Foreshore Development Guide

Fraser Lake

Prepared For:

Living Lakes Canada

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1. Introduction

In recent years, environmental impacts to lake shorelines (e.g., degraded habitat, recreational use conflicts, and water quality impacts) have prompted government agencies to initiate projects focused on increasing our understanding of lake shorelines to support evidence-based lake management strategies. For example, Living Lakes Canada has partnered with Indigenous groups, as well as local, provincial and federal regulators to provide guidance on how to balance shoreline development with protection of important habitats. The guidelines presented in this document are founded on the concept that sustainable management is the shared responsibility of all stakeholders, including proponents, professionals and all levels of government.

This Foreshore Development Guide (FDG) provides development planning guidelines, aimed at protecting sensitive fish and wildlife species and their habitats identified through the previous FIM and FHSI analyses. The FDG is an initial tool used when planning for, prescribing, or reviewing riparian and shoreline alterations. Based on the environmental (species and habitat) values, the FDG identifies the levels of risk associated with shoreline alteration from various types of development activities. The risks identify the anticipated regulatory steps required to proceed with the project. The guidelines provide important information to support both the landowner in preparing foreshore work applications, and the government agencies during their review of the applications.

The FDG recommends areas to be conserved, where development may present very high or significant risk to high value species and their habitats that require shoreline areas to carry out their life-cycle. These sensitive habitats may be protected by various means, including local government inclusion in local planning processes such as Official Community Plans (OCP) and bylaws, conservation covenants on public or private land and parks, and *Land Act* Section 16 Reserves on crown land. Additionally, the FDG describes how restoration opportunities should be sought to improve habitat previously disturbed, and to potentially aid in obtaining regulatory support for new proposed projects.

The FDG methods were first developed for Windermere Lake by the East Kootenay Integrated Lake Management Partnership (EKILMP et al. 2009). These original methods used the BC Ministry of Environment (BC MoE) document - High Value Habitat Maps and Associated Protocol for Works along the Foreshore of Large Lakes within the Okanagan (BC MoE 2008), and input from the various EKILMP members including: Fisheries and Oceans Canada (DFO), BC MoE, Regional District of East Kootenay (RDEK), Ktunaxa Nation Council (KNC), ʔakisq̓nuk First Nation, and Wildsight. Additional lake projects followed and expanded on the initial EKILMP FDG. Notable lake projects included: Moyie Lake (Schleppe 2009), Tie Lake (McPherson et al. 2012) and Kootenay Lake (Kootenay Lake Partnership 2019). With each iteration of these documents, the general process for developing a FDG wasrefined.

In 2019, LLC obtained funding from the Fisheries and Oceans Canada, Canada Nature Fund for Aquatic Species at Risk Program to begin the work to refine the FIM methods and survey and/or re-survey lakes in the Columbia Basin that contain federally designated aquatic Species at Risk. The goal of the project was to improve information about foreshore health and Species at Risk habitat requirements for priority Upper Columbia Basin lakes, and to conserve and restore habitats of highest ecological value.

The 2021 Foreshore Integrated Management Protocol (FIMP) was produced to standardize the FIMP methods for use in all lakes going forward. Improvements included a protocol for lake re-surveys (minimum 10-year return survey) to provide monitoring and development trend data and ecological cumulative impacts data, recommendations for the identification and protection of sensitive habitats and conservation areas, inclusion of First Nations Indigenous Knowledge, updated Foreshore Development Guidelines (FDG), and technological improvements including standards for shoreline drone video collection and GIS mapping.

2. Important Contact Information

Proponents may use the contact information provided below when planning their proposed activities. Even with the use of this document, it is recommended that anyone who is planning work on Crown Land (such as the shoreline), first contact FrontCounterBC or retain the services of a Qualified Environmental Professional (QEP) who will contact FrontCounterBC on their behalf. Depending on the situation, FrontCounterBC will provide guidance on whether the proposed works are allowed or not allowed under the respective legislation. Similarly, works on private lands must also consider local government's requirements (e.g., permitting or notifications). Local First Nations have requested that they be included in the government consultation process.

FrontCounterBC - *FrontCounterBC* should be contacted for any works planned on Crown Land, including work along the lake shoreline.
Phone: 1-877-855-3222
Email: FrontCounterBC@gov.bc.ca

Regional District – Regional District of Bulkley-Nechako should be contacted for any works planned on private land within the region's jurisdiction.
Phone: 250-692-3195
Email: planning@rdbn.bc.ca

Village of Fraser Lake- The Village of Fraser Lake should be contacted for any works on private land within the municipal jurisdiction.
Contact: Ethan Fredeen, Chief Administrative Officer
Phone: 250-699-6257
Email: cao@fraserlake.ca

First Nations – The following individuals should be contacted for any works along the foreshore of Fraser Lake that require First Nation engagement:

Stellat'en First Nation
Contact: Isaiah Reynolds
Email: isaiah.reynolds@stellaten.ca
Contact: Doug Casimel
Email: doug.casimel@stellaten.ca

Nadleh Whut'en First Nation
Contact: Kirsten Chapman
Phone: 250 690 7211 ext.110
Email: referrals@nadleh.ca
Contact: Pamela Ketlo

Nechako Watershed Roundtable (Fraser Basin Council)
Contact: Kim Menounos
Email: kmenounos@fraserbasin.ca
Contact: Tasha Peterson
Email: tpeterson@fraserbasin.ca

Nechako Environment and Water Stewardship Society (NEWSS)
Contact: Wayne Salewski
Email: salewski@telus.net

Nechako White Sturgeon Recovery Initiative
Phone: 250-567-6673
Email: mailto:info@nechakowhitesturgeon.org

2.1. First Nations Indigenous Knowledge

Fraser Lake ("Nadleh Bun") is within the Sellat'en First Nation and Nadleh Whut'en First Nation traditional territory. Living Lakes Canada has been working collaboratively with both Nations to develop a framework for the inclusion of First Nations Indigenous Knowledge within the FIMP program. A representative of each Nation accompanied the field crew during the August 2023 field surveys and provided invaluable information and qualitative knowledge on local history and important cultural sites present around Nadleh Bun. Further consultation with the two First Nations resulted in the creation of polygons around designated culturally significant sites and are presented on the accompanying maps (Appendix A).

Nadleh Bun and its surrounding waterways have provided important transportation routes, social and cultural value, and food sources to local First Nations for time immemorial. The Sellat'en First Nation and Nadleh Whut'en First Nation are dedicated to stewarding and preserving the land, waters, and natural resources crucial to the community's heritage and sustainability while securing a vibrant and resilient future for generations to come.

3. FDG Process Overview

The FDG provides a step-wise process to help direct applicants through the initial planning stages for their proposed shoreline development, project or activity (Figure 1).

Step 1: Identify the fish and wildlife habitat values where the project is situated using the FDG map. The FDG map was prepared using the FHSI outputs, and depicts: a) values by segment, with different colours representing high to low values; and b) where Zones of Sensitivity (ZOS) may be present. ZOS are areas with exceptionally high value, which should if at all possible, be conserved according to local, provincial or federal plans or through private land agreements.

Step 2: Review the general recommendations for the applicable colour zone and ZOS to understand associated habitat sensitivity of the area, and risk anthropogenic disturbances pose.

For areas of greater risk, a very high level of detail is needed in order to submit an application that can be considered for regulatory review. In these cases, it should not be expected that because information is submitted that approvals are forthcoming.

Step 3: Use the Activity Risk Matrix (ARM) to identify the level of risk of the proposed project on the habitat. The risk is indicative of the acceptability of a project to regulators.

Step 4: Determine the necessary regulatory approvals/permits/authorizations (collectively 'approvals') that must be obtained. This final step is project dependent and depends on many factors and is subject to change based on government policy. Hence, only an overview is provided here, along with logistical considerations.

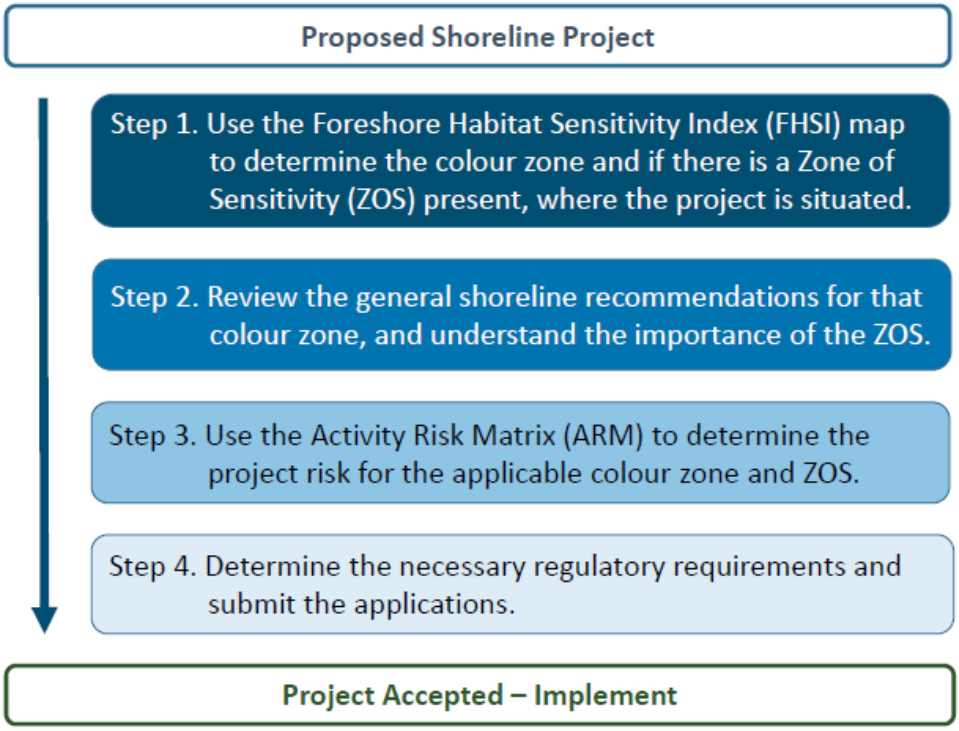


Figure 1. Four steps when planning to develop or modify foreshore habitat.

3.1. Interpret the FDG Map

The key results of the FIM and FHSI are presented in tables and maps (Mackas et al. 2024). When planning foreshore development, the FDG map is the primary reference tool because it synthesizes the pertinent fish and wildlife information into an easy to understand map (Appendix A). In the FDG map, the FHSI ecological rankings for each segment are depicted as one of five colours zones, ranging from very high to very low value (Table 1).

Table 1. FHSI ecological rank, ZOS colour scheme applied to the FDG map.

Value type	Rank/Sensitivity	Map Colour
Ecological Rank	Very High	Red
	High	Orange
	Moderate	Yellow
	Low & Very Low	Grey
Zones of Sensitivity	Fisheries	Blue
	Wildlife	Brown
	Herptiles	Mauve
	Waterfowl	Teal
	Ecosystem/Habitat Feature	Green
	Rare occurrences	Purple
	Vegetation	Olive

The FDG map also depicts each ZOS in a specific colour scheme. Each ZOS is presented as either a polygon, line, or point, and should include an outer buffer. This buffer accounts for unknowns of the ZOS full extent, and protects the core ZOS from potential impacts from adjacent activities (Figure 2). Details on each ZOS, including how each was defined, and how the buffers were determined are presented in Section 5.2.

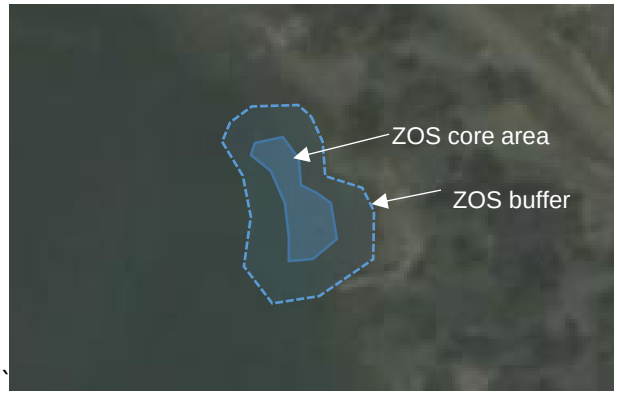


Figure 2. Zone of Sensitivity with an appropriate buffer.

Culturally Sensitive Areas, as identified during communications with Stellat'en and Nadleh First Nations, are also mapped with a buffer in a peach colour on the FDG Maps. In some cases, these areas are of a sensitive nature, and the exact locations have been requested to be kept confidential.

Table 2. Culturally Sensitive Areas colour scheme applied to the FDG map.

Value type	Map Colour
Culturally Sensitive Areas	Peach

4. Step 1. Locate Project Relative to Shoreline Colour Zones and Zones of Sensitivity

Use the FDG map to identify the values present along or within their proposed development area. Together, the FHSI colour zone and the ZOS mapped features provide a science-based tool to guide development planning. The fish and wildlife value/risk and subsequent regulatory review process are highest in red zones and areas with ZOS. Since these areas have the highest natural value and are at greatest risk to shoreline alteration, they require the highest level of on-going protection. The values/risk in the grey zones are lowest. Since there is already likely significant impact from development in grey zones, future development is less likely to cause negative impacts. The specific recommendations for each colour zone and ZOS are provided in the next section.

5. Step 2 – Review Colour Zone, ZOS and Conservation Recommendations

For this step, review the recommendations for the respective colour zone and ZOS that align with the proposed development. The summary tables below provide detail on the values present, and identify how to potentially minimize impacts. Also, refer to the conservation recommendations to see how your project may align with an area that has been identified as a candidate for protection. Proposed development should adhere to these recommendations to reduce impacts on sensitive fish and wildlife values. Opportunities for restoration or re-development should be explored in any zone where work is proposed.

5.1. Shoreline Colour Zone Recommendations

Red Shoreline	
Defined by:	Very High FHSI ecological rank.
FHSI summary:	Red zones account for 26.9% of the total shoreline length of Fraser Lake and include Segments 2, 3, 4, 10, 16, 17, 18, 24, 33, 35, 36, 37, 39, 42, 50, and 55.

Red Shoreline	
Sensitivity Summary:	Red shoreline areas have been identified as essential for the long-term maintenance of fish and/or wildlife values through the FHSI Analysis. These areas are essential for fish and/or wildlife populations. Segments that were assigned a Very High ecological ranking were generally associated with extensive wetlands. In addition to having extensive wetlands, Segments 2, 3, 4, 33, 35, 36, 37 and 55 are located at the mouths of the Stellako and Nautley Rivers, and are important for rearing, staging and migration habitat for fish (particularly salmon). Both Sockeye and Chinook Salmon migrate through the Nautley and Stellako rivers to access spawning habitat. The mouth of the Stellako River has also been identified as important habitat for the endangered Nechako White Sturgeon population. The Stellako River is also considered an important connectivity corridor for wildlife, providing a linkage to François Lake through the Stellako River Wildlife Management Area. The mouth of Ormond Creek (Segment 24) also received a Very High ecological ranking due to the historical presence of spawning salmon, high value staging and migration habitat for fish, undisturbed riparian habitat, and the presence of at-risk ecosystems. Segments 10, 16, 17, 18, 39, and 42 are associated with extensive wetlands and mature forests providing high value fish and wildlife habitat. Huntly Island (Segment 50) is an undisturbed island with mature coniferous forest, including several veteran trees and snags that provide important wildlife habitat. Many of these segments are also considered important waterfowl congregating areas associated with large littoral zones.
Recommen-dations:	Due to their high value (sensitive communities present), Red shoreline areas are recommended to have limited development to promote conservation use (Section 5.3). Low impact water access recreation and traditional First Nation uses are examples of acceptable activities in these areas, while permanent structures or alteration of habitats are not. Invasive aquatic plant removal is often acceptable, provided there is an approved aquatic plant removal program, including trained personnel, and appropriate permitting in place. Habitat restoration opportunities include the reestablishment of native riparian vegetation in areas that have been impacted by clearing for fields (i.e., Segments 2 and 3 along the Stellako River, Segment 17 near the mouth of Stern Creek, Segment 35 on the south side of the Nautley River mouth impacted by agricultural fields. The mouths of the Stellako River, Nautley River, and Ormond Creek are recommended to be designated as conservation zones due to their importance to migrating salmon and sensitive wetland habitat present. A no motorized boat zone and/or restricted speed zones are recommended during salmon spawning periods. The Stellako and Nautley River mouths are also important areas for congregating waterfowl, particularly because

Red Shoreline	
	they typically remain free of ice in the winter. While not used by migrating salmon, the mouth of Stern Creek is also recommended for conservation on account of a large tract of undisturbed wetland which provides high fish and wildlife value, as well as relatively undisturbed mature forest in the upland zone. Huntly Island is also recommended as a conservation zone due to its unique characteristics and important wildlife habitat.

Orange Shoreline	
Defined by:	High FHSI ecological rank.
FHSI summary:	Orange zones account for 24.6% of the total shoreline length of Fraser Lake and include Segments 11, 12, 14, 15, 20, 23, 27, 31, 32, 40, 44, and 45B.
Sensitivity Summary:	Orange shoreline segments have been identified as high value habitat areas for fish and/or wildlife. These areas are comprised of relatively natural undisturbed areas that include important fish and wildlife habitat as well as wetlands. Some of these segments are also considered important waterfowl congregating areas associated with large littoral zones (Segments 11, 12, 14, 15, 23, 27 and 40). These areas are sensitive to development, continue to provide important habitat functions, but may be at risk from adjacent development pressures. Disturbance of the Fraser Lake shoreline is increasing at a rate of 0.2% per year and it is important to identify and protect these sensitive areas from development pressure.
Recommen-dations:	Proponents should consider moving high risk activities to other areas if possible, or pursuing activities that have lower associated risks. The lake environment can benefit from having orange shoreline areas set aside to contribute to the overall lake conservation area. The conservation options identified in Section 5.3 would likely apply through most of the orange areas, benefitting the lake. Restoration opportunities potentially exist in these areas and include restoration of native riparian vegetation in areas disturbed by residential development (e.g., sections of Segments 11, 12, 23) and revegetation of armoured shoreline (e.g., Segment 40) where possible.

Yellow Shoreline	
Defined by:	Medium FHSI ecological rank.
Lake summary:	Yellow zones account for 21.6% of the total shoreline length of Fraser Lake and include Segments 1, 6, 7, 8, 9, 13, 30, 38, 41, 51 and 54.
Sensitivity summary:	Segments that were assigned a Medium ecological rank have experienced a moderate amount of disturbance and pressures associated with the existing agricultural use, recreational development, and cabins, including vegetation clearing, and installation of groynes, docks, gazebos, and retaining walls. Although it has been impacted to some degree, some sections are still largely intact and include habitat values that remain important. Some of these segments are also considered important waterfowl congregating areas associated with large littoral zones (Segments 1, 6, 7, 8, 9, 13, 41, 51 and 54). Disturbance of the Fraser Lake shoreline is increasing at a rate of 0.2% per year, and it is important to identify and protect these sensitive areas from development pressure.
Recommen-dations:	Development along Yellow shoreline areas would likely result in less of an impact, than along Red or Orange areas. However, activities should incorporate protection of habitat features that remain, be well above the high-water mark, and be situated outside of the riparian area, especially along areas of natural shoreline. Restoration may be an option in some areas that have experienced past developments. Development may proceed for low risk activities provided a Best Management Practice (BMP) is available and followed (Appendix B). High risk activities without a BMP or ROS will require an environmental assessment from a QEP. Where possible, future development in residential areas should consider the use of communal boat launches rather than construction of several new private launches. Property owners in densely populated areas should also be encouraged, where possible, to share features such as docks and swim floats. Agricultural landowners should be encouraged to limit the area of livestock access to waterfront, and implement best management practices to reduce agricultural runoff into waters. Restoration opportunities may exist in these areas. The integrity of natural shorelines should be maintained where possible to retain connectivity corridors into important upland habitats (e.g., Segments 13 and 31). Restoration opportunities may include restoration of native vegetation on road and railway banks where possible (e.g., Segments 1 and 41).

Grey Shoreline	
Defined by:	Low and Very Low FHSI Ecological Rank.
Lake summary:	Grey zones account for 26.9% of the total shoreline length of Fraser Lake, including Segments 5, 21, 26, 34, 43, 45A, 47, 48B, 52 and 53 which rated as Low, and 19, 22, 25, 28, 29, 46, 48A and 49 which rated as Very Low.
Sensitivity summary:	Grey shorelines have a lower ecological ranking. However, they still may contain valuable habitats requiring some protection, such as aquatic or riparian vegetation. Their importance as corridors to neighboring high value areas should also be considered during development. Shorelines have been heavily disturbed by residential development, agricultural, park and transportation uses, including the railway that runs along the entire south shore of the lake and roads. Some shoreline segments ranked Low and Very Low even though they had little disturbance. For example, Segments 51, 52 and 53, which are all islands, resulted in a Low to Very Low ecological ranking due to a lack of well-developed vegetation bands and narrow littoral zones. Ellis Island (Segment 53), however, is considered an important ecological area and was designated as a provincial ecological reserve in 1991 due to its importance as a breeding site for gull colonies, especially for the Ring-billed Gulls and Herring Gulls. Other segments that are considered important waterfowl congregating areas associated with large littoral zones include Segments 5, 26, 34 and 48B. Disturbance of the Fraser Lake shoreline is increasing at a rate of 0.2% per year, and it is important to identify and protect these sensitive areas from development pressure.
Recommen-dations:	Human development has been concentrated in these areas and has resulted in disturbances to the natural fish and wildlife habitat. Important habitats do exist in degraded and developed areas, and at least minimal standards are required to protect fish and wildlife habitat in the grey zone areas. In keeping with the objective of concentrating development in areas that are already disturbed or of low value, new developments may be considered in these areas. Re-development will also be considered. Proposals should incorporate fish and wildlife habitat restoration or improvement features, where feasible and practicable. Clearing of vegetation is prevalent along many single family developments and would benefit from reestablishing vegetation where practical. Any redevelopment of property should consider relocation and restoration of existing structures within 15 m of the high water mark, where feasible. For example, a retaining wall redevelopment may be moved back from the HWM and/or incorporate re-vegetation or other fish and wildlife features in the design. Obtain advice from a QEP for habitat restoration techniques.

5.2. Zones of Sensitivity Recommendations

A total of 5 types of ZOS were identified through the FHSI analysis. The ZOS with their corresponding buffers are identified on the FDG map. For this step, use the map and identify if the proposed development aligns with any of the mapped ZOS (use outer edge of buffer). Then refer to the corresponding ZOS summary table(s) below for general information on the values present and recommendations to reduce impacts.

Fisheries – Stream Mouths	
Lake summary:	Stream mouths ZOS include the inlet at the and outlet of the lake formed by the Stellako River and Nautley River, respectively. These were mapped as polygons with a 200 m radius to capture important fish migration and staging habitat. The stream mouth ZOS also includes a 100 m radius polygon for smaller tributary streams with known fish presence upstream, and 30 m radius polygons were applied to small stream outlets that may not be inhabited by fish, but may provide some habitat and nutrient input into Fraser Lake. For all stream mouths, the ZOS includes a 30 m setback from the stream within the 50 m foreshore assessment area. If a stream occurs on private land that has not been identified during the FIMP process, it is the property owner's responsibility to engage with a QEP to determine if a setback is required.
Sensitivity summary:	Stream mouths provide a source of nutrients to the lake and are key staging areas for both spawning fish and emergent fry/juveniles. The Stellako River, which is the inlet of Fraser Lake, is an important migratory corridor for Sockeye and Chinook Salmon. The mouth of the Stellako River has also been as important habitat for the endangered Nechako White Sturgeon population. The buffer around Ormond Creek also captures the blue-listed mountain alder / common horsetail floodplain ecosystem present within the riparian area. In addition to fisheries values, the riparian zones around streams provide high value wildlife habitat.
Recommen-dations:	These sensitive habitats are to be protected, with no permanent developments recommended both within and adjacent to the mapped polygon areas. Development proposed in these areas, with the potential to impact the habitat could likely require an Authorization under the *Fisheries Act*. A QEP is recommended to be retained if development is proposed here.

Ecosystem/Habitat Feature – Wetland	
Lake Summary:	Large wetland ZOSs are located throughout Fraser Lake within the shallow littoral areas.
Sensitivity summary:	Wetland ecosystems are areas of high productivity, provide key rearing and feeding habitat for fish (including Sockeye and Chinook Salmon and the at-risk Nechako White Sturgeon population), are important for birds and other wildlife, and protect the shoreline from wind/wave erosion. Six wetland ecosystems were identified around the shoreline of Fraser Lake, including four of which are blue-listed by the province. An umbrella "wetland" ZOS that captures these features has been delineated and is present along several bays and shoreline sections.
Recommen-dations:	Wetland polygons identified throughout Fraser Lake are sensitive ecosystems that should be protected from any developments, including the placement of mooring buoys. A buffer of 20 m is recommended.

Ecosystem/Habitat Feature – Shallow/Wide Littoral Zones	
Lake summary:	Shallow/wide littoral zones are present around much of the shoreline. For the purposes of mapping the ZOS, the entire shallow littoral area was mapped as a polygon.
Sensitivity summary:	Shallow/wide littoral zones typically have abundant aquatic vegetation, which contributes to primary productivity and provides important habitat for fish, and typically encompass areas used by congregating waterfowl.
Recommen-dations:	These areas are often adjacent to populated areas around the lake and are sensitive to disturbance from foreshore development (e.g., dock and groyne construction) and boat action. These sensitive habitats are to be protected. Development of an educational program is recommended to educate boaters about the potential for disturbing shallow littoral areas, especially at the east end of the lake where there is a very wide and shallow littoral zone with associated sensitive wetlands. Signage could be posted at parks and boat launches.

Rare or Endangered Species or Ecosystem – Douglas-Fir Lodgepole Pine / Clad Lichens Ecosystem	
Lake .Summary:	The Douglas-Fir Lodgepole Pine / Clad Lichens Ecosystem ZOS was mapped within the 50 m riparian area of the lake where it was found on warm aspects with shallow slopes. This is included in Segments 21, 31-33, and 50.
Sensitivity summary:	This provincially blue-listed ecosystem includes areas of both valuable old-growth forest and grassland ecosystems, which are unique around the lake, and are sensitive to development.
Recommen-dations:	These important ecosystems should be protected through the implementation of a Development Permit Area that would extend 30 m upland from the highwater mark. This would not preclude development to occur within this area, however, would require an Environmental Impact Assessment conducted by a QEP prior to any proposed development. Huntly Island (Segment 50) is recommended as a conservation area due to its unique ecological attributes, and presence of the blue listed Douglas-Fir Lodgepole Pine / Clad Lichens Ecosystem (see Section 5.3 for further information on recommended conservation areas).

Rare or Endangered Species or Ecosystem – Black Cottonwood – Hybrid White Spruce / Red-osier Dogwood Ecosystem	
Lake summary:	The Black cottonwood - hybrid white spruce / red-osier dogwood ecosystem ZOS was mapped within the 50 m riparian area of the lake or up to distinct linear boundaries (e.g., railway or large roads) where it was found in patches on sand- or gravel- dominated shorelines (Segments 23-24, 29-30, 36-42, 44-46).
Sensitivity summary:	The Black cottonwood - hybrid white spruce / red-osier dogwood ecosystem is a provincially blue-listed ecosystem. In addition to being an ecosystem at risk, these areas also support a large variety of plant and wildlife species. Because cottonwoods grow quickly and die relatively young, these sites often include many large trees and snags, which are valuable habitat features. These forests provide important wildlife habitat especially for birds and cavity nesters.
Recommen-dations:	Because these important ecosystems are dispersed through out Fraser Lake, they should be protected through the implementation of a Development Permit Area that would extend 30 m upland from the highwater mark. This would not preclude development to occur within this area, however, would require an Environmental Impact Assessment conducted by a QEP prior to any proposed development.

5.3. Culturally Sensitive Areas

Several areas of cultural sensitivity are present along the shoreline of the lake. These areas continue to be of importance to local First Nations and need to be appropriately preserved and protected during foreshore development. Culturally sensitive areas identified by Stellat'en and Nadleh Whut'en First Nations have been delineated with a suitable buffer on the Fraser Lake Foreshore Inventory Maps (Appendix 1)[1]. In some cases, these areas are of a sensitive nature, and the exact locations have been requested to be kept confidential. Development in these areas should proceed with appropriate consultation and considerations for archaeological potential of the area.

5.4. Shoreline Conservation Recommendations

Fraser Lake is considered an Important Bird Area by Bird Life International due to its importance for migrating waterfowl and wintering Trumpeter Swans, and also provides critical habitat to salmon species including Sockeye and Chinook Salmon and the endangered Nechako White Sturgeon population. As such, several areas around Fraser Lake have been proposed for consideration as Conservation Zones. Currently, the only section of shoreline designated as a conservation area is Ellis Island due to its unique value for gull nesting colonies.

In addition to Ellis Island, other areas recommended for consideration as conservation areas include the outlet of Stellako River into Fraser Lake, the lake outlet into Nautley River, the mouth of Ormond Creek, Huntly Island, and the mouth of Stern Creek and the associated wetland area at the west end of Simon Bay. Refer to description below and FDG maps (Appendix A):

- The inlet and outlet of Fraser Lake at the Stellako River (Segments 2, 3, and 4) and Nautley River (Segments 35, 36, 37, 54, and 55), respectively, are high value rearing, staging, and migration habitat for fish, especially for Sockeye and Chinook Salmon. The mouth of the Stellako River has also been identified as important habitat for the Endangered Nechako White Sturgeon population. Additionally, cold-water input from the Stellako River into Fraser Lake likely provides thermal refugia for fish in the west basin of the lake during summer months. The presence of wetlands and abundant aquatic vegetation in these areas are important for fish and wildlife, including waterfowl. As these areas generally remain free of ice during the winter, they both provide particularly important habitat for wintering Trumpeter Swans. Negative impacts to aquatic or riparian habitat in these areas could disproportionately compromise habitat connectivity between Fraser Lake and upstream/downstream aquatic habitat, because alternative migration routes are unavailable. Currently, the Stellako River Wildlife Management Area provides partial protection of the connectivity corridor between Fraser and François Lakes. Continued preservation of the Stellako River shoreline and associated riparian area within the Stellaquo Reserve is important to ensure a continuous corridor. Similarly, preservation of aquatic and riparian habitat associated with the Fraser Lake outlet and Nautley River is highly important to maintain a properly functioning corridor between this habitat and the downstream Nechako River.

[1] Note that the mapped locations are is not necessarily exhaustive, and additional culturally sensitive areas may be present around Nadleh Bun.

- The mouth of Ormond Creek (Segment 24) is a unique feature on Fraser Lake, as it has an ecologically sensitive mature cottonwood floodplain, as well as the blue-listed mountain alder / common horsetail floodplain ecosystem. Ormond Creek has historic returns of Sockeye and Chinook salmon, and there is consideration by locals to reestablish a salmon run here (W. Salewski, pers. comm.). This area was undeveloped at the time of the 2023 survey but posted as for sale. Potential development threatens this sensitive area, as well as the important ecological values it provides. Additionally, any development here would be on the alluvial fan of Ormond Creek and could be vulnerable to potential risk of flooding.

- Huntly Island (Segment 50) is another high value feature on Fraser Lake. This relatively undisturbed, privately owned island had several sensitive features including old growth forest, the blue-listed Douglas-fir lodgepole pine / clad lichens ecosystem, wetlands, two raptor nests, and is reportedly used by congregating waterfowl.

- The mouth of Stern Creek and the associated wetland area at the west end of Simon Bay (Segments 16 and 17) is another high value area on Fraser Lake. The privately owned land is relatively undisturbed, with the exception of a small agricultural field which approaches the shoreline in the central portion of the property. A large tract of undisturbed wetland provides high value habitat to a variety of wildlife, and this section of shoreline also contains high value fish habitat and relatively undisturbed mature forest. Habitat within this area is continuous with a natural area associated with the lot of crown provincial land to the northeast.

These features should be considered designation as conservation zones and could be in the form of conservation covenants. These areas could also be of interest to conservation groups such as Nature Trust of BC and Nature Conservancy of Canada in property acquisition. This would require a concerted and collaborative approach by the property owners, RDBN, conservation organizations, First Nations, and any interested stakeholders.

A Waterfront Development Permit Area (WDP) is recommended for Fraser Lake, extending from the natural boundary of the lake upland. We suggest that this WDP area be established around the entire Fraser Lake shoreline, including islands, regardless of the foreshore ecological ranking designation. Additionally, we recommend that this WDP Area be established around all other watercourses, including streams and wetlands. A 15 m setback has been identified by the RDBN as a target WDP distance, however we recommend that the setback be 30 m to align with provincial standards. A WDP does not preclude development within these areas, however, landowners would be required to obtain a Development Permit prior to proceeding with any projects including any construction (such as addition or alteration of a building or other structure) or alteration of land (such removal of riparian or aquatic vegetation, site grading, deposition of fill, beach creation, or dredging), and would require an Environmental Impact Assessment report prepared by a QEP.

Fraser Lake has experienced an increase of ~2.6% (or 0.2% per year) in the total length of shoreline disturbance since the previous FIM conducted in 2011. This rate of change is a concern especially considering the importance of Fraser Lake to many aquatic and wildlife species.

6. Step 3. Refer to the Activity Risk Matrix (ARM) to Determine Project Risk.

This step involves using the ARM to determine what the predicted level of risk is for your specific proposed activity, given the shoreline colour zone and ZOS present. It is a well understood concept that the potential for negative environmental impacts are deemed greatest in areas where values and risk are highest (Figure 3; DFO 2006). In the ARM, each colour zone and activity combination has been rated as having a risk of either: Very High (VH), High (H), Moderate (M), or Low (L) (Figure 3). These risk ratings reflect the potential impacts on fish and wildlife, with a Very High risk posing the greatest potential concern, and the Low Risk a lower level of concern. The ARM also identifies that if a ZOS is present, the risk also increases.

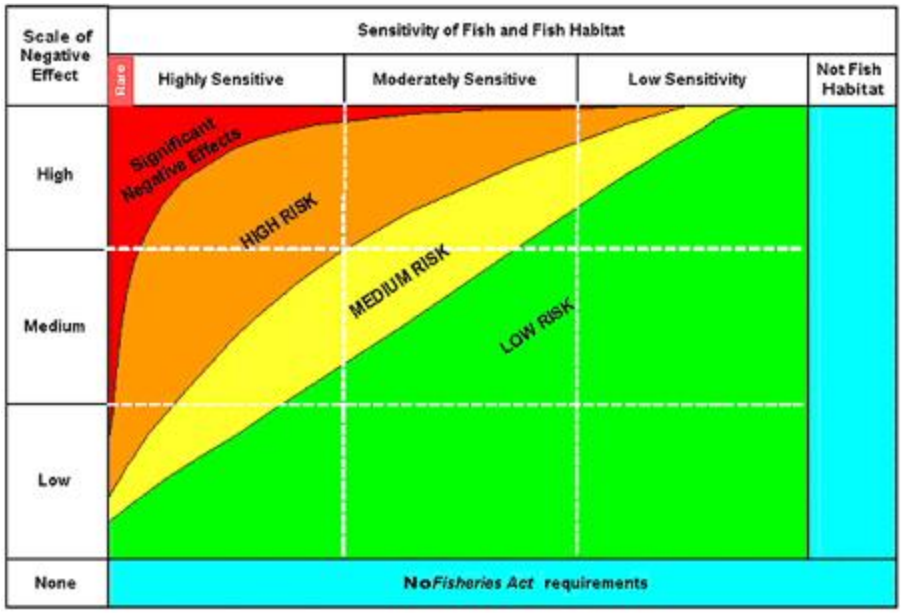


Figure 3. How the potential for negative effects relates to sensitivity and risk (DFO 2006).

6.1. Using the ARM

Clarifications for using the ARM are listed below:

1. If your activity is not listed, assume High Risk and contact FrontCounterBC for advice.
2. Where several activities with differing risk rating are proposed for a single Project, the cumulative risk may increase. Consequently, it is recommended to seek the advice of a QEP to determine if the higher of the two risk ratings effectively captures the cumulative risk, or if the highest risk rating should be used [e.g., Very High]).
3. The ARM distinguishes between several activities above and below the present natural boundary (NB). The NB is the legal term BC Crown Land Branch uses to define the Crown Land property boundary along the shoreline. High Water Hark (HWM) is a similar standard term used by DFO when considering impacts to fish values. The NB and HWM are often located in the same location, but this can vary. Only a registered BC Legal Land Surveyor may determine the NB.

4. In some instances, the project may not seem to have a high degree of risk. However, the ARM also accounts for other accompanying impacts likely to occur once the modification is in place. For instance, once a dock is in place, other likely associated impacts are: prop wash, maintenance, and boat traffic.

6.2. General Mitigation Hierarchy

The general principles of shoreline development are to design in such a way that there is "No Net Loss" in the quantity or quality of existing habitat. These principles are supported by the federal and provincial policy[2,3]). In general, these principles are achieved through application of the following mitigation options: (1) avoidance of environmental impacts and associated components; (2) minimization of unavoidable impacts on environmental values and associated components; (3) restore on site environmental values and associated components, and, (4) offset impacts to environmental values of components for residual impacts that cannot be minimized.

6.3. Very High and High Risk Activities

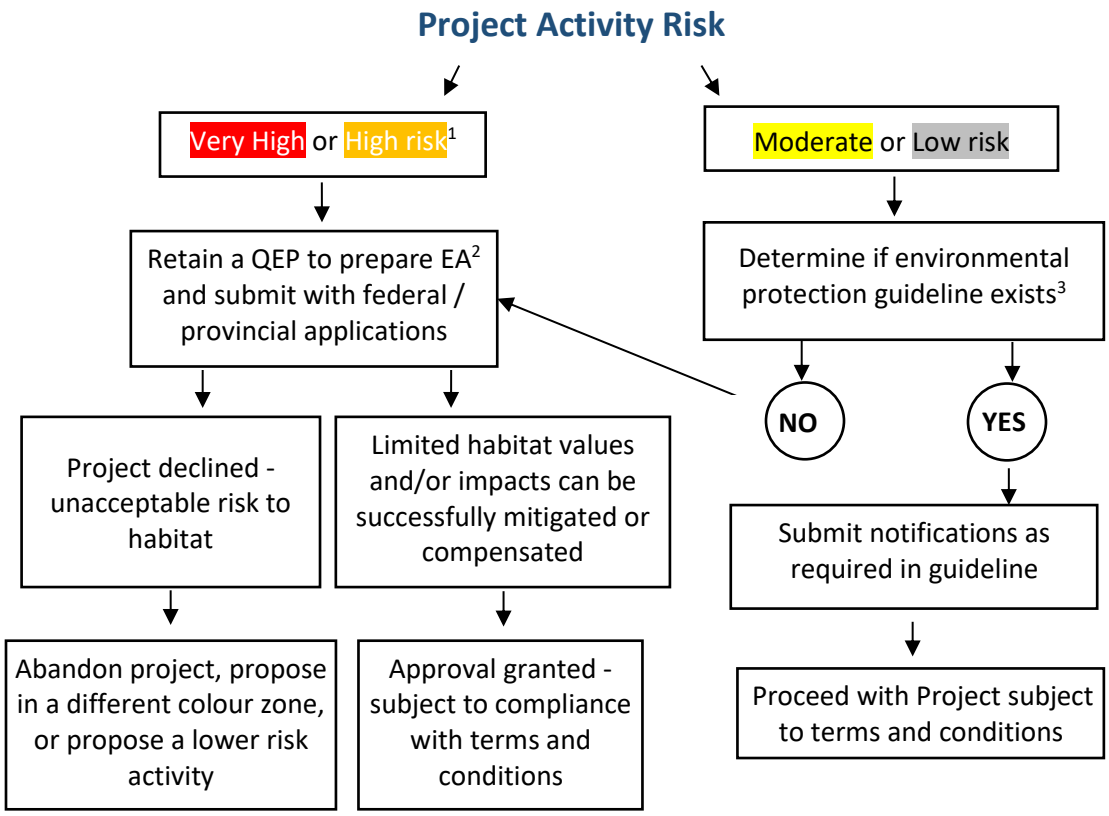
Most in-stream works in Red and Orange shoreline zone areas are considered Very High and High Risk activities. All activities in a ZOS are considered Very High Risk. Development in these areas has the potential to cause long-term or irreparable disturbance to the highly sensitive/unique values present. The Very High Risk activities in particular, are known to have significant challenges related to providing adequate mitigation to address the loss of fish and/or wildlife habitat values. For example, the dredging activity is considered Very High Risk in all colour zones, since it results in a major disturbance to the substrate, aquatic vegetation that may be present, and has the potential for direct impacts on aquatic life, and processes (wave climate and sediment transport). There may also be indirect impacts, such as on water quality, if for example the dredge is to support a marina.

If your activity is identified as being Very High or High Risk, determine if you can modify the activity or location to reduce the risk. This may involve moving the project to a colour zone with less sensitive habitat, or selecting a lower risk activity (Figure 4). If reducing the risk is not possible by re-designing or re-locating the project, there is a high likelihood that a detailed environmental assessment would be required to support the project application. In these areas, the high risks may trigger a request for a Harmful Alteration, Disruption or Destruction of Fish Habitat (HADD) authorization under the federal *Fisheries Act*. If residual effects cannot be mitigated, compensation may be required. Acceptable mitigation and compensation measures would likely be very costly to implement. It is highly advised that a QEP be retained to assist with the project planning in all high and very high risk areas. A QEP should be knowledgeable about both the permitting and application process for proposed activities and will be able to provide guidance on potential environmental risks and impacts. A QEP would likely conduct an environmental assessment within the project area, confirm risks, and make recommendations to reduce impacts to aid in the regulatory permitting process. Applications for these types of developments may not be supported by regulators and may not be approved, even if extensive and detailed information is provided as part of a permitting process.

[2] DFO Projects Near Water website: https://dfo-mpo.gc.ca/pnw-ppe/index-eng.html
[3] BC Environmental Mitigation Policy website: https://www2.gov.bc.ca/gov/content/environment/natural-resource-stewardship/laws-policies-standards-guidance/environmental-guidance-and-policy/environmental-mitigation-policy.

As an example, the type of information that might be required to support an application for a proposed project located in a sensitive area could include, a detailed erosion control plan that might require a BC Legal Land Surveyor to determine the location of NB and property boundaries, a QEP to provide recommendations to mitigate construction works as part of an environmental assessment, or an engineer may be needed to provide a detailed design for submission of permits under regulatory processes.

Figure 4. Typical Environmental Regulatory Review Decision-Making Process



[1] Very High or High Risk activities have the potential to raise significant concerns. These activities have great challenges related to providing adequate mitigation or compensation to address the loss of fish and/or wildlife habitat values, and could be costly to implement (may require compensation).

[2] Environmental Assessment

[3]BMP – Best Management Practice; ROS –Regional Operating Statement

6.4. Moderate and Low Risk Activities

With appropriate design and planning, Moderate and Low Risk activities could be incorporated along the foreshore with fewer impacts on fish and wildlife habitat values. Where available, these activities should follow applicable Best Management Practices (BMP), Standards and Codes of Practice (collectively BMP; see next section). Where BMPs are not available, or a deviation from the BMP is proposed, a QEP should be retained to complete the application. The application will be reviewed by the applicable agencies.

7. Step 4 – Determine Regulatory Requirements and Submit Applications

The final step when planning a foreshore development project is to determine the regulatory requirements necessary for the project to proceed and to submit those applications. Regulatory applications are to be made to the federal, provincial, or local governments for necessary permits, authorizations, notifications, and reviews etc. Essentially any shoreline development will require the preparation of at least one regulatory application. The regulatory application's acceptance will be required for the project to proceed legitimately. Commencing work without approval may be considered unlawful and result in infractions such as trespass. Work that has not been approved may also be subject to enforcement actions by the respective agencies, and may require additional effort to mitigate any undesired environmental impacts that occurred. Alternatively, the project proponent could be required to remove all infrastructure and restore the area.

Typical regulatory requirements for each activity listed in the ARM are provided in Appendix C. As well, Provincial BMPs have been listed in Appendix D[4]. Although summarized here, the requirements at the time of planning the project will need to be confirmed, as regulatory changes might occur. Also, the DFO website should be reviewed for applicable Standards and Codes of Practice that may help guide planning and development [5] . Contact FrontCounterBC to determine which provincial permits, approvals or authorizations you need, or retain a QEP for guidance.

This document does not provide a full summary of all potential requirements for a particular project. Proponents must ensure that they have adequately considered, consulted, and determined the necessary approvals required for a project to proceed prior to undertaking any works.

7.1. Other Considerations to Facilitate Project Approvals

This FDG addresses both existing and proposed works. Sometimes there are concerns with the installation of past structures, which may include, if the structures:

- Resulted in extensive impacts along the shoreline;
- Were installed without appropriate permits or approvals in place; and/or,
- Were not compliant with standard BMPs.

If any of the above concerns are present on the property where work is planned, then follow these steps, so that new applications, or applications for maintenance or expansion on existing projects, can be reviewed more effectively:

1. Determine if the existing works are on private land or Crown Land.
2. Determine if they are located in an Application Only Area/Reserve area established under the *Land Act*.
3. Determine if the works were authorized by the appropriate authority. If yes, skip to step 5.

[4] A current list of provincial BMP's are available at: https://www2.gov.bc.ca/gov/content/environment/natural-resource-stewardship/laws-policies-standards-guidance/best-management-practices

[5] DFO Project Near Water website: https://www.dfo-mpo.gc.ca/pnw-ppe/index-eng.html

4. Seek approval from the appropriate authority. Approval may or may not be granted depending on the situation. Previous projects installed without appropriate permits or approvals may be required to be removed as part of an application process.
5. Plan and update existing works to current Best Management Practices.
6. Include other mitigation practices, such as landscape restoration (planting native riparian vegetation), substrate improvement (removing or mitigating existing groynes), and other habitat improvements.

8. References

BC Ministry of Environment (BC MOE). 2008. High value habitat maps and Associated protocol for works along the foreshore of large lakes within the Okanagan, Region 8. Government memorandum.

BC MOE. 2019. *Natural Resource Best Management Practices.* Retrieved from https://www2.gov.bc.ca/gov/content/environment/natural-resource-stewardship/laws-policies-standards-guidance/best-management-practices

DFO. 2006. Habitat Management Program: Standard Operating Policies.

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Mackas, R., Masse, S., Ehlers, T. and B. Newbery. 2024. Fraser Lake Foreshore Integrated Management Plan. Report prepared by Masse Environmental Consultants Ltd. Report prepared for Living Lakes Canada, Nelson, BC.

McPherson[1] S.M., D.G. Paton[2] and M.D. Robinson[1]. 2012. Tie Lake Shoreline Management Guidelines of Fish and Wildlife Habitats. Consultant report prepared for Ministry of Forests Lands and Natural Resource Operations, Nelson BC. Prepared by Lotic Environmental Ltd[1], Anatum Ecological Consulting Ltd[2].

Schleppe, J. 2009. Moyie Lake Foreshore Inventory and Mapping. Ecoscape Environmental Consultants Ltd. Prepared for: East Kootenay Integrated Lake Management Partnership.

Schleppe, J.[1], S. McPherson[2], L. Porto[3], and B. Mason[4]. 2020. Foreshore Integrated Management Plan Methods. Prepared for Living Lakes Canada. Prepared by: Ecoscape Environmental Consultants Ltd.[1], Lotic Environmental Ltd.[2], Wood Environment and Infrastructure Ltd.[3], and BC Community Mapping Network[4].

Appendix A. Foreshore Guidance Document Map

Fraser Lake Foreshore Inventory
Segment FHSI Ranking Overview

Cadastral Boundaries

- Provincial Parks
- First Nation Reserves
- Village of Fraser Lake

Foreshore Habitat Sensitivity Index

- Very High
- High
- Medium
- Low / Very Low

MASSE ENVIRONMENTAL

Map Date: 2024-06-11
Projection: WGS 84 / UTM zone 10N
Project #: 2023-1056

0 1 2 km

Fraser Lake Foreshore Inventory Mapping Mapsheet 1 of 15

Segment Number: 6
Shore Type: Rocky Shore
Land Use: Rural
Level of Impact: Medium
Number of Modifications: 11

Segment Number: 5
Shore Type: Rocky Shore
Land Use: Transportation
Level of Impact: Medium
Number of Modifications: 4

Segment Number: 4
Shore Type: Wetland
Land Use: Rural
Level of Impact: Medium
Number of Modifications: 2

Segment Number: 3
Shore Type: Stream Mouth
Land Use: Rural
Level of Impact: Medium
Number of Modifications: 3

Segment Number: 2
Shore Type: Wetland
Land Use: Transportation
Level of Impact: High
Number of Modifications: 3

Segment Number: 1
Shore Type: Wetland
Land Use: Single Family
Level of Impact: Medium
Number of Modifications: 39

Village of Fraser Lake
Wastewater Treatment Facility
Discharge Outfall

Burbot, Chinook, Bull Trout, Kokanee, Longnose Dace, Mountain Whitefish, Northern Pikeminnow, Prickly Sculpin, Rainbow Trout, Redside Shiner, Sockeye

Stellaquo Reserve

Stellako River

Highway 16

Fraser Lake

376000 376500 377000 377500 378000 378500 379000

5992800 5992200 5991600 5991000 5990400

Railway
Highways
Road
BC Freshwater Atlas Streams
Contours (20 m)

Cadastral Boundaries

- First Nation Reserves
- Provincial Parks
- Village of Fraser Lake
- Crown Agency
- Crown Provincial
- Untitled Provincial
- Municipal
- Private

Foreshore Habitat Sensitivity Index

- Very High
- High
- Medium
- Low / Very Low

Zones of Sensitivity

- Stream Mouths
- Wetlands
- Wetlands 20m buffer
- Shallow/Wide Littoral
- SBSdw3/102 Ecosystem (inc. rock outrops/grassland)
- Fm02 Ecosystem
- Culturally Sensitive Areas

Fish / Wildlife Features

- Beaver Lodge
- Raptor Nest
- Fish Species within Tributary/Upstream (summarized from provincial data)

MASSE ENVIRONMENTAL

Map Date: 2024-06-11
Projection: WGS 84 / UTM zone 10N
Project #: 2023-1056
Scale: 1:10.000

0 150 300 m

Fraser Lake Foreshore Inventory Mapping Mapsheet 2 of 15

Railway
Highways
Road
BC Freshwater Atlas Streams
Contours (20 m)

Cadastral Boundaries

First Nation Reserves
Provincial Parks
Village of Fraser Lake
Crown Agency
Crown Provincial
Untitled Provincial
Municipal
Private

Foreshore Habitat Sensitivity Index

Very High
High
Medium
Low / Very Low

Zones of Sensitivity

Stream Mouths
Wetlands
Wetlands 20m buffer
Shallow/Wide Littoral
SBSdw3/102 Ecosystem (inc. rock outrops/grassland)
Fm02 Ecosystem
Culturally Sensitive Areas

Fish / Wildlife Features

Beaver Lodge
Raptor Nest
Fish Species within Tributary/Upstream (summarized from provincial data)

MASSE ENVIRONMENTAL

Stern Creek
Perry Creek
Rainbow Trout

Segment Number: 7
Shore Type: Wetland
Land Use: Rural
Level of Impact: High
Number of Modifications: 38

Segment Number: 8
Shore Type: Gravel
Land Use: Agriculture
Level of Impact: Medium
Number of Modifications: 3

Segment Number: 9
Shore Type: Rocky Shore
Land Use: Rural
Level of Impact: Low
Number of Modifications: 2

Map Date: 2024-06-11
Projection: WGS 84 / UTM zone 10N
Project #: 2023-1056
Scale: 1:10,000

0 150 300 m

Fraser Lake Foreshore Inventory Mapping Mapsheet 3 of 15

Segment Number: 14
Shore Type: Rocky Shore
Land Use: Natural Area
Level of Impact: None
Number of Modifications: 0

Segment Number: 15
Shore Type: Wetland
Land Use: Single Family
Level of Impact: High
Number of Modifications: 26

Segment Number: 13
Shore Type: Wetland
Land Use: Rural
Level of Impact: Medium
Number of Modifications: 18

Segment Number: 12
Shore Type: Rocky Shore
Land Use: Rural
Level of Impact: Low
Number of Modifications: 8

Segment Number: 10
Shore Type: Wetland
Land Use: Rural
Level of Impact: Medium
Number of Modifications: 0

Segment Number: 11
Shore Type: Rocky Shore
Land Use: Rural
Level of Impact: Low
Number of Modifications: 6

Segment Number: 52
Shore Type: Rocky Shore
Land Use: Rural Area
Level of Impact: Low
Number of Modifications: 3

Segment Number: 50
Shore Type: Rocky Shore
Land Use: Rural
Level of Impact: None
Number of Modifications: 0

Segment Number: 51
Shore Type: Rocky Shore
Land Use: Natural Area
Level of Impact: Low
Number of Modifications: 1

379500 380000 380500 381000 381500 382000 382500

5995200 5994600 5994000 5993400

Railway
Highways
Road
BC Freshwater Atlas Streams
Contours (20 m)

Cadastral Boundaries

- First Nation Reserves
- Provincial Parks
- Village of Fraser Lake
- Crown Agency
- Crown Provincial
- Untitled Provincial
- Municipal
- Private

Foreshore Habitat Sensitivity Index

- Very High
- High
- Medium
- Low / Very Low

Zones of Sensitivity

- Stream Mouths
- Wetlands
- Wetlands 20m buffer
- Shallow/Wide Littoral
- SBSdw3/102 Ecosystem (inc. rock outrops/grassland)
- Fm02 Ecosystem
- Culturally Sensitive Areas

Fish / Wildlife Features

- Beaver Lodge
- Raptor Nest
- Fish Species within Tributary/Upstream (summarized from provincial data)

MASSE ENVIRONMENTAL

Map Date: 2024-06-11
Projection: WGS 84 / UTM zone 10N
Project #: 2023-1056
Scale: 1:10,000

0 150 300 m

Fraser Lake Foreshore Inventory
Mapping Mapsheet 4 of 15

Segment Number: 17
Shore Type: Wetland
Land Use: Rural
Level of Impact: Medium
Number of Modifications: 0

Segment Number: 18
Shore Type: Gravel
Land Use: Natural Area
Level of Impact: None
Number of Modifications: 0

Segment Number: 16
Shore Type: Wetland
Land Use: Rural
Level of Impact: None
Number of Modifications: 0

Segment Number: 19
Shore Type: Gravel
Land Use: Single Family
Level of Impact: High
Number of Modifications: 33

Stern Creek

Rainbow Trout

- Railway
- Highways
- Road
- BC Freshwater Atlas Streams
- Contours (20 m)

Cadastral Boundaries

- First Nation Reserves
- Provincial Parks
- Village of Fraser Lake
- Crown Agency
- Crown Provincial
- Untitled Provincial
- Municipal
- Private

Foreshore Habitat Sensitivity Index

- Very High
- High
- Medium
- Low / Very Low

Zones of Sensitivity

- Stream Mouths
- Wetlands
- Wetlands 20m buffer
- Shallow/Wide Littoral
- SBSdw3/102 Ecosystem (inc. rock outrops/grassland)
- Fm02 Ecosystem
- Culturally Sensitive Areas

Fish / Wildlife Features

- Beaver Lodge
- Raptor Nest
- Fish Species within Tributary/Upstream (summarized from provincial data)

MASSE ENVIRONMENTAL

Map Date: 2024-06-11
Projection: WGS 84 / UTM zone 10N
Project #: 2023-1056
Scale: 1:10.000
0 150 300 m

Fraser Lake Foreshore Inventory Mapping Mapsheet 5 of 15

382000 382500 383000 383500 384000 384500 385000

5995800 5995200 5994600 5994000 5993400

820 800 780 760 740 720 700 680

19 20 21 22 12

Segment Number: 20
Shore Type: Gravel
Land Use: Natural Area
Level of Impact: None
Number of Modifications: 1

Segment Number: 21
Shore Type: Rocky Shore
Land Use: Rural
Level of Impact: Low
Number of Modifications: 2

Segment Number: 22
Shore Type: Sand
Land Use: Single Family
Level of Impact: High
Number of Modifications: 41

- Railway
- Highways
- Road
- BC Freshwater Atlas Streams
- Contours (20 m)

Cadastral Boundaries

- First Nation Reserves
- Provincial Parks
- Village of Fraser Lake
- Crown Agency
- Crown Provincial
- Untitled Provincial
- Municipal
- Private

Foreshore Habitat Sensitivity Index

- Very High
- High
- Medium
- Low / Very Low

Zones of Sensitivity

- Stream Mouths
- Wetlands
- Wetlands 20m buffer
- Shallow/Wide Littoral
- SBSdw3/102 Ecosystem (inc. rock outrops/grassland)
- Fm02 Ecosystem
- Culturally Sensitive Areas

Fish / Wildlife Features

- Beaver Lodge
- Raptor Nest
- Fish Species within Tributary/Upstream (summarized from provincial data)

MASSE ENVIRONMENTAL

Map Date: 2024-06-11
Projection: WGS 84 / UTM zone 10N
Project #: 2023-1056
Scale: 1:10.000

0 150 300 m

Fraser Lake Foreshore Inventory Mapping Mapsheet 6 of 15

385000 385500 386000 386500 387000 387500 388000

5996400 5995200 5994000

760 740 720 700 680 660 780 800

Ormond Creek

Peterson's Beach Recreation Site

Segment Number: 26
Shore Type: Gravel
Land Use: Park
Level of Impact: High
Number of Modifications: 3

Chinook (historic), Bull Trout, Kokanee, Rainbow Trout, Sockeye (historic)

Segment Number: 23
Shore Type: Sand
Land Use: Rural
Level of Impact: Medium
Number of Modifications: 2

Segment Number: 24
Shore Type: Stream Mouth
Land Use: Rural
Level of Impact: None
Number of Modifications: 0

Segment Number: 25
Shore Type: Sand
Land Use: Single Family
Level of Impact: High
Number of Modifications: 68

22 23 24 25 26 27 28

Legend

- Railway
- Highways
- Road
- BC Freshwater Atlas Streams
- Contours (20 m)

Cadastral Boundaries

- First Nation Reserves
- Provincial Parks
- Village of Fraser Lake
- Crown Agency
- Crown Provincial
- Untitled Provincial
- Municipal
- Private

Foreshore Habitat Sensitivity Index

- Very High
- High
- Medium
- Low / Very Low

Zones of Sensitivity

- Stream Mouths
- Wetlands
- Wetlands 20m buffer
- Shallow/Wide Littoral
- SBSdw3/102 Ecosystem (inc. rock outrops/grassland)
- Fm02 Ecosystem
- Culturally Sensitive Areas

Fish / Wildlife Features

- Beaver Lodge
- Raptor Nest
- Fish Species within Tributary/Upstream (summarized from provincial data)

MASSE ENVIRONMENTAL

Map Date: 2024-06-11
Projection: WGS 84 / UTM zone 10N
Project #: 2023-1056
Scale: 1:10.000

0 150 300 m

Fraser Lake Foreshore Inventory Mapping Mapsheet 7 of 15

Segment Number: 29
Shore Type: Gravel
Land Use: Single Family
Level of Impact: High
Number of Modifications: 33

Chinook, Rainbow Trout, Prickly Sculpin

Segment Number: 28
Shore Type: Rocky Shore
Land Use: Single Family
Level of Impact: High
Number of Modifications: 35

Peterson's Beach Recreation Site

Railway
Highways
Road
BC Freshwater Atlas Streams
Contours (20 m)

Cadastral Boundaries
- First Nation Reserves
- Provincial Parks
- Village of Fraser Lake
- Crown Agency
- Crown Provincial
- Untitled Provincial
- Municipal
- Private

Foreshore Habitat Sensitivity Index
- Very High
- High
- Medium
- Low / Very Low

Zones of Sensitivity
- Stream Mouths
- Wetlands
- Wetlands 20m buffer
- Shallow/Wide Littoral
- SBSdw3/102 Ecosystem (inc. rock outrops/grassland)
- Fm02 Ecosystem
- Culturally Sensitive Areas

Fish / Wildlife Features
- Beaver Lodge
- Raptor Nest
- Fish Species within Tributary/Upstream (summarized from provincial data)

MASSE ENVIRONMENTAL

Map Date: 2024-06-11
Projection: WGS 84 / UTM zone 10N
Project #: 2023-1056
Scale: 1:10,000

0 150 300 m

Fraser Lake Foreshore Inventory
Mapping Mapsheet 8 of 15

390000 390500 391000 391500 392000 392500 393000

5997000 5996400 5995800 5995200 5994600

880 860 840 820 800 780 760 740 720 700 680 660

29 30 31 32

Segment Number: 30
Shore Type: Gravel
Land Use: Rural
Level of Impact: Medium
Number of Modifications: 12

Segment Number: 31
Shore Type: Rocky Shore
Land Use: Natural Area
Level of Impact: Low
Number of Modifications: 0

- Railway
- Highways
- Road
- BC Freshwater Atlas Streams
- Contours (20 m)

Cadastral Boundaries

- First Nation Reserves
- Provincial Parks
- Village of Fraser Lake
- Crown Agency
- Crown Provincial
- Untitled Provincial
- Municipal
- Private

Foreshore Habitat Sensitivity Index

- Very High
- High
- Medium
- Low / Very Low

Zones of Sensitivity

- Stream Mouths
- Wetlands
- Wetlands 20m buffer
- Shallow/Wide Littoral
- SBSdw3/102 Ecosystem (inc. rock outrops/grassland)
- Fm02 Ecosystem
- Culturally Sensitive Areas

Fish / Wildlife Features

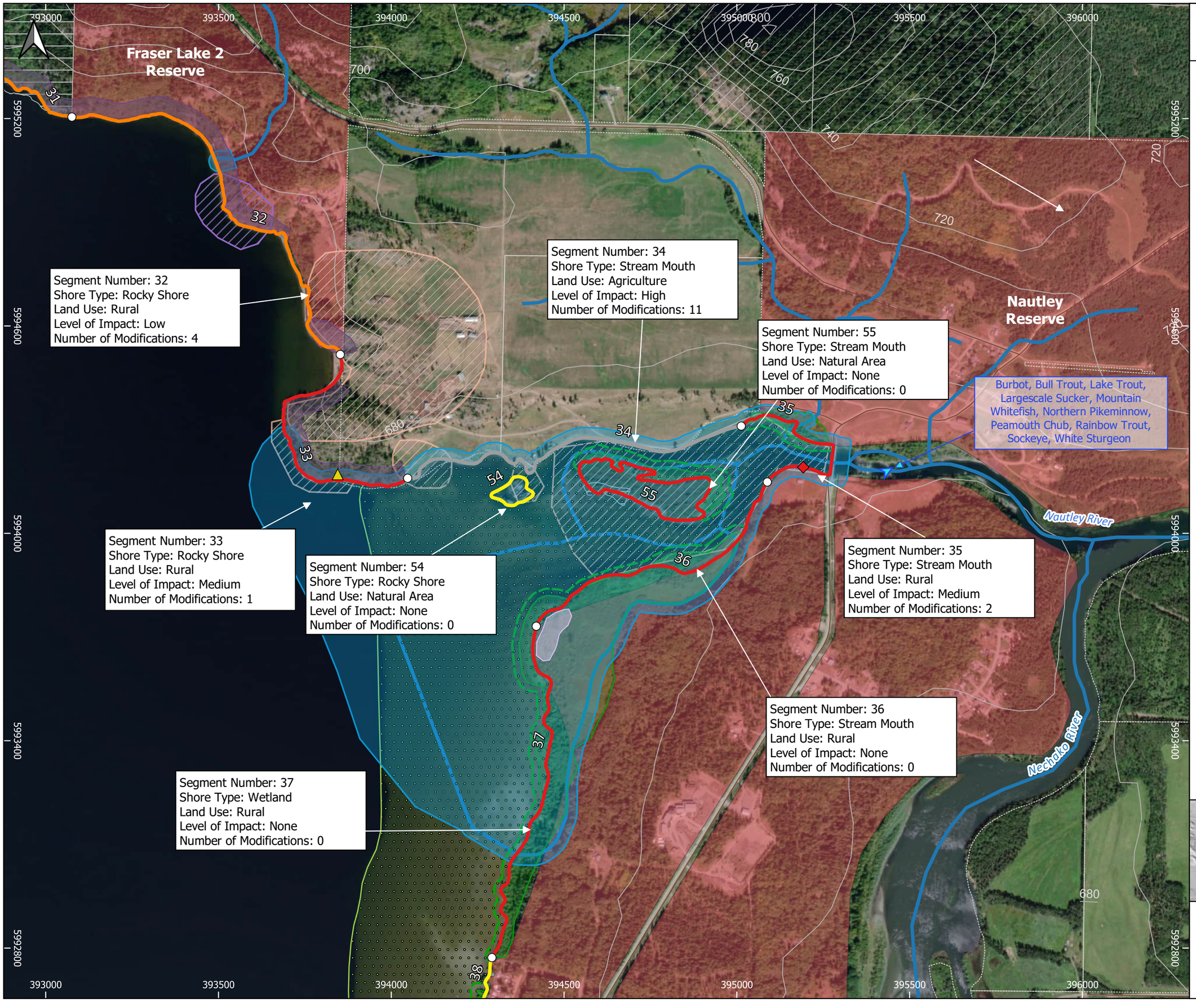
- Beaver Lodge
- Raptor Nest
- Fish Species within Tributary/Upstream (summarized from provincial data)

MASSE ENVIRONMENTAL

Map Date: 2024-06-11
Projection: WGS 84 / UTM zone 10N
Project #: 2023-1056
Scale: 1:10.000

0 150 300 m

Fraser Lake Foreshore Inventory Mapping Mapsheet 9 of 15



- Railway
- Highways
- Road
- BC Freshwater Atlas Streams
- Contours (20 m)

Cadastral Boundaries

- First Nation Reserves
- Provincial Parks
- Village of Fraser Lake
- Crown Agency
- Crown Provincial
- Untitled Provincial
- Municipal
- Private

Foreshore Habitat Sensitivity Index

- Very High
- High
- Medium
- Low / Very Low

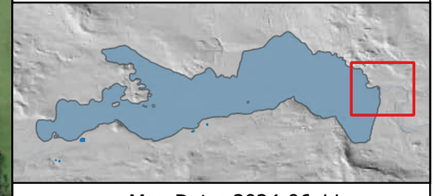
Zones of Sensitivity

- Stream Mouths
- Wetlands
- Wetlands 20m buffer
- Shallow/Wide Littoral
- SBSdw3/102 Ecosystem (inc. rock outrops/grassland)
- Fm02 Ecosystem
- Culturally Sensitive Areas

Fish / Wildlife Features

- Beaver Lodge
- Raptor Nest
- Fish Species within Tributary/Upstream (summarized from provincial data)

MASSE ENVIRONMENTAL



Map Date: 2024-06-11
Projection: WGS 84 / UTM zone 10N
Project #: 2023-1056
Scale: 1:10.000

0 150 300 m

Fraser Lake Foreshore Inventory
Mapping Mapsheet 10 of 15

Segment Number: 40
Shore Type: Rocky Shore
Land Use: Transportation
Level of Impact: High
Number of Modifications: 2

Segment Number: 38
Shore Type: Wetland
Land Use: Single Family
Level of Impact: High
Number of Modifications: 43

Segment Number: 39
Shore Type: Wetland
Land Use: Park
Level of Impact: Medium
Number of Modifications: 1

Largescale Sucker, Longnose Sucker, Northern Pikeminnow, Rainbow Trout, Peamouth Chub, Rainbow Trout, Sculpin (General)

Highway 16

Nautley Reserve

- Railway
- Highways
- Road
- BC Freshwater Atlas Streams
- Contours (20 m)

Cadastral Boundaries

- First Nation Reserves
- Provincial Parks
- Village of Fraser Lake
- Crown Agency
- Crown Provincial
- Untitled Provincial
- Municipal
- Private

Foreshore Habitat Sensitivity Index

- Very High
- High
- Medium
- Low / Very Low

Zones of Sensitivity

- Stream Mouths
- Wetlands
- Wetlands 20m buffer
- Shallow/Wide Littoral
- SBSdw3/102 Ecosystem (inc. rock outrops/grassland)
- Fm02 Ecosystem
- Culturally Sensitive Areas

Fish / Wildlife Features

- Beaver Lodge
- Raptor Nest
- Fish Species within Tributary/Upstream (summarized from provincial data)

MASSE ENVIRONMENTAL

Map Date: 2024-06-11
Projection: WGS 84 / UTM zone 10N
Project #: 2023-1056
Scale: 1:10.000

0 150 300 m

Fraser Lake Foreshore Inventory
Mapping Mapsheet 11 of 15

Segment Number: 41
Shore Type: Rocky Shore
Land Use: Transportation
Level of Impact: High
Number of Modifications: 1

388500 389000 389500 390000 390500 391000 391500

5994000 5993400 5992800 5992200

680 700 720 740 760 780 800

41 42 40

- Railway
- Highways
- Road
- BC Freshwater Atlas Streams
- Contours (20 m)

Cadastral Boundaries

- First Nation Reserves
- Provincial Parks
- Village of Fraser Lake
- Crown Agency
- Crown Provincial
- Untitled Provincial
- Municipal
- Private

Foreshore Habitat Sensitivity Index

- Very High
- High
- Medium
- Low / Very Low

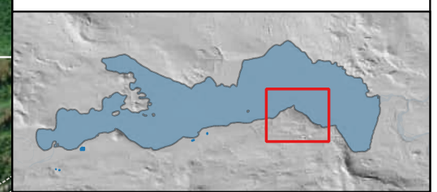
Zones of Sensitivity

- Stream Mouths
- Wetlands
- Wetlands 20m buffer
- Shallow/Wide Littoral
- SBSdw3/102 Ecosystem (inc. rock outrops/grassland)
- Fm02 Ecosystem
- Culturally Sensitive Areas

Fish / Wildlife Features

- Beaver Lodge
- Raptor Nest
- Fish Species within Tributary/Upstream (summarized from provincial data)

MASSE ENVIRONMENTAL



Map Date: 2024-06-11
Projection: WGS 84 / UTM zone 10N
Project #: 2023-1056
Scale: 1:10.000

0 150 300 m

Fraser Lake Foreshore Inventory
Mapping Mapsheet 12 of 15

Railway
Highways
Road
BC Freshwater Atlas Streams
Contours (20 m)

Cadastral Boundaries

First Nation Reserves
Provincial Parks
Village of Fraser Lake
Crown Agency
Crown Provincial
Untitled Provincial
Municipal
Private

Foreshore Habitat Sensitivity Index

Very High
High
Medium
Low / Very Low

Zones of Sensitivity

Stream Mouths
Wetlands
Wetlands 20m buffer
Shallow/Wide Littoral
SBSdw3/102 Ecosystem
(inc. rock outrops/grassland)
Fm02 Ecosystem
Culturally Sensitive Areas

Fish / Wildlife Features

Beaver Lodge
Raptor Nest
Fish Species within Tributary/Upstream
(summarized from provincial data)

MASSE ENVIRONMENTAL

Segment Number: 53
Shore Type: Cliff/Bluff
Land Use: Conservation
Level of Impact: None
Number of Modifications: 0

Segment Number: 42
Shore Type: Wetland
Land Use: Transportation
Level of Impact: Medium
Number of Modifications: 0

West Fraser Mills
Log Yard Treatment / Sawmill
Runoff Treatment System
Discharge Point

Map Date: 2024-06-11
Projection: WGS 84 / UTM zone 10N
Project #: 2023-1056
Scale: 1:10,000

0 150 300 m

West Fraser Mills
Planer Mill Oil/Grit Separator
Discharge Point

Segment Number: 43
Shore Type: Gravel
Land Use: Industrial
Level of Impact: Medium
Number of Modifications: 0

Segment Number: 44
Shore Type: Gravel
Land Use: Rural
Level of Impact: Medium
Number of Modifications: 3

Segment Number: 45A
Shore Type: Wetland
Land Use: Transportation
Level of Impact: Medium
Number of Modifications: 0

Segment Number: 45B
Shore Type: Gravel
Land Use: Rural
Level of Impact: Low
Number of Modifications: 0

Seaspunkut Reserve

Fraser Lake Foreshore Inventory Mapping Mapsheet 13 of 15

- Railway
- Highways
- Road
- BC Freshwater Atlas Streams
- Contours (20 m)

Cadastral Boundaries

- First Nation Reserves
- Provincial Parks
- Village of Fraser Lake
- Crown Agency
- Crown Provincial
- Untitled Provincial
- Municipal
- Private

Foreshore Habitat Sensitivity Index

- Very High
- High
- Medium
- Low / Very Low

Zones of Sensitivity

- Stream Mouths
- Wetlands
- Wetlands 20m buffer
- Shallow/Wide Littoral
- SBSdw3/102 Ecosystem (inc. rock outrops/grassland)
- Fm02 Ecosystem
- Culturally Sensitive Areas

Fish / Wildlife Features

- Beaver Lodge
- Raptor Nest
- Fish Species within Tributary/Upstream (summarized from provincial data)

MASSE ENVIRONMENTAL

Map Date: 2024-06-11
Projection: WGS 84 / UTM zone 10N
Project #: 2023-1056
Scale: 1:10.000

0 150 300 m

Fraser Lake Foreshore Inventory Mapping Mapsheet 14 of 15

Segment Number: 48A
Shore Type: Gravel
Land Use: Transportation
Level of Impact: High
Number of Modifications: 0

Segment Number: 47
Shore Type: Gravel
Land Use: Rural
Level of Impact: Medium
Number of Modifications: 0

Segment Number: 46
Shore Type: Rocky Shore
Land Use: Transportation
Level of Impact: High
Number of Modifications: 7

Lake Chub, Longnose Sucker, Rainbow Trout, Redside Shiner

Robertson Creek

Foster Creek

Shotgun Creek

48B

48A

47

46

45B

680

700

720

740

760

780

380500 381000 381500 382000 382500 383000 383500

5992800 5992200 5991600 5991000 5990400

Railway
Highways
Road
BC Freshwater Atlas Streams
Contours (20 m)

Cadastral Boundaries

- First Nation Reserves
- Provincial Parks
- Village of Fraser Lake
- Crown Agency
- Crown Provincial
- Untitled Provincial
- Municipal
- Private

Foreshore Habitat Sensitivity Index

- Very High
- High
- Medium
- Low / Very Low

Zones of Sensitivity

- Stream Mouths
- Wetlands
- Wetlands 20m buffer
- Shallow/Wide Littoral
- SBSdw3/102 Ecosystem (inc. rock outrops/grassland)
- Fm02 Ecosystem
- Culturally Sensitive Areas

Fish / Wildlife Features

- Beaver Lodge
- Raptor Nest
- Fish Species within Tributary/Upstream (summarized from provincial data)

MASSE ENVIRONMENTAL

Map Date: 2024-06-11
Projection: WGS 84 / UTM zone 10N
Project #: 2023-1056
Scale: 1:10.000

0 150 300 m

Segment Number: 49
Shore Type: Gravel
Land Use: Urban Park
Level of Impact: High
Number of Modifications: 47

Segment Number: 48B
Shore Type: Rocky Shore
Land Use: Transportation
Level of Impact: High
Number of Modifications: 0

Segment Number: 48A
Shore Type: Wetland
Land Use: Transportation
Level of Impact: Medium
Number of Modifications: 0

Whiteswan Municipal Park
Mouse Mountain Park
Fraser Lake
Highway 16
Robertson Creek

Fraser Lake Foreshore Inventory Mapping Mapsheet 15 of 15

- Railway
- Highways
- Road
- BC Freshwater Atlas Streams
- Contours (20 m)

Cadastral Boundaries

- First Nation Reserves
- Provincial Parks
- Village of Fraser Lake
- Crown Agency
- Crown Provincial
- Untitled Provincial
- Municipal
- Private

Foreshore Habitat Sensitivity Index

- Very High
- High
- Medium
- Low / Very Low

Zones of Sensitivity

- Stream Mouths
- Wetlands
- Wetlands 20m buffer
- Shallow/Wide Littoral
- SBSdw3/102 Ecosystem (inc. rock outrops/grassland)
- Fm02 Ecosystem
- Culturally Sensitive Areas

Fish / Wildlife Features

- Beaver Lodge
- Raptor Nest
- Fish Species within Tributary/Upstream (summarized from provincial data)

MASSE ENVIRONMENTAL

Map Date: 2024-06-11
Projection: WGS 84 / UTM zone 10N
Project #: 2023-1056
Scale: 1:10.000
0 150 300 m

Appendix B. Activity Risk Matrix (Risk ratings: NA = Not Allowed, VH = Very High, H = High, M = Moderate, and L = Low)

Activity[1]	Risk rating based on Ecological Ranking				Risk rating if Zone of Sensitivity Present[2]
	Very High	High	Moderate	Low / Very low	
Aquatic Vegetation Removal					
Removing native aquatic vegetation - by hand, or mechanical cutting for swimming areas and private beach access	VH	VH	VH	VH	NA
Removing non-native/invasive aquatic vegetation - by hand or mechanical cutting for swimming areas and private beach access	VH	VH	H	M	NA
Dredging, Infilling and Beach Creation					
Dredging - new or expansion works, no current tenure	VH	VH	VH	VH	NA
Maintenance dredging - dredged in last 10 years, no increase in footprint below the NB[1], dredged material deposited on land, within existing tenure	VH	VH	VH	VH	NA
Lake infilling - e.g. extension of upland landscaping	VH	VH	VH	VH	NA
Beach creation below the lake NB	VH	VH	VH	VH	NA
Foreshore sediment disturbance and removal of lakebed substrate (e.g., beach grooming)	VH	VH	H	M	NA
Foreshore Erosion, Sediment or Wave Control Structures					
New groyne construction or increase in existing footprint	VH	VH	VH	VH	NA
Maintenance of existing groyne, no increase in existing footprint, within existing tenure	M	M	L	L	NA
Erosion control (e.g. concrete, rip rap, vegetation, etc.)	VH	VH	H	M	NA
Infill breakwaters or boat basins	VH	VH	H	H	NA
Wave control structures (e.g., log booms)	VH	VH	H	M	NA
Boat Launches					
Construction of new hard surface boat launch or repair/upgrade of existing hard surface boat launch without land tenure	VH	VH	VH	H	NA
Upgrade/repair of existing hard surface boat launch with land tenure and within existing footprint	VH	H	H	M	NA
Upgrade/repair of existing hard surface boat launch with land tenure and increasing size of the existing allowable footprint	VH	VH	H	M	NA

Activity[1]	Risk rating based on Ecological Ranking				Risk rating if Zone of Sensitivity Present[2]
	Very High	High	Moderate	Low / Very low	
Construction of new boat rail launch or repair/upgrade of existing boat rail launch without land tenure	VH	H	M	L	NA
Upgrade/repair of existing boat rail launch with land tenure and within existing footprint	H	H	M	M	NA
Buoys					
Placement of up to 2 helical screw anchor mooring buoys for non-commercial use.	VH	H	M	L	NA
Placement of up to 2 non-helical screw mooring buoys for non-commercial use.	VH	H	H	M	NA
Placement mooring buoys for commercial use	Moorage # dependant - see Marina Activity rankings				NA
Docks, boathouses, pile supported structures, float home structures, and other - below NB					
Docks - floating, pile supported or removable	VH	H	M	L	NA
Floating or lake access boat house, covered boat storage, or permanent non-moorage structures	VH	VH	VH	VH	NA
Land boat house - located on land with access directly to the water	VH	VH	VH	H	NA
Pumphouse	VH	VH	VH	H	NA
Boat lifts	VH	H	L	L	NA
Float homes and house boats - refers to long term storage area.	VH	VH	VH	VH	NA
Float home/ house boats - refers to short term mooring (in bays).	VH	H	M	L	NA
Submarine cables, including related land clearing and equipment access.	VH	VH	VH	H	NA
Submarine cables - no land clearing necessary.	L	L	L	L	NA
Overwater piled structure (e.g. building, deck, etc.)	VH	VH	VH	VH	NA
Elevated boardwalk over water	VH	H	H	H	NA
Marinas					
Private dock moorage = < 6	VH	H	M	M	NA
Small Marina = 6 – 20 slips	VH	H	H	H	NA
Marina Large = >20 slips	VH	VH	VH	VH	NA
Water Withdrawal, Use or Discharge					

Activity[1]	Risk rating based on Ecological Ranking				Risk rating if Zone of Sensitivity Present[2]
	Very High	High	Moderate	Low / Very low	
Waterline - directional drilling	M	M	M	M	NA
Waterline - open excavation	VH	VH	H	M	NA
Geothermal heating/cooling - commercial, industrial, strata or multi-family	VH	VH	VH	H	NA
Geothermal heating/cooling - single family residence	H	H	M	L	NA
Treated effluent discharge pipe	VH	VH	VH	VH	NA
Commercial water withdrawals (addressed through water licencing, with physical activites addressed elsewhere in this table)	-	-	-	-	-
Transition to Private Land from Crown Land					
Application to purchase or lease crown land (crown grant)	VH	H	M	L	NA
Land development, on private land - above NB					
Native vegetation modification/removal, including for: buildings (e.g., boathouses, covered boat storage, permanent non-moorage structures), beach creation, landscaping, and septic fields.	VH	VH	VH	H	NA
Non-native vegetation modification / removal, including for: buildings (see above), landscaping, beach creation, and septic fields.	VH	H	M	L	NA
Drilling and blasting	VH	VH	VH	H	NA

Legend:

[1]NB refers to present natural boundary. NB is the legal term BC Crown Land Branch uses to define the property boundary. Often NB and High Water Hark (HWM) are similar. Only a registered BC Legal Land Surveyor may determine NB.

[2]For all activities, if species or Critical Habitat listed under the Species at Risk Act are present, refer to DFO Projects Near Water Website for next steps (https://www.dfo-mpo.gc.ca/pnw-ppe/index-eng.html).

[3]Refer to DFO Land Development Guidelines (http://stewardshipcentrebc.ca/PDF_docs/StewardshipSeries/LandDevelopmentGuidelines.pdf)

Appendix C. Legal Requirements and Policy

The following provides a brief summary of environment related legislation that may be applicable to a proponent's project. While this list is fairly inclusive, other pieces of legislation may be applicable, and proponents are to ensure that they have identified all legislation that may apply to their project. The Federal Project Near Water website may be updated to reflect the integration of permitting under the *Species at Risk Act* and *Fisheries Act.* It is the proponents 'responsibility to refer to the Projects Near Water website for any updates.

Federal Acts:

- *The Department of Environment Act*
- *Fisheries Act*
- *Species at Risk Act (SARA)*
- *Migratory Birds Convention Act*
- *Canada Wildlife Act*
- *Navigable Waters Protection Act*
- *Pesticides Act*
- *Canadian Environmental Assessment Act (CEAA)*
- *Indian Act*

Federal Regulations:

- *Canada Environmental Protection Act* Regulations
- *Migratory Birds Regulations*
- *Fisheries Act Regulations*
- *Wildlife Area Regulations*

Provincial Acts:

- *Water Sustainability Act*
- *Fish Protection Act*
- *Wildlife Act*
- *Land Act*
- *Weed Control Act*
- *Environmental Management Act*
- (Contaminated Sites Regulations)
- *Local Government Act*
- *Heritage Conservation Act*
- *Health Act (e.g., Sewerage System Regulation)*

Local Government:

- Development Permit Areas (DPAs)
- Subdivision Servicing Bylaw
- Official Community Plans
- Floodplain Management Bylaw
- Building Bylaw
- Zoning Bylaws

The Legal Requirements table, provided below (Table C1) identifies the main fish and wildlife habitat regulatory requirements for typical foreshore activities. These requirements involve three regulatory processes:

1. Obtaining a BC Crown Land tenure - to request permission for use of provincial Crown land.

2. Obtaining a BC Water Sustainability Act Section 11 notification or approval for making changes in and about a stream.
3. Obtaining necessary DFO acceptance through a Project Review. DFO staff will review the project plans to identify the potential risks of the project to the conservation and protection of fish and fish habitat. During the review, it will be determined if the project will: a) impact an aquatic species at risk, result in the death of fish and the harmful alternation, disruption or destruction of fish habitat, and if so, require an authorization under the *Fisheries Act*.

Although potential regulatory requirements (e.g., permits) are listed, the requirements at the time of planning the project should be confirmed, as regulatory changes do occur. FrontCounterBC should be contacted to confirm these requirements.

The Legal Requirements table only provides direction related to protecting fish and wildlife habitat values, and as such, does not consider other development factors (such as erosion hazards, drinking water quality, or navigation considerations). Proposed works may be subject to requirements such as: local government zoning or permitting, BC *Water Sustainability Act* approvals or notifications (in addition to those noted above) and Water License applications, Heritage Conservation Act permits, Land Act permits, licenses or permissions for occupation of Crown Lands, or Navigable Waters Protection Act approvals. It remains the responsibility of the project proponent to verify this information and meet all regulatory requirements that may apply to their project.

Table C1. Summary of typical legal environmental requirements for select development activities.

Activity[1]	Crown Land Tenure	BC Water Sustainability Act-Section 11[2]	Federal Fisheries Act Review[4]	Other
Aquatic Vegetation Removal				
Removing native aquatic vegetation - by hand, or mechanical cutting for swimming areas and private beach access	N	Y	See DFO website	-
Removing non-native/invasive aquatic vegetation - by hand or mechanical cutting for swimming areas and private beach access	N	Y	See DFO website	-
Dredging, Infilling and Beach Creation				
Dredging - new or expansion works, no current tenure	Y	Y	Y	Federal Navigable Waters Act[6]
Maintenance dredging - dredged in last 10 years, no increase in footprint below the NB, dredged material deposited on land, within existing tenure.	N	Y	See DFO website, likely N	Federal Navigable Waters Act[6]
Lake infilling - e.g. extension of upland landscaping	Y	Y	Y	-
Beach creation below the lake NB	Y[3]	Y	Y	-
Beach creation above the lake NB, assumes on the applicant's land	N	Y	See DFO website, likely N	See DFO Land Development Guidelines[5]
Foreshore sediment disturbance and removal of lakebed substrate (e.g., beach grooming)	N	Y	See DFO website, likely Y	-
Foreshore Erosion, Sediment or Wave Control Structures				-
New groyne construction or increase in existing footprint	Y	Y	Y	Federal Navigable Waters Act[6]
Maintenance of existing groyne, no increase in existing footprint, within existing tenure	N	Y	N	Federal Navigable Waters Act[6]
Erosion control (e.g. concrete, rip rap, vegetation, etc.)	N	Y	See DFO website	Federal Navigable Waters Act[6]
Infill breakwaters or boat basins	Y	Y	See DFO website	Federal Navigable Waters Act[6]
Wave control structures (e.g., log booms)	Y	Y	See DFO website	Federal Navigable Waters Act[6]
Boat Launches				-
Construction of new hard surface boat launch or repair/upgrade of existing hard surface boat launch without land tenure	Y	Y	See DFO website	-

Activity[1]	Crown Land Tenure	BC Water Sustainability Act-Section 11[2]	Federal Fisheries Act Review[4]	Other
Upgrade/repair of existing hard surface boat launch, within land tenure, and within existing footprint	N	Y	N	-
Upgrade/repair of existing hard surface boat launch, within land tenure, and increasing size of the existing allowable footprint	Y	Y	Y	-
Construction of new boat rail launch or repair/upgrade of existing boat rail launch without land tenure	Y	Y	See DFO website	-
Upgrade/repair of existing boat rail launch with land tenure and within existing footprint	N	Y	N	-
Buoys				
Placement of up to 2 helical screw anchor mooring buoys for non-commercial use.	Y[3]	Y	N	Federal Navigable Waters Act[6]
Placement of up to 2 non-helical screw mooring buoys for non-commercial use.	Y[3]	Y	N	Federal Navigable Waters Act[6]
Placement mooring buoys for commercial use	Y	Y	N	-
Docks, boathouses, pile supported structures, float home structures, and other - below NB				
Docks - floating, pile supported or removable	Y[3]	Y	See DFO website	-
Floating or lake access boat house, covered boat storage, or permanent non-moorage structures	Y	Y	Y	-
Land boat house - located on land with access directly to the water.	Y	Y	See DFO website	-
Pumphouse	Y	Y	Y	-
Boat lifts	Y[3]	Y	See DFO website	-
Float homes and house boats - refers to long term storage area.	Y	Y	Y	-
Float home/ house boats - refers to short term mooring (in bays).	Y	Y	See DFO website	-
Submarine cables, including related land clearing and equipment access.	N	Y	See DFO website	Federal Navigable Waters Act[6]
Submarine cables - no land clearing necessary.	N	Y	N	Federal Navigable Waters Act[6]
Overwater piled structure (e.g. building, deck, etc.)	Y	Y	See DFO website	-
Elevated boardwalk over water	Y	Y	See DFO website	-
Marinas				

Activity[1]	Crown Land Tenure	BC Water Sustainability Act-Section 11[2]	Federal Fisheries Act Review[4]	Other
Private dock moorage = < 6	Y[3]	Y	See DFO website, likely Y	-
Small Marina = 6 – 20 slips	Y	Y	Y	Federal Navigable Waters Act[6]
Marina Large = >20 slips	Y	Y	Y	Federal Navigable Waters Act[6]
Water Withdrawal, Use or Discharge				
Waterline - directional drilling	N	Y	See DFO website	May require a Water License
Waterline - open excavation	N	Y	See DFO website	May require a Water License
Geothermal heating/cooling - commercial, industrial, strata or multi-family	Y[3]	Y	See DFO website	May require a Water License
Geothermal heating/cooling - single family residence	Y[3]	Y	See DFO website	May require Water License
Treated effluent discharge pipe	Y[3]	Y	N	Environment Canada Federal Navigable Waters Act[6]
Commercial water withdrawals	Y[3]	Y	See DFO website	Requires Water License Federal Navigable Waters Act[6]
Transition to Private Land from Crown Land				-
Application to purchase or lease crown land (crown grant)	Y	N	N	-
Land development, on private land - above NB				
Native Vegetation modification / removal	N	Y[3]	See DFO website	-
Non-native Vegetation modification / removal	N	Y[3]	See DFO website	-
Drilling and blasting	N	Y	See DFO website	If < 30 m NB, contact local government

Activity[1]	Crown Land Tenure	BC Water Sustainability Act-Section 11[2]	Federal Fisheries Act Review[4]	Other
Boathouses / covered boat storage / permanent non-moorage structures	N	Y[3]	See DFO website	Refer to Local Government
Building and development permit application	N	Y[3]	Y[3]	Refer to Local Government
Landscaping with Native Vegetation	N	N	See DFO website	Refer to Local Government
Landscaping with Non-native Vegetation	N	N	See DFO website	Refer to Local Government
Septic application	Y[3]	N	N	Refer to Health Authority

Legend:

[1]NB refers to present natural boundary. NB is the legal term BC Crown Land Branch uses to define the property boundary. Often NB and High Water Hark (HWM) are similar. Only a registered BC Legal Land Surveyor may determine NB.

[2] BC Water Sustainability Act Approval or Notification.

[3] Although indicated as Yes, the requirement is structure/location dependant. Refer to FrontCounterBC.

[4]DFO Projects Near Water Website (https://www.dfo-mpo.gc.ca/pnw-ppe/index-eng.html). For all activities, if species or Critical Habitat listed under the Species at Risk Act are present, refer to this website.

[5]Refer to DFO Land Development Guidelines (http://stewardshipcentrebc.ca/PDF_docs/StewardshipSeries/LandDevelopmentGuidelines.pdf).

[6]Refer to Transport Canada Works on navigable waters in Canada: (https://tc.canada.ca/en/programs/navigation-protection-program/works-navigable-waters-canada#item_3)

Appendix D. Best Management Practices

The BC Ministry of Environment (MOE 2019) defines best management practices (BMPs) as “guidelines that help development projects meet necessary legislation, regulations and policies. For example, legislation might dictate that projects cannot harm a stream, while best management practices provide practical methods to avoid harming a stream.”

The table below provides a summary of potentially applicable environmental and archaeological BMPs. This list is not exhaustive, other applicable BMPs may be available for a given project, and updates occur regularly. Thus, it is recommended that the website be accessed at the following link for a current updated list: https://www2.gov.bc.ca/gov/content/environment/natural-resource-stewardship/laws-policies-standards-guidance/best-management-practices.

FrontCounterBC or a QEP should be contacted for more information on recent Provincial BMP’s that may be specifically applicable to the Project. For Federal documents, the *Projects Near Water* website by Fisheries and Oceans Canada should also be referred to (https://www.dfo-mpo.gc.ca/pnw-ppe/index-eng.html).

Table D1. Summary of BMPs and guidelines that may be applicable to development in the Omineca Region (Adapted from: Kootenay Lake Partnership 2019).

Federal BMPs/Standards/Codes of Practice	Target - species habitat	Applicability	Web Link
Land Development Guidelines for the Protection of Aquatic Habitat (1992)	Aquatic	Works undertaken in areas adjacent to riparian features.	http://www.dfo-mpo.gc.ca/Library/165353.pdf
DFO Codes of Practice: Culvert Maintenance, Municipal and Agricultural Drain Maintenance, Repair and Maintenance of In-water Structures, Repair Maintenance and Construction of Docks, Moorings and Boathouses, Routine Maintenance Dredging for Navigation,	Aquatic	Specify conditions and measures for managing risks to fish and fish habitat	https://www.dfo-mpo.gc.ca/pnw-ppe/practice-practique-eng.html
Provincial BMPs	**Target - species habitat**	**Applicability**	**Web Link**
Develop with Care: Environmental Guidelines for Urban and Rural Land Development in British Columbia (2014)	Sensitive Species Terrestrial Aquatic Riparian	Works involving any form of land development.	https://www2.gov.bc.ca/gov/content/environment/natural-resource-stewardship/laws-policies-standards-guidance/best-management-practices/develop-with-care
Guidelines for Amphibian and Reptile Conservation during Urban and Rural Land Development in British Columbia (2014)	Amphibians and Reptiles	Ecosystems comprised of aquatic habitats, rocky outcrops and forested areas.	https://www2.gov.bc.ca/assets/gov/environment/natural-resource-stewardship/best-management-practices/herptilebmp_complete.pdf
Guidelines for Raptor Conservation during Urban and Rural Land Development in British Columbia (2013)	Raptors	Terrestrial ecosystems comprised of mature coniferous and mixed woodlands.	http://www.env.gov.bc.ca/wld/documents/bmp/raptor_conservation_guidelines_2013.pdf

Provincial BMPs	Target - species habitat	Applicability	Web Link
Best Management Practices Guidelines for Bats during Urban and Rural Land Development in British Columbia in BC (2016)	Bats	Terrestrial ecosystems, insect rich riparian zones, as well as wetlands, forest edges and open woodland.	http://a100.gov.bc.ca/pub/eirs/viewDocumentDetail.do?fromStatic=true&repository=BDP&documentId=12460
Standards and Best Practices for In-stream Works (2004)	Aquatic	Works undertaken in-stream.	http://www.env.gov.bc.ca/wld/documents/bmp/iswstdsbpsmarch2004.pdf
A User's Guide for changes In and About A stream in British Columbia 0 Understanding your obligations under the Water Sustainability Act and Water Sustainability Regulation (2022)	Aquatic	Works undertaken in-stream	https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/working-around-water/wsa-cias-users_guide.pdf
General BMPs and Standard Project Considerations	Aquatic	Any projects undertaken in and around a stream.	http://www.env.gov.bc.ca/wld/in-streamworks/generalBMPs.htm
Bank Stabilization Specific BMPs	Terrestrial Aquatic	Bank stabilization works that could impact fish or wildlife habitat.	http://www.env.gov.bc.ca/wld/in-streamworks/bankstabilization.htm
Best Management Practices for Hazard Tree and Non-Hazard Tree Limbing, Topping or Removal (2009)	Terrestrial Aquatic	Works involving tree removal.	https://www2.gov.bc.ca/assets/gov/environment/natural-resource-stewardship/best-management-practices/hazardtree_26may_09.pdf
Standards and Best Practices for In-stream Works	Terrestrial Aquatic	Wharves, piers, docks, boathouses, and small moorings in and about a stream	http://www.env.gov.bc.ca/wld/in-streamworks/downloads/Docks.pdf
Best Management Practices for Boat Launch Construction & Maintenance on Lakes (2006)	Terrestrial Aquatic	Boat Launch Construction & Maintenance on Lakes (Okanagan specific)	http://www.env.gov.bc.ca/okanagan/documents/BMPBoat_LaunchDraft.pdf

Provincial BMPs	Target - species habitat	Applicability	Web Link
Best Management Practices for Small Boat Moorage on Lakes (2006)	Terrestrial Aquatic	Small Boat Moorage on Lakes (Okanagan specific)	http://www.env.gov.bc.ca/okanagan/documents/BMPSmallBoatMoorage_WorkingDraft.pdf
Best Management Practices for Installation and Maintenance of Water Line Intakes (2006)	Aquatic	Installation and Maintenance of Water Line Intakes (Okanagan specific)	http://www.env.gov.bc.ca/okanagan/documents/BMPIntakes_WorkingDraft.pdf
Beaver Management Guidelines (2001)	Aquatic	Areas that support beaver communities.	http://www.env.gov.bc.ca/van-island/pa/pdf/Beaver-Guide.pdf
Tree replacement criteria (1996)	Terrestrial	Works involving tree removal and replacement.	http://www.env.gov.bc.ca/wld/documents/bmp/treereplcrit.pdf
Terms and Conditions for changes in and about a stream specified by MWLAP Habitat Officers, Omineca Region	Aquatic	Changes in and around a stream of the kind listed in Part 3 of the *Water Sustainability Regulation.*	https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/working-around-water/terms_conditions_timing_omineca.pdf
Fish Habitat Rehabilitation Procedures (1997)	Aquatic	Works with an erosion and sediment risk near water.	https://www.for.gov.bc.ca/hfd/library/ffip/Slaney_PA1997_A.pdf
Guidelines for Wetland Protection and Conservation in British Columbia: Land Development (2009)	Wetlands	Wetland protection near development sites.	https://www2.gov.bc.ca/assets/gov/environment/natural-resource-stewardship/best-management-practices/wetland_ways_ch_10_development.pdf
First Nation BMPs	**Target Area**	**Applicability**	**Web Link**
Stellat'en Archeological Procedures Document (Under Development)	Archaeology	Archeological protection on Stellaquo Reserve.	Contact Stellat'en First Nation