first few weeks after they emerge from the gravel and before they move offshore to feed. For both of these important fish populations, it is critical to maintain high quality habitat along the shoreline.

s.17, s.22

Your support will help maintain a healthy fish population, raise awareness of best practises and build a culture of environmental stewardship in the community.

If you are in agreement with this offer to restore your shoreline to a naturalized condition as described above, **please sign the accompanying letter of consent, and return the letter to me by September 12th, 2011**.

For more information regarding the restoration, please contact Project Manager Dr. Ken Ashley of Northwest Hydraulic Consultants at 604-980-6011 or kashley@nhc-van.com or me at the number below.

Sincerely,

Andy Oetter
Manager of Authorizations
250-828-4413

Attn: Andy Oetter, Manager of Authorizations

Ministry of Forests, Lands and Natural Resource Operations
441 Columbia Street
Kamloops, BC V2C 2T3

To whom it may concern:

Re:

s.17, s.22

I am the owner of the above noted property and the current owner of the groynes, located adjacent to the above noted property, which occupies Crown Land forming the bed of Shuswap Lake, as shown in the attached photo and map.

With respect to the above noted groynes, I hereby consent to the removal of the groynes and/or restoration of natural foreshore substrate by the Ministry of Forests, Lands and Natural Resource Operations. Any chattels or personal property remaining on the Crown Land site after August 31, 2011 will be deemed abandoned and subject to removal and disposal in conjunction with the site restoration.

In addition, I will allow access to the above referenced Crown Land site through my private property, for the purposes of removing the groynes and imported substrate, completing the foreshore site restoration and disposing of materials.

Dated this day of , 2011 at

s.22

Witness
Name:
Address:

Fax: (250) 832-3375
email: cbenner@csrd.bc.ca
web: csrd.bc.ca

From: Smith, Todd A FLNR:EX [mailto:Todd.Smith@gov.bc.ca]
Sent: Monday, March 12, 2012 2:03 PM
To: Candice Benner
Subject: Land ownership request

s.17, s.22

Thanks.

TODD A. SMITH

RESOURCE COMPLIANCE TECHNOLOGIST
SALMON ARM FIELD OFFICE
OKANAGAN - SHUSWAP FIELD UNIT
THOMPSON - OKANAGAN REGION
PROVINCIAL OPERATIONS - COMPLIANCE AND ENFORCEMENT BRANCH
MINISTRY OF FORESTS, LANDS AND NATURAL RESOURCE OPERATIONS
PHONE: 250-833-7434 *FAX: 250-833-7433*

"ENSE ET ARATRO"

BRITISH COLUMBIA

SLIPP Shuswap Lake Integrated Planning Process

Working together to sustain our watershed

Visit slippbc.com

SLIPP Site S22

March 15, 2012

s.22

This letter explains the interest that the Shuswap Lake Integrated Planning Process (SLIPP) agency partners have regarding your Shuswap property (Roll No. s.22

Your participation in this shoreline restoration project will contribute to the success of SLIPP which is critical to the future health of our lakes, fish populations and the water quality we all depend upon.

SLIPP brings together communities, First Nations and public agencies to make the Shuswap watershed a great place to live, work and play. SLIPP was launched in 2007 in response to pressures from conflicting demands on recreational resources, increased development and contaminants flowing into the lakes. Working in partnership on innovative approaches and projects, SLIPP aims to increase public safety on the lakes, ensure a healthy lake and create an environment where a diversity of recreational experiences and economic opportunities can be enjoyed by all. More complete details of SLIPP's vision and goals are available at www.slippbc.com.

SLIPP has begun to act on the Foreshore Restoration Project as an important step in the rehabilitation of fish habitat. This Project flows from the 2008 Foreshore Inventory and Mapping study which documented the entire shorelines of the Shuswap and Mara Lakes.

As part of the mapping process, thousands of incidents of foreshore damage were observed and 55 sites were prioritized for action based on the highest threats to fish populations and water quality. Your property lies behind one of these areas which is why we asked for the meeting with you.

One of the factors that will increase the health of our lakes and its fish population is the removal of concrete boat ramps, docks and groynes that are located in high value fish habitat areas along the shoreline. We are asking for your cooperation to remove the

Ministry of Forests, Lands and Natural Resource Operations

Thompson / Okanagan Region

Mailing/Location Address:
441 Columbia Street
Kamloops, BC V2C 2T3

Telephone: 250-828-4131
Facsimile: 250-828-4442

Web Address:
http://www.gov.bc.ca

concrete boat launch from the front of your property as it is a modification of Crown Land and is in one of the sensitive fish habitats, and to restore the Crown shoreline to a natural substrate condition.

Each year between October and December, Lake Char (a sub–species of Salmonid) may use the beach in front of your property to lay their eggs in the gravel and cobbles located in the shallow waters next to your groynes. Foreshore modifications such as yours negatively impacts their spawning grounds while beach clearing results in more sediment which affects egg incubation and the emergence of char fry. In addition, sockeye fry use habitat close to the shore in the first few weeks after they emerge from the gravel and before they move offshore to feed. For both of these important fish populations, it is critical to maintain high quality habitat along the shoreline.

s.17, s.22

Your support will help maintain a healthy fish population, raise awareness of best practises and build a culture of environmental stewardship in the community.

If you are in agreement with this offer to restore your shoreline to a naturalized condition as described above, **please sign the accompanying letter of consent, and return the letter to me by March 19, 2012**.

For more information regarding the restoration, please contact Project Manager Dr. Ken Ashley of Northwest Hydraulic Consultants at 604-980-6011 or kashley@nhc-van.com or me at the number below.

Sincerely,

Andy Oetter
Manager of Authorizations
250-828-4413

Attn: Andy Oetter, Manager of Authorizations

Ministry of Forests, Lands and Natural Resource Operations
441 Columbia Street
Kamloops, BC V2C 2T3

To whom it may concern:

Re:

s.17, s.22

I am the owner of the above noted property and the current owner of the concrete boat ramp, located adjacent to the above noted property, which occupies Crown Land forming the bed of Shuswap Lake, as shown in the attached photo and map.

With respect to the above noted concrete boat ramp, I hereby consent to the removal of the concrete boat ramp and/or restoration of natural foreshore substrate by the Ministry of Forests, Lands and Natural Resource Operations. Any chattels or personal property remaining on the Crown Land site after March 19, 2012 will be deemed abandoned and subject to removal and disposal in conjunction with the site restoration.

In addition, I will allow access to the above referenced Crown Land site through my private property, for the purposes of removing the concrete boat ramp and imported substrate, completing the foreshore site restoration and disposing of materials.

Dated this _____ day of _____, 2012 at _____

_____

s.22

Witness
Name:
Address:

BRITISH COLUMBIA

SLIPP Shuswap Lake Integrated Planning Process

Working together to sustain our watershed

Visit slippbc.com

SLIPP Site S22

March 15, 2012

s.22

This letter explains the interest that the Shuswap Lake Integrated Planning Process (SLIPP) agency partners have regarding your Shuswap property (Roll No. s.22

Your participation in this shoreline restoration project will contribute to the success of SLIPP which is critical to the future health of our lakes, fish populations and the water quality we all depend upon.

SLIPP brings together communities, First Nations and public agencies to make the Shuswap watershed a great place to live, work and play. SLIPP was launched in 2007 in response to pressures from conflicting demands on recreational resources, increased development and contaminants flowing into the lakes. Working in partnership on innovative approaches and projects, SLIPP aims to increase public safety on the lakes, ensure a healthy lake and create an environment where a diversity of recreational experiences and economic opportunities can be enjoyed by all. More complete details of SLIPP's vision and goals are available at www.slippbc.com.

SLIPP has begun to act on the Foreshore Restoration Project as an important step in the rehabilitation of fish habitat. This Project flows from the 2008 Foreshore Inventory and Mapping study which documented the entire shorelines of the Shuswap and Mara Lakes.

As part of the mapping process, thousands of incidents of foreshore damage were observed and 55 sites were prioritized for action based on the highest threats to fish populations and water quality. Your property lies behind one of these areas which is why we asked for the meeting with you.

One of the factors that will increase the health of our lakes and its fish population is the removal of concrete boat ramps, docks and groynes that are located in high value fish habitat areas along the shoreline. We are asking for your cooperation to remove the

Ministry of Forests, Lands and Natural Resource Operations

Thompson / Okanagan Region

Mailing/Location Address:
441 Columbia Street
Kamloops, BC V2C 2T3

Telephone: 250-828-4131
Facsimile: 250-828-4442

Web Address:
http://www.gov.bc.ca

groynes from the front of your property as it is an unauthorized structure on Crown Land and is in one of the sensitive fish habitats, and to restore the Crown shoreline to a natural substrate condition.

Each year between October and December, Lake Char (a sub–species of Salmonid) may use the beach in front of your property to lay their eggs in the gravel and cobbles located in the shallow waters next to your groynes. Foreshore modifications such as yours negatively impacts their spawning grounds while beach clearing results in more sediment which affects egg incubation and the emergence of char fry. In addition, sockeye fry use habitat close to the shore in the first few weeks after they emerge from the gravel and before they move offshore to feed. For both of these important fish populations, it is critical to maintain high quality habitat along the shoreline.

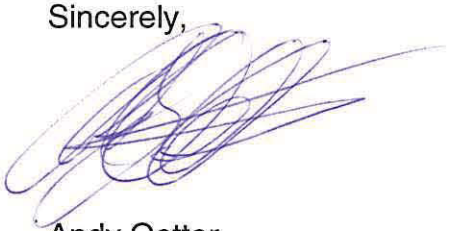
s.17, s.22

Your support will help maintain a healthy fish population, raise awareness of best practises and build a culture of environmental stewardship in the community.

If you are in agreement with this offer to restore your shoreline to a naturalized condition as described above, **please sign the accompanying letter of consent, and return the letter to me by March 19, 2012**.

For more information regarding the restoration, please contact Project Manager Dr. Ken Ashley of Northwest Hydraulic Consultants at 604-980-6011 or kashley@nhc-van.com or me at the number below.

Sincerely,



Andy Oetter
Manager of Authorizations
250-828-4413

Attn: Andy Oetter, Manager of Authorizations

Ministry of Forests, Lands and Natural Resource Operations
441 Columbia Street
Kamloops, BC V2C 2T3

To whom it may concern:

Re:

s.17, s.22

I am the owner of the above noted property and the current owner of the groynes, located adjacent to the above noted property, which occupies Crown Land forming the bed of Shuswap Lake, as shown in the attached photo and map.

With respect to the above noted groynes, I hereby consent to the removal of the groynes and/or restoration of natural foreshore substrate by the Ministry of Forests, Lands and Natural Resource Operations. Any chattels or personal property remaining on the Crown Land site after March 19, 2012 will be deemed abandoned and subject to removal and disposal in conjunction with the site restoration.

In addition, I will allow access to the above referenced Crown Land site through my private property, for the purposes of removing the groynes and imported substrate, completing the foreshore site restoration and disposing of materials.

Dated this _____ day of _____, 2012 at _____

s.22

_____

Witness
Name:
Address:

BRITISH COLUMBIA

SLIPP Shuswap Lake Integrated Planning Process

Working together to sustain our watershed

Visit slippbc.com

SLIPP Site S22

March 15, 2012

s.22

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One of the factors that will increase the health of our lakes and its fish population is the removal of concrete boat ramps, docks and groynes that are located in high value fish

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habitat areas along the shoreline. We are asking for your cooperation to remove the concrete boat launch from the front of your property as it is an unauthorized structure on Crown Land and is in one of the sensitive fish habitats, and to restore the Crown shoreline to a natural substrate condition.

Each year between October and December, Lake Char (a sub–species of Salmonid) may use the beach in front of your property to lay their eggs in the gravel and cobbles located in the shallow waters next to your groynes. Foreshore modifications such as yours negatively impacts their spawning grounds while beach clearing results in more sediment which affects egg incubation and the emergence of char fry. In addition, sockeye fry use habitat close to the shore in the first few weeks after they emerge from the gravel and before they move offshore to feed. For both of these important fish populations, it is critical to maintain high quality habitat along the shoreline.

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Your support will help maintain a healthy fish population, raise awareness of best practises and build a culture of environmental stewardship in the community.

If you are in agreement with this offer to restore your shoreline to a naturalized condition as described above, **please sign the accompanying letter of consent, and return the letter to me by March 23rd, 2012**. To meet this deadline, **please fax a copy of your consent letter to 250-828-4442 and return the original by mail**.

For more information regarding the restoration, please contact Project Manager Dr. Ken Ashley of Northwest Hydraulic Consultants at 604-980-6011 or kashley@nhc-van.com or me at the number below.

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Andy Oetter
Manager of Authorizations
250-828-4413

Attn: Andy Oetter, Manager of Authorizations

Ministry of Forests, Lands and Natural Resource Operations
441 Columbia Street
Kamloops, BC V2C 2T3

To whom it may concern:

Re:

s.17, s.22

I am the owner of the above noted property and the current owner of the concrete boat launch, located adjacent to the above noted property, which occupies Crown Land forming the bed of Shuswap Lake, as shown in the attached photo.

With respect to the above noted concrete boat launch, I hereby consent to the removal of the concrete boat launch and/or restoration of natural foreshore substrate by the Ministry of Forests, Lands and Natural Resource Operations. Any chattels or personal property remaining on the Crown Land site after March 25th, 2012 will be deemed abandoned and subject to removal and disposal in conjunction with the site restoration.

In addition, I will allow access to the above referenced Crown Land site through my private property, for the purposes of removing the concrete boat launch fill and imported substrate, completing the foreshore site restoration and disposing of materials.

Dated this _____ day of _____, 2012 at _____

s.22

_____

Witness
Name:
Address:

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I am the owner of the above noted property and the current owner of the concrete boat ramp, located adjacent to the above noted property, which occupies Crown Land forming the bed of Shuswap Lake, as shown in the attached photo and map.

With respect to the above noted concrete boat ramp, I hereby consent to the removal of the concrete boat ramp and/or restoration of natural foreshore substrate by the Ministry of Forests, Lands and Natural Resource Operations. Any chattels or personal property remaining on the Crown Land site after March 19, 2012 will be deemed abandoned and subject to removal and disposal in conjunction with the site restoration.

In addition, I will allow access to the above referenced Crown Land site through my private property, for the purposes of removing the concrete boat ramp and imported substrate, completing the foreshore site restoration and disposing of materials.

Dated this _____ day of _____, 2012 at _____

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Witness
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Address: