

Windermere Lake Foreshore Development Guide

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- Real Estate Foundation of BC
- Columbia Basin Trust
- District of Invermere
- Foreshore Inventory and Mapping Technical Committee
- Lake Windermere Ambassadors

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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, Windermere Lake is multi-jurisdictional and lake management occurs at all levels (i.e., Local, Regional, Provincial, Federal, and First Nations). 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 provided in the Foreshore Integrated Management Planning report (FIMP; Schleppe and McPherson 2021). 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. 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, when completing the original Windermere Lake study, 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) 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 were refined. This FDG was developed using the most recent template as a guide (McPherson and Schleppe 2020), with lake specific modifications made as required.

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).

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 East Kootenay should be contacted for any works planned on private land within the region's jurisdiction.

Phone: 250-489-2791

Email: info@rdek.bc.ca

Local Municipality – District of Invermere should be contacted for any works planned on private land within the city's jurisdiction.

Phone: 250-342-9281

Email: info@invermere.net

First Nations – The following should be contacted for any works that require First Nation engagement.

Ktunaxa Nation

Phone: 250-489-2464

Email: news@ktunaxa.org

Shuswap Indian Band

250-341-3678

Website: <http://www.shuswapband.net/>

Lake Partnership Group – Lake Windermere Ambassadors

Phone: 250-341-6898

Email: info@lakeambassadors.ca

2.1. First Nations Traditional Ecological Knowledge

Our project team reached out to local First Nations and requested participation in field data collection and/or inclusion of First Nations Traditional Ecological Knowledge (TEK) data. The Ktunaxa Nation Council, Shuswap Indian Band, and Akisqnuq First Nations were contacted in late July. The Shuswap Indian Band expressed their interest and participated in both the field data collection (Basil Stevens) and provided TEK data. The other First Nations contacted did not have the capacity to participate.

Basil Stevens was a valuable member of the field team. He assisted with photography and modification counts. Basil also provided memories of growing up and recreating on the lake, and other fish and wildlife insight including but not limited to where winter angling currently occurs, and the presence of turtle habitat at Kinsmen park.

In regard to providing TEK, the Shuswap Indian Band provided point observations with details such a Kokanee spawning locations or other wildlife, ecosystem, or habitat related data. Overall, there was high degree of overlap with the data available in the scientific literature. Sufficient detail was not provided to generate any one specific criteria, etc. Additionally, our agreement to confidentiality was that we were limited in the specific data that could be provided.

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 (Schleppe and McPherson 2021), 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.

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.

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.

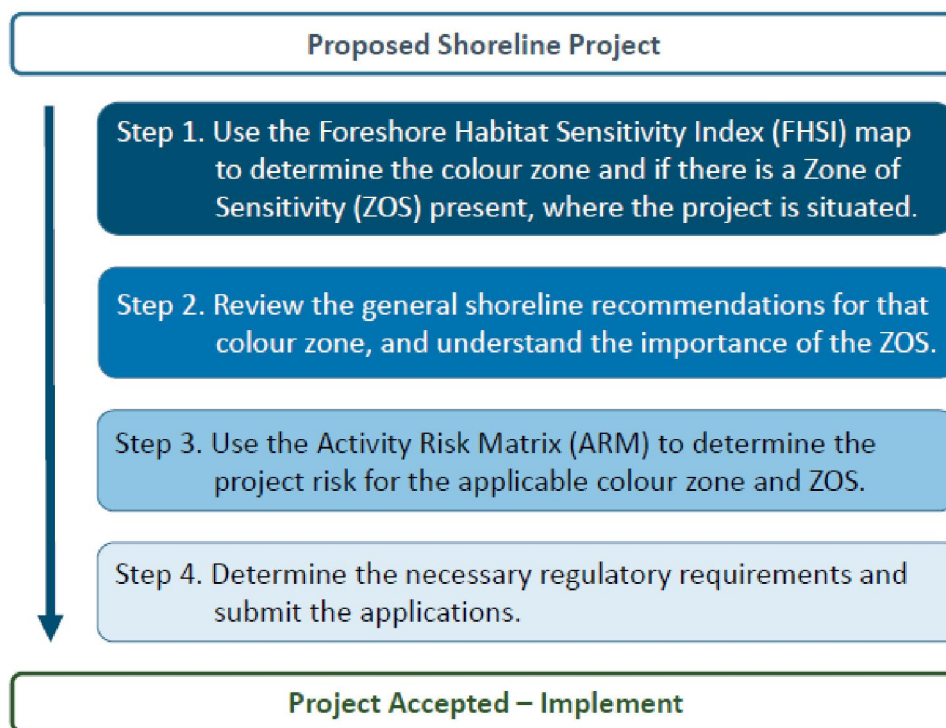


Figure 1. Four steps when planning to develop or modify foreshore habitat.

3.1. Interpret the FDG Map

The key results of the FIM and FHSI are presented in tables and maps in the FIMP (Schleppe and McPherson 2021). 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 and 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
	Waterfowl	Teal
	Ecosystem/Habitat Feature	Green

The FDG map also depicts each ZOS in a specific colour scheme. Each ZOS is presented as either a polygon, line, or point, and includes appropriate buffers. 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.

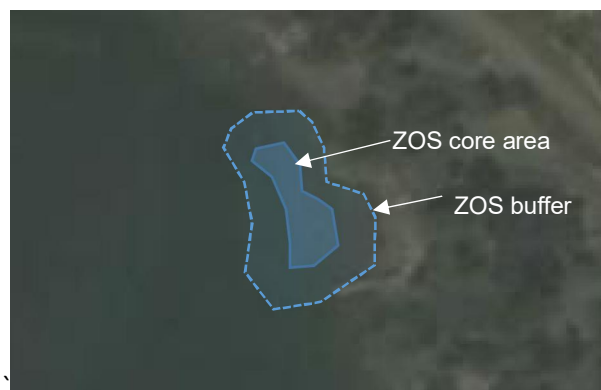


Figure 2. Zone of Sensitivity with an appropriate buffer.

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 aligns 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. See the complete FIMP report for a full presentation of details on all of these topics (Schleppe and McPherson 2021).

5.1. Shoreline Colour Zone Recommendations

Red Shoreline	
Defined by:	Very High FHSI ecological rank.
FHSI summary:	Red zones account for 30% of the total shoreline length of 11,270 m.
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.
Recommendations:	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 may be appropriate in these areas, where applicable.

Orange Shoreline	
Defined by:	High FHSI ecological rank.
FHSI summary:	Orange zones account for 19% or 7140 m of the total shoreline length.
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 habitats and likely have ZOS present. These areas are sensitive to development, continue to provide important habitat functions, but may be at risk from adjacent development pressures.
Recommendations:	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 (see FIMP report recommendations).

Yellow Shoreline	
Defined by:	Medium FHSI ecological rank.
Lake summary:	Yellow zones account for 32% or 12,120 m of the total shoreline length.
Sensitivity summary:	These areas have experienced a moderate amount of development disturbance and pressures. Although these areas have been impacted to some degree, they still are largely intact and habitat values remain important.
Recommendations:	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 and/or be situated outside of the riparian area. 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) or Regional Operating Statement (ROS) is available and followed (Appendix B). High risk activities without a BMP or ROS will require an environmental assessment from a QEP.

Grey Shoreline

Defined by: Low and Very Low FHSI Ecological Rank.

Lake summary: Grey zones account for 18% or 6870 m of the total shoreline length.

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.

Recommendations: 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. 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. Comparison of results with the original FDG

A direct comparison with the original assessment was not possible, given that the FHSI techniques and definitions for determination of colour zone have changed (Table 2). However, a few observations were as follows:

- The extent of red colour zone shoreline decreased from the original assessment.
- The combined orange and red zones were similar at 55% in the original study and 49% in this study.
- The extent of yellow colour zones was also very similar between the two years of study, and the grey was exactly the same.
- There is an increase in the number of ZOS or what were formally known as Key Habitat Areas.

Areas that were designated as Orange or Red zones in the original study that are found to not be in this current study have not likely lost their protections. This is because the Activity Risk Matrix now accounts for Zones of Sensitivity uniquely for each development activity (see Section 6.1).

Table 2. Comparison of original (EKILMP et al. 2009) and current extent of each colour zone.

Colour Zone	Original		Current	
	Definition	% shoreline	Definition	% shoreline
Red	Very high or high rank with key habitat area	49%	Very high rank	30%
Orange	Key habitat area	6%	High rank	19%
Yellow	Very high and high rank	27%	Moderate rank	32%
Grey	Moderate, low and very low rank	18%	Low and very low	18%

5.3. Zones of Sensitivity Recommendations

Nine 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. Development proposed in these areas with the potential to impact the habitat may require possible Federal, Provincial, local government, and/or First Nations approvals depending upon proposed activities and the location of works. A QEP is recommended to be retained if development is proposed in or adjacent to (i.e., a 30 m buffer) to help guide proposed development if avoidance is not possible.

Fisheries – Known Kokanee Spawning Area

Lake summary:	The Province has identified Kokanee spawning habitat as high conservation value areas in the Rocky Mountain and Kootenay Lake Forest District (Neufeld pers. comm. 2021, Chirico 2005). The most recent Kokanee spawner counts upstream and downstream of the Athalmer Bridge were 2,500 in 2009 and 2,000 in 2008 (K. Bray pers. comm. 2021). Numbers have decreased with time in this area, with 15,000 spawners reported in 1995 in gravel outcrops at the lake outlet 50 m upstream and 200 m downstream of the Athalmer Bridge (Oliver 1995). Oliver (1995) also reported 1,500 Kokanee spawners in the lower 500 m of Windermere Creek and 50 fish in the lower 50 m of Goldie Creek. Kokanee may also utilize other shoreline areas for spawning. During the original Windermere Lake FIMP for example, 30 spawning Kokanee were evident 200 m upstream of the lake outlet along the cobble shoreline (McPherson and Hlushak 2008).
Sensitivity summary:	Kokanee spawning habitat is important to the long-term viability of this species. It is limited to only select locations along the shoreline where suitable conditions are present. These conditions include a combination of appropriate gravel bed areas, and the presence of upwelling or springs to keep the gravels clean and allow the eggs to be oxygenated].
Recommendations:	These sensitive habitats are to be protected, with no permanent developments recommended both within and adjacent to the mapped polygon areas. A buffer of 30 m is recommended.

Fisheries – Stream Confluence

Lake summary:	In addition to Kokanee and Burbot spawning habitat identified above, creek outlets provide potential rearing and staging habitat for other native fish species. Adfluvial populations of Bull Trout have been reported in Windermere and Salter creeks (Griffith 1994, and Bissett pers. comm. 2008). Rainbow Trout were present in Windermere Creek and possibly Abel and Goldie creeks (Griffith 1994). No information was available on adfluvial forms of Westslope Cutthroat Trout, although resident fish were reported in Windermere Creek (Artech 2002, Griffith 1994). Creek mouths are also important to wildlife. In recognition of these values, stream confluences were mapped as ZOS. The larger tributaries had a 100 m buffer applied (i.e., Goldie and Windermere creeks) and the smaller tributaries had a 50 m buffer mapped. The weighting given to this ZOS recognizes that stream confluences overlap with riparian and wildlife corridors values, and at select streams the Kokanee and Burbot spawning areas present.
Sensitivity summary:	Stream confluences are important for a variety of reasons. Small streams, determined by TRIM linework, were given a 50 m buffer. Goldie and Windermere Creek were each given a 100 m buffer.
Recommendations:	These sensitive habitats should be considered during proposed developments that occur both within and adjacent to the mapped polygon areas. A buffer of 30 m is recommended.

Fisheries – Native Mussel Beds	
Lake summary:	Native mussels are considered a fish under the Federal <i>Fisheries Act</i> , they hold First Nations traditional ecological value, and many populations are declining. Declines are largely the result of habitat loss or degradation. Most mussel species have a complex life cycle involving a fish host, free living form, and the more commonly observed mussel. Previous sampling on Windermere Lake has found <i>Anodonta californiensis/nuttalliana</i> clade (California/Winged Floater) mussels to be present (Moore and Machial 2007, McPherson 2020a and 2020b). The <i>Anodonta</i> species are evidenced by their singular “finger-like” papillae. Mussel presence in the original FIMP was noted in only a few sites (segments 11 and 16), and these sites were included in the FDG. This FIMP identified that mussels were present to a much greater extent around the lake. Marked points were compiled into polygons where mussel presence was expected. Only presence was used because mussel densities were not mapped.
Sensitivity summary:	Mussels, once established are not highly motile. For this reason, they are very susceptible to any form of lakebed disturbance. The areas identified within this ZOS do not differentiate mussel density and more data could be collected to identify highly important beds. Some inferences regarding density can be made however, by the density of observation points in the dataset.
Recommendations:	These sensitive habitats should be considered during proposed developments that occur both within and adjacent to the mapped polygon areas. A buffer of 30 m is recommended.

Fisheries – Burbot Spawning and Rearing

Lake summary:	<p>Burbot are considered a species of regional concern in the Columbia River system due to marked declines in their numbers (McPhail 2007). A conservation strategy for the upper Columbia River Burbot population (Golden to Columbia Lake) is anticipated to be developed, once the outcomes of the Upper Kootenay River Burbot Conservation Strategy are realized (East Kootenay Burbot Scientific Working Group [EKBSWG] 2019). In lakes and rivers, Burbot generally spawn in shallow depths (0 to 10 m) over a variety of substrates from silt and sand to coarse gravel and cobble (McPhail and Paragamian 2000). At Windermere Lake, Burbot historically spawned by the hundreds in weed beds at the Windermere and Goldie creek mouths and other areas of the lake with macrophytes (Westlope 2001). At Windermere Lake and other lakes in the East Kootenays, peak spawning occurs in the middle of February (Arndt 2001, EKBSWG 2019). Studies in Columbia and Windermere lake found juvenile Burbot to be strongly associated with interstitial spaces in the substrate. Shoreline with gravel and cobble substrates were the preferred habitat for age 0 burbot, while older juveniles were associated with larger substrates of cobble and boulders (Taylor 2001 and 2002). Where aquatic vegetation was utilized, extensively branching species such as bushy pondweed (<i>Najas flexis</i>) was preferred (Taylor 2001). The western shoreline of Windermere Lake has been found to provide juvenile burbot habitat (mean density was 4.5 age 0 burbot/100 m, and 0.6 age-1 burbot/100 m; Taylor 2002). For this reason, the outlets of Windermere Creek and Goldie Creek, and shoreline with gravel/cobble habitat and low %fines (<10%) were mapped and reported as being high value in the original Windermere FIMP and were included in this dataset. In addition, areas with proximal deep-water habitat with similar substrates as the western shore were also considered important to Burbot and included.</p>
Sensitivity summary:	<p>Burbot spawning and rearing habitat is important to the long-term viability of this species. Historical data has been included in the ZOS using by estimating preferred habitat from data collected in this study. The spatial accuracy of this ZOS can be improved if more data is collected specifically focused on fish densities. It is thought that this ZOS overlaps with other important habitats for fish</p>
Recommendations:	<p>These sensitive habitats should be considered during proposed developments that occur both within and adjacent to the mapped polygon areas. A buffer of 30 m is recommended.</p>

Wildlife – Avian Bank Nesting

Lake summary: The Bank Swallow (*Riparia riparia*) is a Threatened species under the SARA, that has documented nesting sites along the shoreline of Windermere Lake (Darvill 2021). Bank Swallows generally arrive at their breeding grounds in North America during early spring and depart late summer to midfall. Bank Swallows have high site fidelity if nests were successful the previous year (BC CDC 2021, Darvill pers. comm.). At Windermere Lake, nests were present in steep sand/gravel banks, near the top of the bank, along the edge of the water. Due to their sensitivity, known Bank Swallow nesting locations were masked. Known Bank Swallow nests were valued higher than other general bank nesting locations, which either had past nesting evidence or potential for nests for Bank Swallows or other species. If a project is planned in an area marked as having avian bank nesting, the QEP is to refer to the GIS database to confirm if Bank Swallow nesting habitat is present, as this is where the masked data resides for this sensitive species.

Sensitivity summary: Nesting birds are protected under a variety of different pieces of legislation. Disturbance to active nest sites can possibly cause harm to the birds themselves if actively nesting, or impact habitats if they are altered due to the site fidelity.

Recommendations: These sensitive habitats should be avoided with appropriate buffers if development is proposed that occur both within and adjacent to the mapped polygon areas. as described by R. Darvill (pers. comm. 2021) *“Bank nesting birds are aerial feeders over Lake Windermere and on the terrestrial landscape around colonies. When breeding, feeding sites have been described as usually within 200 m of where young are fed, but this distance may vary depending on availability of foraging areas and may be up to 1 km away. Given that research has shown the feeding area to be usually be within 200 m, a buffer of 200 m is recommended during the nesting period”*.

Waterfowl – Floating Nests

Lake Summary: Surveys in the Columbia Wetlands have documented Lake Windermere as important bird habitat when compared to the rest of the Columbia Wetlands ecosystem (Darvill 2019). Darvill (2019) summarized the significance of Lake Windermere to birds, as follows "Bird data retrieved from an online database indicates that 165 bird species have been detected at Lake Windermere, with 17 of these species considered to be at-risk." The south end of the lake lies within the Columbia Wetlands Wildlife Management Area (the WMA). As outlined by the Province of BC (2021b), "*The WMA was established for the conservation and management of fish and wildlife habitats and landscape connectivity so that the Columbia River Wetlands continues to function as a natural floodplain ecosystem*". Several species of birds that make floating nests were observed, including several grebes (e.g., Western Grebe (*Aechmophorus occidentalis*, listed as Special Concern by COSEWIC). Large wind and wave events or waves generated from boats can cause nests to become submerged. For this reason, areas of possible nesting were identified using the floating and emergent data sets, looking for areas with large coverage such as the south end of the lake, where nesting and foraging opportunities were most probable. All these areas were digitized from the large expanses of floating and emergent vegetation data collected in this study to inform areas most likely important to waterfowl that nest using floating platforms. These data can be spatially updated as more specific nesting survey data becomes available, and these areas are only considered possible nesting locations. Actual nesting may vary from data presented.

Sensitivity summary: This ZOS is focused on identifying possible floating nesting site locations. Species that utilize floating nests are highly susceptible to nest loss through wind and wave events or from wake generated by large boats. Nesting birds are protected and this ZOS is intended to provide a summary of the most probable nesting locations on the lake.

Recommendations: These sensitive habitats should be avoided with appropriate buffers if development is proposed that occurs both within and adjacent to the mapped polygon areas. A site-specific buffer should be developed based upon known values.

Waterfowl – Migration Flyway

Lake Summary: As outlined by the Province of BC (2021b), “*The WMA is an important component of the Pacific Flyway, a waterfowl migration route stretching from nesting areas on the Arctic Ocean to wintering grounds in South America. The WMA is adjacent to the Columbia River, extending 180 km from Canal Flats to the head of the Mica Reservoir, north of Donald*”. Darvill (2019) described that “*The south end of the lake has consistently had large concentrations of staging waterfowl during migration and had the highest single day bird counts resulting from a regional coordinated bird count (i.e. Columbia Wetlands Waterbird Survey). When compared across 105 survey stations in the Columbia Wetlands, the south end of Windermere Lake appears to contain the most important staging area within the continuous wetlands ecosystem for at-risk grebe species, as well as for other bird species such as American Coot. Creek mouths at Windermere Lake are also important habitat for birds, especially for migrating shorebirds.*” The south end of the lake and the Windermere Creek mouth (due to it being the largest tributary) were digitized to inform areas most likely important to migrating waterfowl. These data can be spatially updated as more specific waterfowl staging density data becomes available. These areas are only considered possible locations based upon data available using airphoto interpretation and associated aquatic vegetation data collected in this study.

Sensitivity summary: This ZOS is focused on identifying high value migration locations in the Pacific Flyway. These areas provided important habitat for migrating waterfowl for forage, rest, and other requirements during migration periods. More inventory is needed to identify key habitat areas, and it is expected that this dataset may change over time as new data is collected.

Recommendations: These sensitive habitats should be avoided with appropriate buffers if development is proposed that occurs both within and adjacent to the mapped polygon areas. A site-specific buffer should be developed based upon known values.

Ecosystem/Habitat Feature - Grasslands

Lake Summary: The following summarizes some of the unique and sensitive values grassland ecosystems (Grassland Conservation Council of BC [GCCBC] 2018): *“Grasslands cover less than one percent of the province. Their rarity is largely due to loss or fragmentation of habitat. Where they remain, grasslands are frequently impacted by other causes including: invasive species, ranching/hay fields, industrial development grazing, recreation, forest encroachment, and fire suppression. Many animals use grasslands for at least parts of their life cycle, and most of BC’s species at risk are found in the grasslands. In the Kootenay Region, grasslands provide high-quality wildlife habitat, and in many areas provide critical ungulate winter range. Much of the grassland area in the Rocky Mountain Trench is on private land and is considered to be a rare or at risk ecosystem.”* Examples of mapped sensitive species that are associated with grasslands along the shoreline of Windermere Lake are the American Badger and Lewis’s Woodpecker. Lewis’s Woodpecker is listed as Threatened federally (SARA Schedule 1, 2012), and Special Concern provincially (blue listed), and has been documented utilizing grassland habitat south of Goldie Creek (Province of BC 2021a). These high value habitats were mapped using the RDEK Official Community Plan areas, BC Provincial Grasslands layers, and Vegetation Resource Inventory data. A composite layer was created using all data layers.

Sensitivity summary: Grasslands are extremely fragile and susceptible to invasive species. Further, they provide forage, thermal and a variety of other important functions for wildlife. Any significant ground disturbance can result in establishment of invasive species. Additional ecosystem mapping could be considered to determine if any coniferous woodlands or other habitats should be considered in this ZOS.

Recommendations: These sensitive habitats should be avoided with appropriate buffers if development is proposed that occurs both within and adjacent to the mapped polygon areas. If development is proposed, key mitigation strategies may be required, including avoidance, invasive species management, or other strategies depending where and what is proposed.

Ecosystem/Habitat Feature – Connectivity Corridor

Lake Summary: Connectivity to habitat is important for wildlife immigration and emigration. Connectivity and any specific habitat requirements to facilitate this process varies by species. As outlined in the original FIMP (McPherson and Hlushak 2008): *“Foreshore areas are highly productive and diverse, providing important foraging and refuge habitat for wildlife. They also provide a critical link between aquatic and terrestrial ecosystems. Maintaining the habitat and unrestricted access to upslope habitats is thus important.”* In accordance with the original FIMP and the RDEK OCP, this ZOS includes connectivity corridors for wildlife in general, riparian habitat of creeks, linkages for Badger movement and important high value ungulate winter range (RDEK 2019 and McPherson and Hlushak 2008). The badger linkage is provided by the BC Hydro right-of-way, Copper Point Golf Course and Holland Creek drainage. The ungulate winter range of note is located along the southwest facing slopes, and includes riparian and shoreline areas. These original FIMP and OCP should be referenced for further specifics by area. These high value habitats were mapped using the RDEK Official Community Plan areas. Additional areas included the mapped occurrence of Painted Turtle in Dorothy Lake in Kinsmen Park. The Painted Turtle - Intermountain - Rocky Mountain Population is listed as a species of Special Concern both federally (SARA Schedule 1, 2007), and provincially (blue listed) (Province of BC 2021b).

Sensitivity summary: Connectivity corridors for wildlife are important. These corridors allow immigration and emigration to and from areas they require to carry out their life cycle. Connectivity corridors identified in this ZOS are generally consistent with previous guidance documents.

Recommendations: These sensitive habitats should be avoided with appropriate buffers if development is proposed that occurs both within and adjacent to the mapped polygon areas. If development is proposed, key mitigation strategies may be required, including avoidance, invasive species management, or other strategies depending where and what is proposed.

Ecosystem/Habitat Feature – Shore Wetlands

Lake Summary: Emergent shore wetlands were present in many areas of Windermere Lake. These areas ranged from simple emergent bulrush areas to very complex habitats with submergent, floating and emergent vegetation at the south end of the lake identified in the WMA. There were also several backwater wetlands identified, located behind rail fill that were likely historically connected to the lake. Wetlands provide valuable fish and wildlife habitats. For example, sampling during the original FIMP found Mountain Whitefish fry in the vegetated/wetland habitat in Segment 25 (Cemetery/Hidden Bay shoreline area), and juveniles and subadults in the wetlands at the south end of the lake (McPherson and Hlushak 2008). Wetland areas were identified as all areas that were either mapped as emergent or floating vegetation, and those that were in backwater wetlands.

Sensitivity summary: Wetlands are highly productive areas of lakes that are used for foraging, nesting and reproduction, cover and a variety of other life history requirements for many species including but not limited to fish, wildlife, waterfowl, and aquatic insect

Recommendations: These sensitive habitats should be avoided with appropriate buffers if development is proposed that occurs both within and adjacent to the mapped polygon areas. If development is proposed, key mitigation strategies may be required, including avoidance, invasive species management, or other strategies depending where and what is proposed.

5.4. Shoreline Conservation Recommendations

At this time, all remaining natural areas on Windermere Lake provide important habitat. Focus in areas that are urbanized should be on achieving restoration during redevelopment. Avoidance of natural areas that are more prevalent on the south and western ends of the lake is important. The data in this study and others suggest that densification of natural areas is likely of greatest risk to shoreline habitats that support fish and wildlife communities. The FIMP technical report provides specific recommendations for local, Provincial, and Federal Agencies to consider to aid in implementation of the FDG (Schleppe and McPherson 2021).

It is recommended that the Regional District of East Kootenay and District of Invermere be consulted in regards to how these colour zone updates and ZOS can be best integrated into their respective Windermere Lake Official Community Plans.

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) (Appendix B). 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.

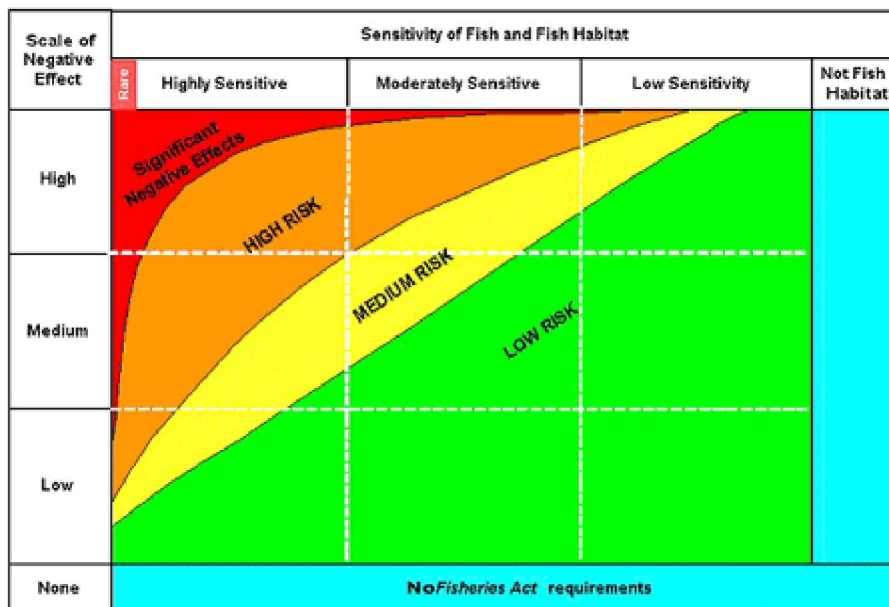


Figure 3. How the potential for negative effects relates to sensitivity and risk (DFO 2006).

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 Mark (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^{1,2}). 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.

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

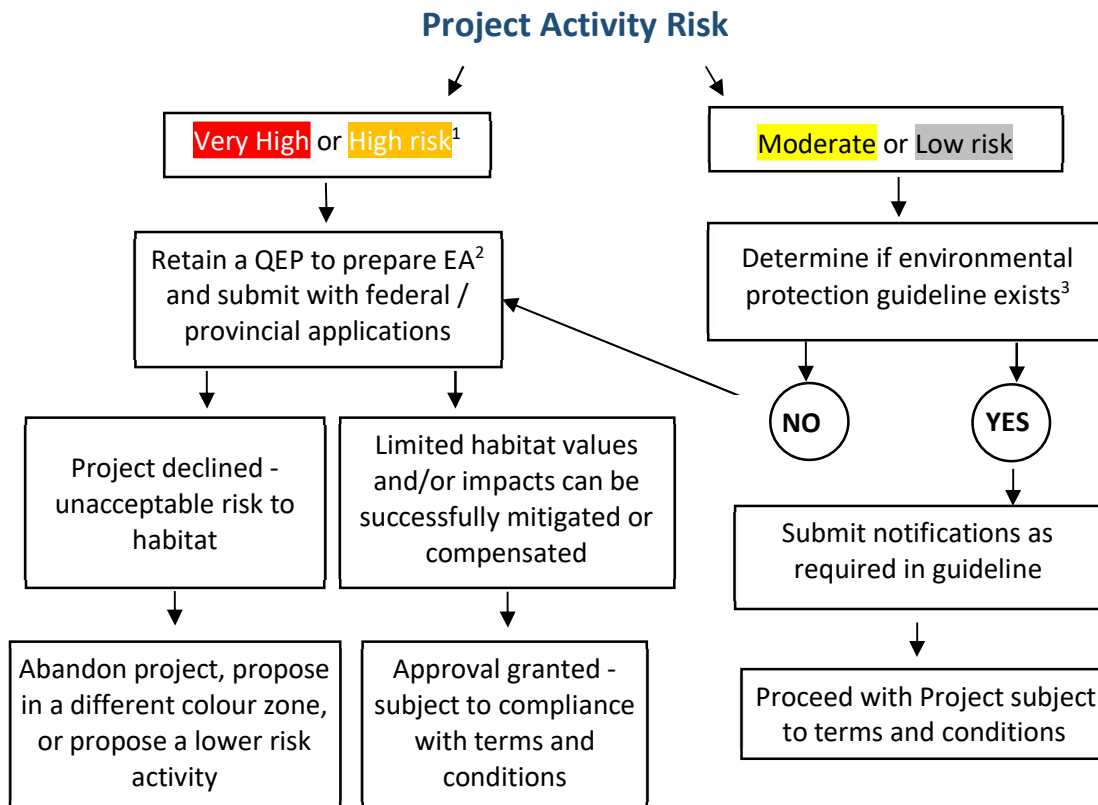
¹ DFO Projects Near Water website: <https://dfo-mpo.gc.ca/pnw-ppe/index-eng.html>

² 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>.

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

³BMP – 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 D³. 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 development⁴. 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. 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.

³ 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>

⁴ DFO Project Near Water website: <https://www.dfo-mpo.gc.ca/pnw-ppe/index-eng.html>

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Appendix A. Foreshore Guidance Document Map

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 activities 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 Mark (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-ppc/index-eng.html).					
³ Refer to DFO Land Development Guidelines (http://stewardshipcentrebc.ca/PDF_docs/StewardshipSeries/LandDevelopmentGuidelines.pdf)					

Activity ¹	Fisheries			Wildlife	Waterfowl	Waterfowl	Ecosystem / Habitat Feature	Ecosystem / Habitat Feature	Ecosystem / Habitat Feature
	Known Kokanee Spawning Area	Mussel Beds	Burbot Spawn and Rear	Avian Bank Nesting	Floating Nests	Migration Flyway	Grasslands	Connectivity Corridor	Shore Wetlands
Aquatic Vegetation Removal									
Removing native aquatic vegetation - by hand, or mechanical cutting for swimming areas and private beach access	VH	VH	VH	M	VH	VH	L	L	VH
Removing non-native/invasive aquatic vegetation - by hand or mechanical cutting for swimming areas and private beach access	H	VH	H	M	VH	VH	L	L	VH
Dredging, Infilling and Beach Creation									
Dredging - new or expansion works, no current tenure	VH	VH	VH	M	VH	VH	H	H	VH
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	M	H	H	M	M	H
Lake infilling - e.g. extension of upland landscaping	VH	VH	VH	M	VH	VH	VH	VH	VH
Beach creation below the lake NB	VH	VH	VH	M	VH	VH	VH	VH	VH
Foreshore sediment disturbance and removal of lakebed substrate (e.g., beach grooming)	VH	VH	H	M	VH	VH	VH	VH	VH
Foreshore Erosion, Sediment or Wave Control Structures									
New groyne construction or increase in existing footprint	VH	VH	VH	H	VH	H	M	M	VH
Maintenance of existing groyne, no increase in existing footprint, within existing tenure	M	M	M	L	H	H	M	M	H
Erosion control (e.g. concrete, rip rap, vegetation, etc.)	VH	VH	H	M	H	H	M	M	H
Infill breakwaters or boat basins	VH	VH	VH	M	VH	VH	VH	VH	VH
Wave control structures (e.g., log booms)	VH	VH	VH	M	VH	VH	H	H	VH
Boat Launches									
Construction of new hard surface boat launch or repair/upgrade of existing hard surface boat launch without land tenure	VH	VH	VH	VH	VH	VH	H	H	VH
Upgrade/repair of existing hard surface boat launch with land tenure and within existing footprint	VH	H	H	M	M	M	M	M	M

Activity ¹	Fisheries			Wildlife	Waterfowl	Waterfowl	Ecosystem / Habitat Feature	Ecosystem / Habitat Feature	Ecosystem / Habitat Feature
	Known Kokanee Spawning Area	Mussel Beds	Burbot Spawn and Rear	Avian Bank Nesting	Floating Nests	Migration Flyway	Grasslands	Connectivity Corridor	Shore Wetlands
Upgrade/repair of existing hard surface boat launch with land tenure and increasing size of the existing allowable footprint	VH	VH	H	M	M	M	M	M	M
Construction of new boat rail launch or repair/upgrade of existing boat rail launch without land tenure	VH	H	M	H	H	H	H	H	H
Upgrade/repair of existing boat rail launch with land tenure and within existing footprint	H	H	M	M	M	M	M	M	M
Buoys									
Placement of up to 2 helical screw anchor mooring buoys for non-commercial use.	VH	H	M	L	H	H	M	M	H
Placement of up to 2 non-helical screw mooring buoys for non-commercial use.	VH	H	H	L	H	H	M	M	H
Placement mooring buoys for commercial use	Moorage # dependant - see Marina Activity rankings								
Docks, boathouses, pile supported structures, float home structures, and other - below NB									
Docks - floating, pile supported or removable	VH	H	M	L	H	H	M	M	H
Floating or lake access boat house, covered boat storage, or permanent non-moorage structures	VH	VH	VH	H	H	H	M	M	H
Land boat house - located on land with access directly to the water	VH	VH	VH	H	H	H	H	H	H
Pumphouse	VH	VH	VH	H	H	H	H	H	H
Boat lifts	VH	H	L	L	H	H	M	M	H
Float homes and house boats - refers to long term storage area.	VH	VH	VH	VH	VH	VH	M	M	VH
Float home/ house boats - refers to short term mooring (in bays).	VH	H	M	L	VH	VH	M	M	VH
Submarine cables, including related land clearing and equipment access.	VH	VH	VH	H	H	H	H	H	H
Submarine cables - no land clearing necessary.	L	L	L	L	L	L	H	H	L
Overwater piled structure (e.g. building, deck, etc.)	VH	VH	VH	M	H	H	M	M	H
Elevated boardwalk over water	VH	H	H	M	H	H	M	M	H
Marinas									

Activity ¹	Fisheries			Wildlife	Waterfowl	Waterfowl	Ecosystem / Habitat Feature	Ecosystem / Habitat Feature	Ecosystem / Habitat Feature
	Known Kokanee Spawning Area	Mussel Beds	Burbot Spawn and Rear	Avian Bank Nesting	Floating Nests	Migration Flyway	Grasslands	Connectivity Corridor	Shore Wetlands
Private dock moorage = < 6	VH	H	H	M	H	H	H	H	H
Small Marina = 6 – 20 slips	VH	H	H	H	VH	VH	H	H	VH
Marina Large = >20 slips	VH	VH	VH	H	VH	VH	H	H	VH
Water Withdrawal, Use or Discharge									
Waterline - directional drilling	H	M	M	M	M	M	M	M	M
Waterline - open excavation	VH	VH	VH	M	M	M	H	H	VH
Geothermal heating/cooling - commercial, industrial, strata or multi-family	VH	VH	VH	M	M	M	H	H	M
Geothermal heating/cooling - single family residence	H	H	M	L	L	L	M	M	L
Treated effluent discharge pipe	VH	VH	VH	VH	VH	VH	VH	VH	VH
Commercial water withdrawals (addressed through water licencing, with physical activities addressed elsewhere in this table)	-	-	-	-	-	-			-
Transition to Private Land from Crown Land									
Application to purchase or lease crown land (crown grant)	VH	H	H	H	H	H	VH	VH	H
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	M	H	H	H	H	VH
Non-native vegetation modification / removal, including for: buildings (see above), landscaping, beach creation, and septic fields.	H	H	H	M	H	H	H	H	H
Drilling and blasting	VH	VH	VH	M	H	H	VH	VH	VH

Legend:

¹NB 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 Mark (HWM) are similar. Only a registered BC Legal Land Surveyor may determine NB.

²For 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>).

³Refer 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 alteration, disruption or destruction of fish habitat, or need authorization under the *Fisheries Act*.
4. Obtaining a development permit, where necessary as outlined by district and regional official community plans.

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.

[Make updates in the Excel spreadsheet and insert as a pdf here]

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	-
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	-
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	-
Maintenance of existing groyne, no increase in existing footprint, within existing tenure	N	Y	N	-
Erosion control (e.g. concrete, rip rap, vegetation, etc.)	N	Y	See DFO website	-
Infill breakwaters or boat basins	Y	Y	See DFO website	-
Wave control structures (e.g., log booms)	Y	Y	See DFO website	-
Boat Launches				-

Activity ¹	Crown Land Tenure	BC Water Sustainability Act-Section 11 ²	Federal Fisheries Act Review ⁴	Other
Construction of new hard surface boat launch or repair/upgrade of existing hard surface boat launch without land tenure	Y	Y	See DFO website	-
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
Placement of up to 2 non-helical screw mooring buoys for non-commercial use.	Y ³	Y	N	Federal Navigable Waters Act
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	-
Submarine cables - no land clearing necessary.	N	Y	N	-
Overwater piled structure (e.g. building, deck, etc.)	Y	Y	See DFO website	-

Activity ¹	Crown Land Tenure	BC Water Sustainability Act-Section 11 ²	Federal Fisheries Act Review ⁴	Other
Elevated boardwalk over water	Y	Y	See DFO website	-
Marinas				
Private dock moorage = < 6	Y ³	Y	See DFO website, likely Y	-
Small Marina = 6 – 20 slips	Y	Y	Y	-
Marina Large = >20 slips	Y	Y	Y	-
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
Commercial water withdrawals	Y ³	Y	See DFO website	Requires Water License
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
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

Activity ¹	Crown Land Tenure	BC Water Sustainability Act-Section 11 ²	Federal Fisheries Act Review ⁴	Other
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:

¹NB 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 Mark (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.

⁴DFO 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.

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

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 Kootenay Region (Source: Kootenay Lake Partnership 2019).

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
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
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

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

Provincial BMPs	Target - species habitat	Applicability	Web Link
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
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
Kootenay-Boundary Water Sustainability Regulation Terms and Conditions (2018)	Aquatic	Changes in and around a stream of the kind listed in Part 3 of the <i>Water Sustainability Regulation</i> .	https://www2.gov.bc.ca/assets/gov/environment/natural-resource-stewardship/best-management-practices/iswstdsbpsmarch2004.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

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

Provincial BMPs	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
Ktunaxa Nation Council BMPs	Target Area	Applicability	Web Link
Guidelines for Conducting Archaeological Assessment in Ktunaxa Territory	Archaeology	Activities with moderate to high risk to Archaeological values	http://www.ktunaxa.org/four-pillars/lands-resource-agency/archaeology-engagement-guidelines/