Foreshore Development Guide

Columbia Lake

Prepared For:

Living Lakes Canada

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    - Habitat
    - Lands
- Okanagan Nation Alliance
- Ktunaxa Nation Council
- Shuswap Band
- Regional District of East Kootenay
- Regional District of Central Kootenay
- Wood Environment & Infrastructure
- Foreshore Inventory and Mapping Technical Committee

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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 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 FGD 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 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) 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.

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 (Cranbrook)
Email: info@rdek.bc.ca

Local Municipality – The Village of Canal Flats should be contacted for any works planned on private land within the city's jurisdiction.
Phone: 250-349-5462
Email: village@canalflats.ca

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

Ktunaxa Nation Council
Phone: 250-489-2464
Email: news@ktunaxa.org

Shuswap Band
Phone: 250-341-3678
Email: reception@shuswapband.ca

Lake Partnership Group – Columbia Lake Stewardship Society
Email: columbialakess@shaw.ca

2.1. First Nations Traditional Ecological Knowledge (TEK)

The Columbia Lake FIMP program was developed to include the direct involvement of Shuswap Band (SB) members during the FIM field survey as well as in the review of FHSI criteria and the FIMP documents. In January 2022, SB conducted a desktop review of Traditional Ecological Knowledge (TEK) and cultural knowledge desktop review related to Columbia Lake, which was directly incorporated into the FIMP report and FHSI evaluation. TEK, as shared by SB, has been incorporated into the FHSI where appropriate, to include potential changes to the landscape and impacts to areas where important ecological and cultural values have been noted. Through this, SB aims to protect, restore, and maintain a strong, healthy, and diverse environmental landscape within *Secwépemcu'l'ecw*. Note that the information provided is not an exhaustive summary of SB's occupation or activities in the area in question. Shuswap Band is currently in the relearning phase of their history, due to a lack of consideration put into understanding rights and title due to forces outside of their control. More information will become available as SB continues to gain a better understanding of their historical cultural context in these areas.

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.

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.

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 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.

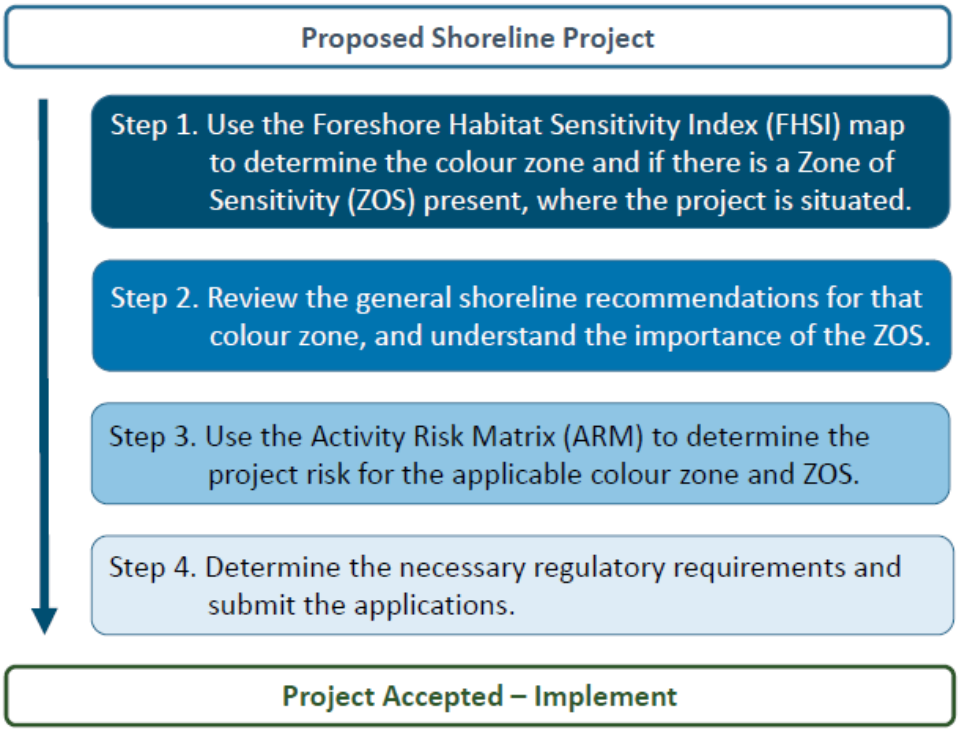


Figure 1. Four steps when planning to develop or modify foreshore habitat.

3.1. Interpret the FDG Map

The key results of the FIM and FHSI are presented in tables and maps in Wood (2022). 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
	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.

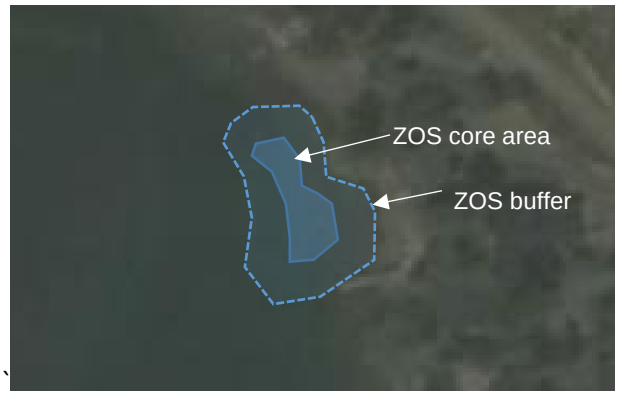


Figure 2. Zone of Sensitivity with an appropriate buffer.

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.

5.1. Shoreline Colour Zone Recommendations

Red Shoreline	
Defined by:	Very High FHSI ecological rank.
FHSI summary:	Red zones account for 19.6% of the total shoreline length of Columbia Lake.
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. These shoreline areas also have wide littoral areas, wetlands with abundant aquatic vegetation, and provide important habitat for fish (e.g., Kokanee staging, Burbot spawning and migration, staging and rearing habitat for other fish species). Diversity and functional habitat in these areas is essential to allow abundant gathering opportunities for Indigenous peoples, and access to Burbot and Kokanee as reliable and culturally significant food sources. Shoreline disturbance is increasing at a rate of approximately 0.02% of the Columbia Lake shoreline per year and it is important to protect sensitive areas from development pressure.
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 may be appropriate in these areas, where applicable.

Orange Shoreline	
Defined by:	High FHSI ecological rank.
FHSI summary:	Orange zones account for 38.6% of the total shoreline length of Columbia Lake.
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 that include wetlands with abundant aquatic vegetation, avian bank nesting and wildlife connectivity corridors between the foreshore and upland grassland habitat. Healthy, diverse, and abundant wildlife resources provide for abundant gathering opportunities

Orange Shoreline	
	for Indigenous peoples. These areas are sensitive to development, continue to provide important habitat functions, but may be at risk from adjacent development pressures. Shoreline disturbance is increasing at a rate of approximately 0.02% of the Columbia Lake shoreline per year and it is important to protect 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.

Yellow Shoreline	
Defined by:	Medium FHSI ecological rank.
Lake summary:	Yellow zones account for 39.8% of the total shoreline length of Columbia Lake.
Sensitivity summary:	These areas have experienced a moderate amount of development disturbance and pressures. The foreshore has been modified by the railway line and its associated erosion protection structures as well as by docks, groynes, retaining walls, boat launches and mooring buoys. Although these areas have been impacted to some degree, they still are largely intact and habitat values remain important. The diversity and biological richness found in intact riparian habitat provides abundant gathering opportunities for Indigenous peoples Shoreline disturbance is increasing at a rate of approximately 0.02% of the Columbia Lake shoreline per year and it is important to protect sensitive areas from development pressure.

Yellow Shoreline	
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 highwater mark, and 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. Local Official Community Plans (e.g., Canal Flats OCP and the Fairmont Hot Springs & Columbia Lake Area OCP) also provide direction and bylaws for development adjacent to the foreshore.

Grey Shoreline	
Defined by:	Low and Very Low FHSI Ecological Rank.
Lake summary:	Grey zones account for 1.9% of the total shoreline length of Columbia Lake.
Sensitivity summary:	Grey shorelines have a lower ecological ranking. Shorelines have been heavily disturbed by transportation, urban park and marina developments. However, they still may contain valuable habitats requiring protection, such as aquatic or riparian vegetation. Their importance as corridors to neighboring high value areas should also be considered as contributing factors to the health and abundance of these connected ecosystems and the resources therein during development. Shoreline disturbance is increasing at a rate of approximately 0.02% of the Columbia Lake shoreline per year and it is important to protect sensitive areas from development pressure.
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. Zones of Sensitivity Recommendations

A total of three 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 – Tributary Mouth	
Lake summary:	Tributary mouth ZOS are located at the confluence of Columbia Lake and inflow and outflow tributaries. Tributary mouth areas were mapped as polygons that capture the confluence of the two waterbodies and include both shallow areas used for migration and deeper areas used for staging. This was done by outlining a 50 m radius semicircle polygon at the confluence of each tributary identified in the BC Freshwater Atlas and Columbia Lake. A 20 m buffer was applied to the ZOS around its perimeter. Note that other tributary mouth locations may exists and though not identified as ZOS at this time these areas still provide important fish habitat. Tributary mouth ZOS can be updated to include other locations if additional information becomes available. The recommendations within this document apply to both mapped and unmapped features.
Sensitivity summary:	Tributary mouths provide important habitat for fish rearing, migration and staging. Tributaries to Columbia Lake may provide spawning, egg incubation and juvenile rearing habitat for Westslope Cutthroat Trout (Species at Risk Act (SARA) Schedule 1; Of Special Concern), Bull Trout and Rainbow Trout. Tributary mouths can also provide a cool water refuge during summer when there are periods of higher water temperatures. Fish species such as salmonids and Burbot hold special importance to Indigenous peoples as culturally valued food resources. In addition to fisheries values, water quality parameters such as temperature, dissolved oxygen, turbidity and nutrients of tributary inflows play an important role in the overall water quality of lake ecosystems.
Recommen-dations:	These sensitive habitats are to be protected, with no permanent or temporary developments recommended both within and adjacent to the mapped polygon areas. A ZOS buffer of 20 m is recommended.

Fisheries – Burbot Spawning Areas	
Lake summary:	Burbot spawning has been documented in a tributary at the south end of the lake (Segment 8) and under the ice at the north end of the lake (Segment 4). Burbot spawn during the winter and aggregations of up to 200 individuals have been observed at one time in the spawning tributary at the south end of the lake. Known spawning locations were identified as a ZOS point location based on the level of data available.

Fisheries – Burbot Spawning Areas	
Sensitivity summary:	Burbot are considered a species of regional conservation concern in the Columbia River system. Burbot are considered a winter food staple for Indigenous peoples. The Columbia Lake Burbot population declined by approximately half between 2006 and 2016 when the last population assessment was completed. Burbot are sensitive to modification or loss of spawning habitat because of the limited spawning areas documented, recent population declines observed and the risk associated with loss of Burbot spawning habitat.
Recommen-dations:	These sensitive habitats are to be protected, with no permanent or temporary developments recommended near the point location.

Vegetation – Aquatic Vegetation	
Lake summary:	Emergent aquatic vegetation on Columbia Lake was originally mapped by McPherson et al. (2010) and updated during the 2021 re-FIM (Wood 2022). Aquatic vegetation polygons were more extensive than wetland polygons delineated in the BC Freshwater Atlas and were a better representation of where potential wetland habitat is located in Columbia Lake. Wetlands were not included as a unique ZOS because detailed wetland inventory and mapping has not been conducted and the available polygons from the BC Freshwater Atlas did not incorporate the full extent of wetland areas observed during FIM surveys and orthophoto and UAV image review. Therefore, aquatic vegetation polygons were selected as the best way to represent this ZOS at this time.
Sensitivity summary:	Aquatic vegetation contributes to the overall health of an ecosystem by providing an important source of nutrients, oxygenation and habitat for aquatic, terrestrial and avian species. Aquatic vegetation is an important component of wetlands, which provide habitat, flood control, water filtration and food resources. Healthy aquatic vegetation creates richness and diversity in littoral and riparian areas. These areas, in turn, provide abundant gathering opportunities for Indigenous peoples. Aquatic vegetation disturbance was observed in Columbia Lake.
Recommen-dations:	These sensitive habitats are to be protected, with no permanent or temporary developments recommended both within and adjacent to the mapped polygon areas. A ZOS buffer of 20 m is recommended.

5.3. Shoreline Conservation Recommendations

Columbia Lake is unique in that conservation zones are already established along a significant percentage (58%) of the foreshore and most of this area remains in natural condition (96%). Habitat adjacent to most of the north, east and south foreshore is protected by park, conservation areas and Wildlife Management Areas (WMAs) located in Segments 2, 3, 4 and 8. It is recommended that conservation of these areas is supported in perpetuity.

Mooring buoys and docks were observed within emergent vegetation and tributary mouth ZOS in Columbia Lake. Disturbance of littoral substrates and aquatic vegetation was observed to facilitate placement of shoreline modifications in some locations. For example, mooring buoy anchor/chain drag and scour was observed to disturb benthic sediments and impact the growth of aquatic vegetation. It is recommended that non-tenured mooring buoys and docks be removed from sensitive habitat areas identified as ZOS.

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.

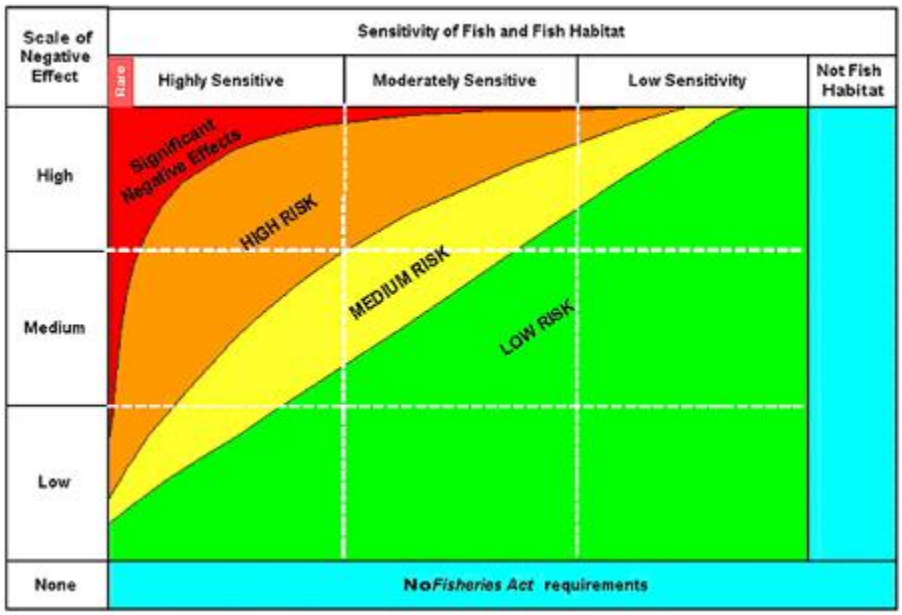


Figure 3. How the potential for negative effects relates to sensitivity and risk (DFO 2006).

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 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[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.

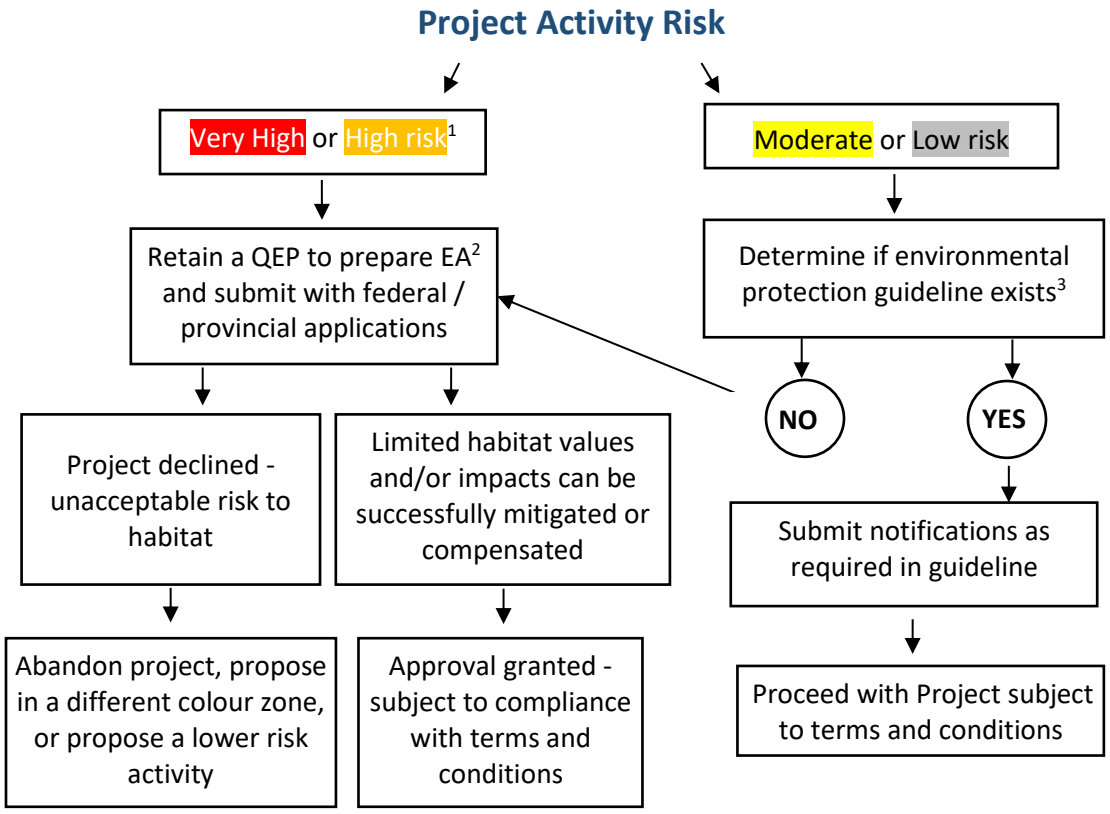
If your activity is identified as being Very High or High Risk, determine if you can modify the activity or location to reduce the risk. This may involve moving the project to a colour zone with less sensitive habitat, or selecting a lower risk activity (Figure 4). If reducing the risk is not possible by re-designing or re-locating the project, there is a high likelihood that a detailed

[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 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 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[3]. 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 [4] . 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;

[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

- 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.

8. References

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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].

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Appendix A. Foreshore Guidance Document Map

CLIENT:

LivingLakes

PROJECT:

Columbia Lake FIMP

TITLE:

Columbia Lake Foreshore Development Guidelines

LEGEND:

- Segment Break

FHSI Ecological Rank

- Very High
- High
- Moderate
- Very Low

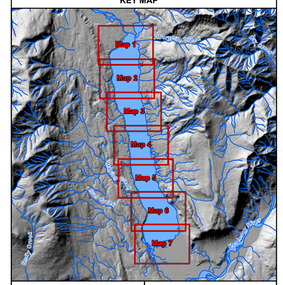
Zones of Sensitivity

- Fisheries – Burbot Spawning Area
- Vegetation – Aquatic Vegetation
- Fisheries – Tributary Mouth
- Zones of Sensitivity Buffer

Base Data

- Railway
- Highway
- Road
- Watercourse
- Parcel Boundary

KEY MAP



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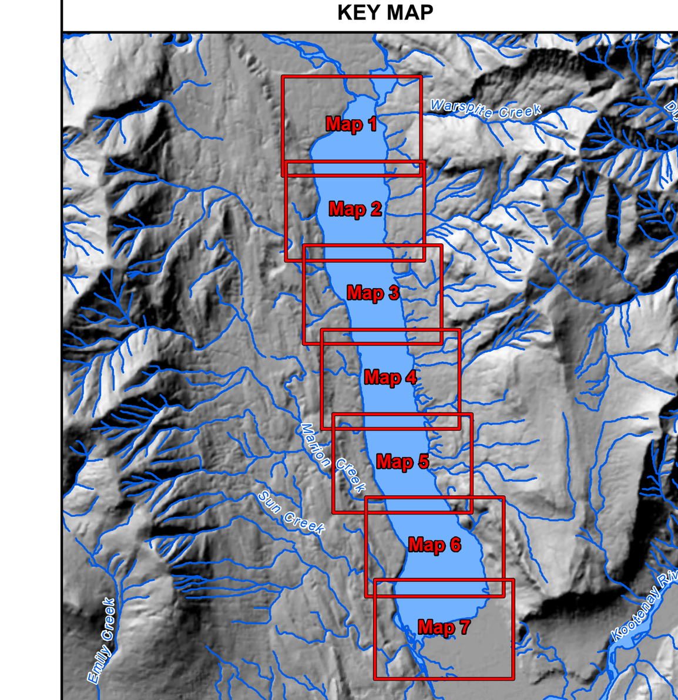

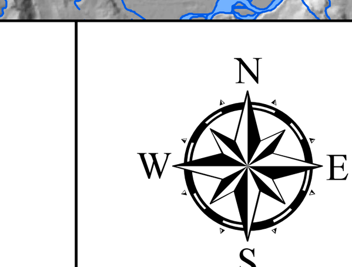

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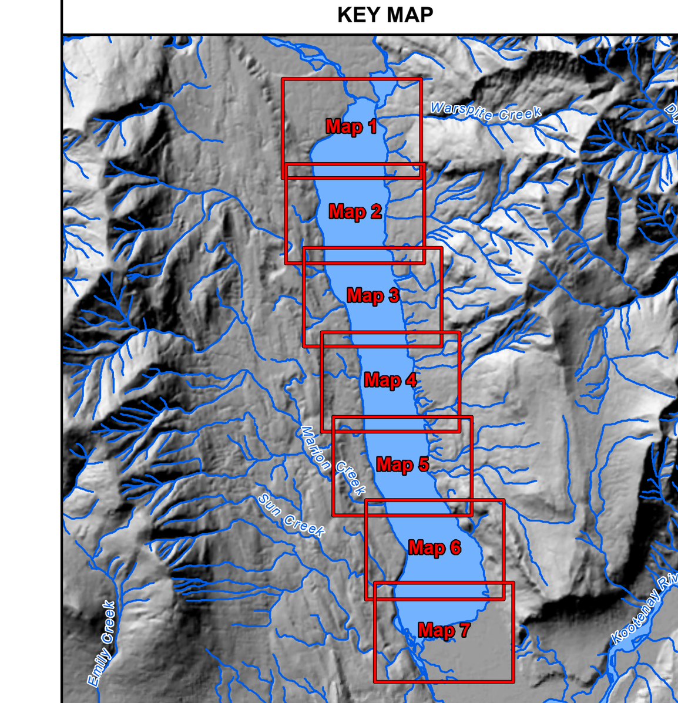

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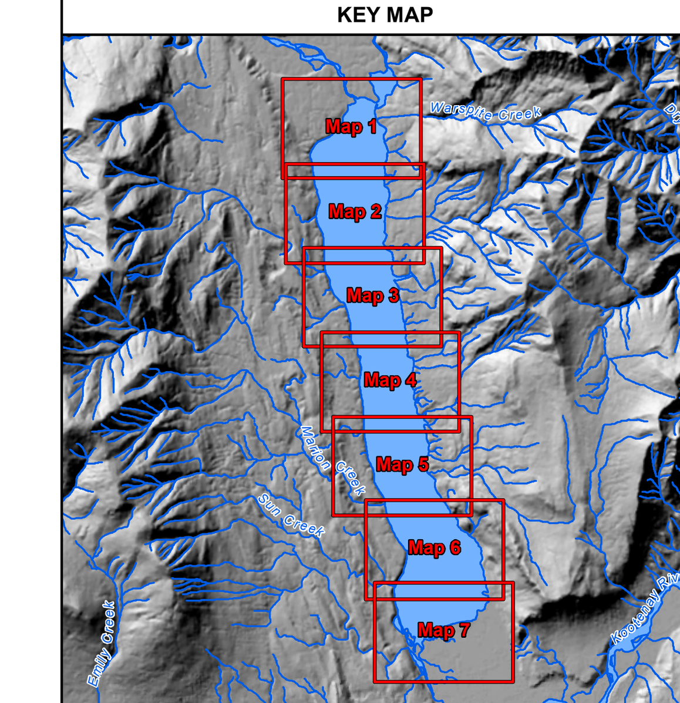

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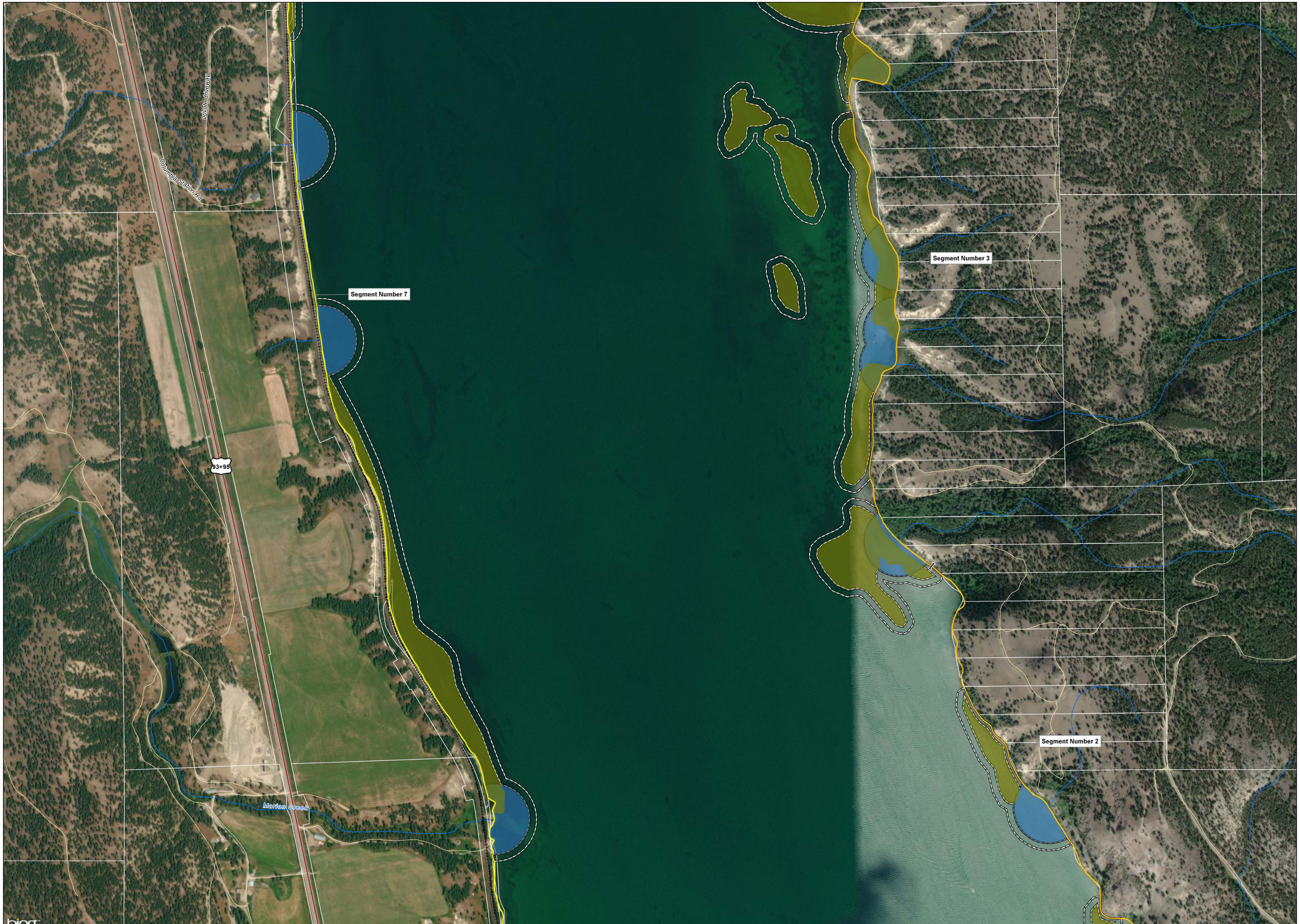

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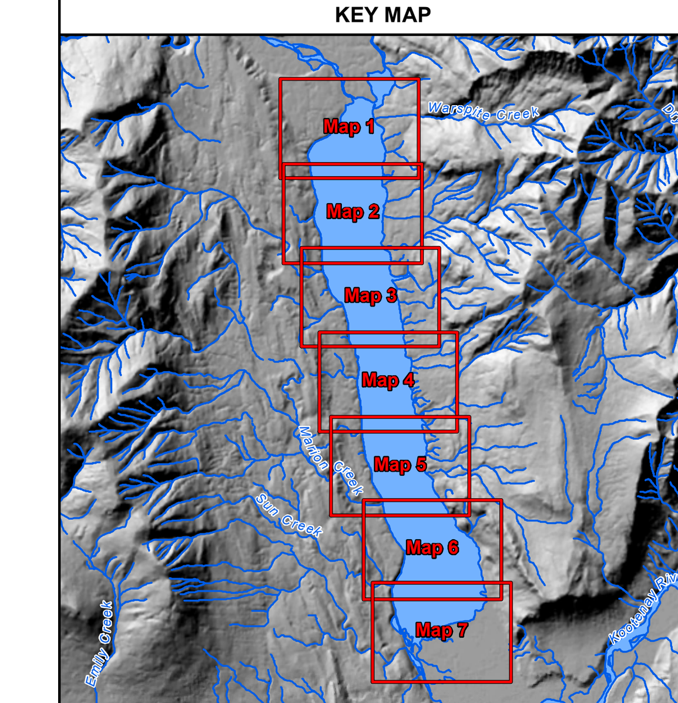

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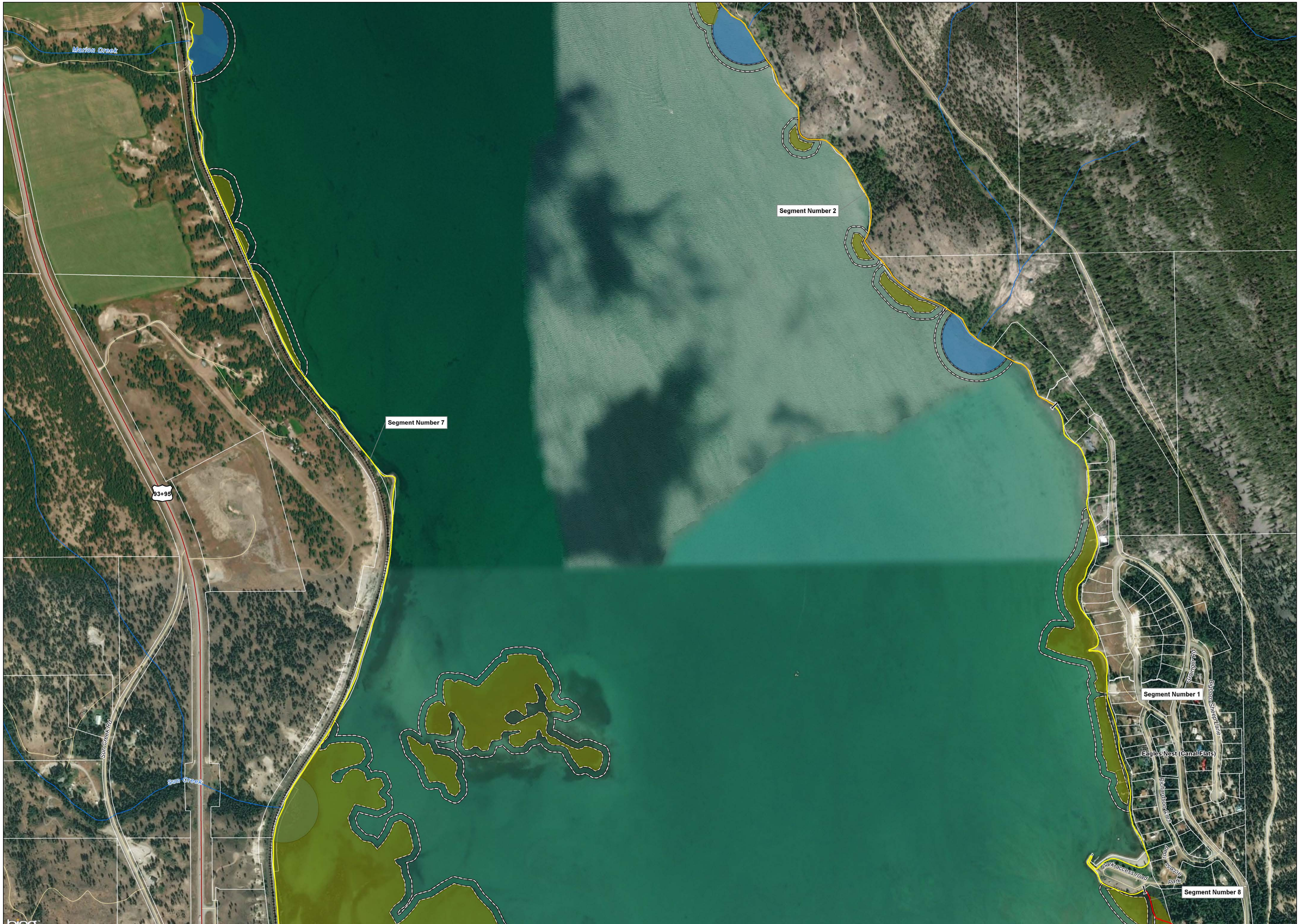

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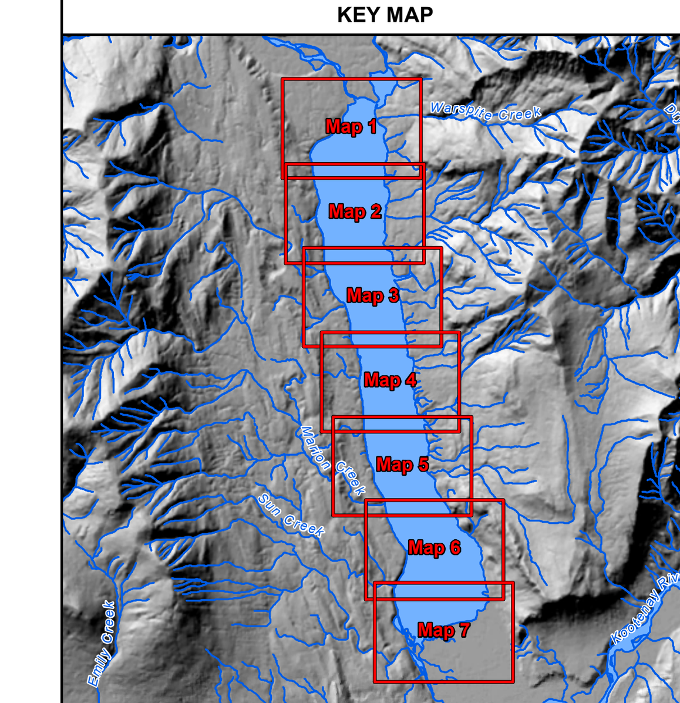

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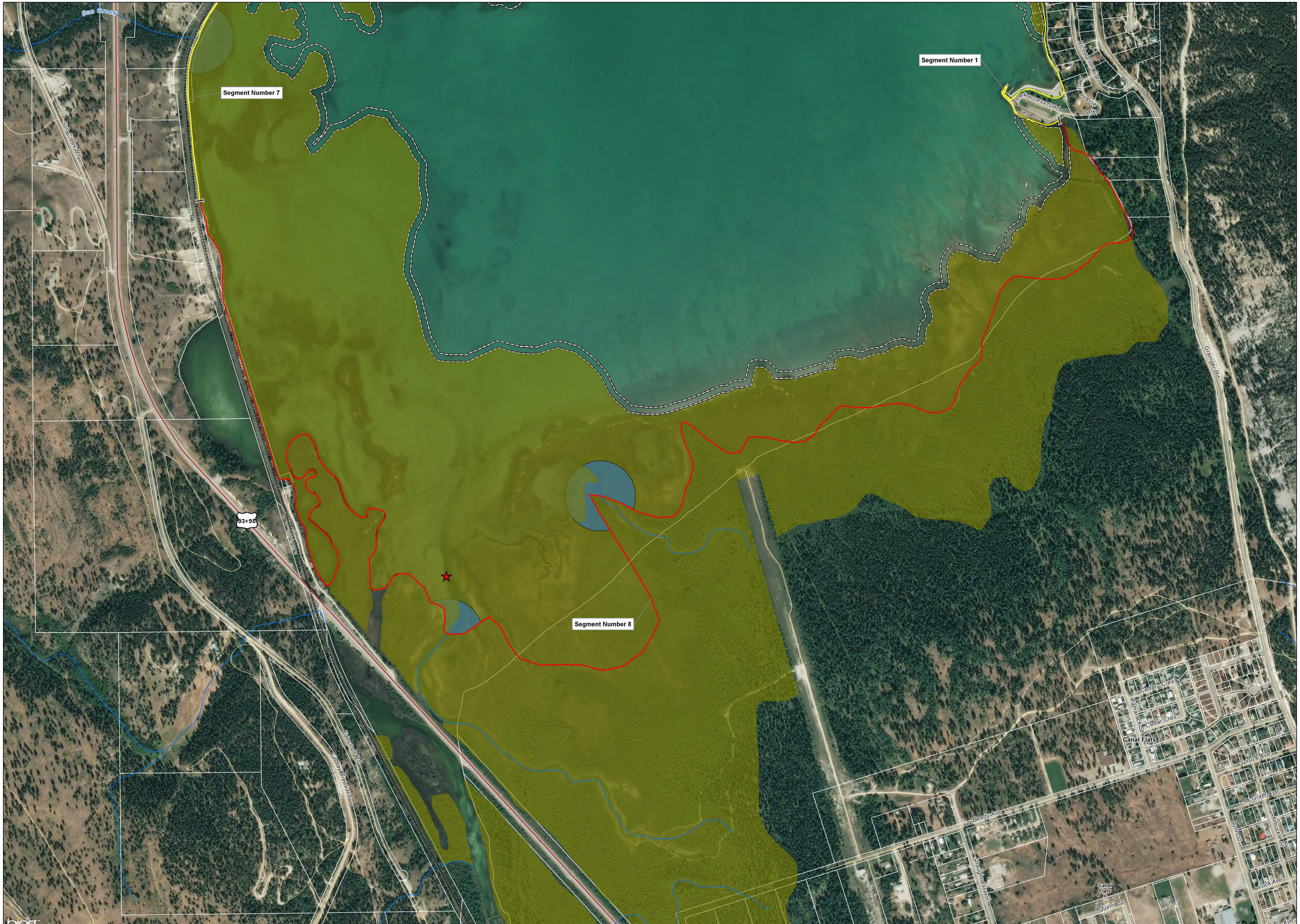

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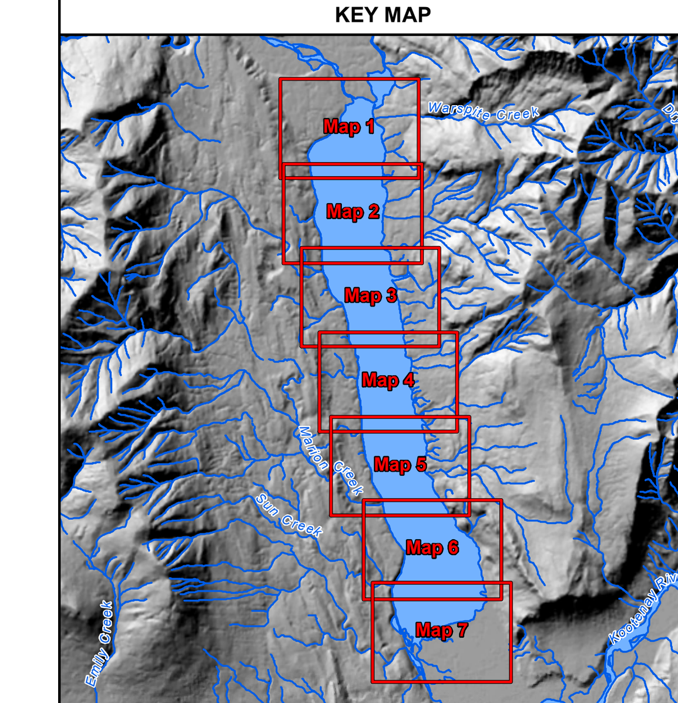

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Appendix B. Activity Risk Matrix (Risk ratings: NA = Not Allowed, VH = Very High, H = High, M = Moderate, and L = Low)

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

Activity[1]	Risk rating based on Ecological Ranking				Risk rating if Zone of Sensitivity Present[2]
	Very High	High	Moderate	Low / Very low	
Upgrade/repair of existing hard surface boat launch with land tenure and increasing size of the existing allowable footprint	VH	VH	H	M	NA
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 # dependent - 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

Activity[1]	Risk rating based on Ecological Ranking				Risk rating if Zone of Sensitivity Present[2]
	Very High	High	Moderate	Low / Very low	
Marina Large = >20 slips	VH	VH	VH	VH	NA
Water Withdrawal, Use or Discharge					
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 licensing, 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 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, or need 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	-
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				-
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	-

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 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	-
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	-

Activity[1]	Crown Land Tenure	BC Water Sustainability Act-Section 11[2]	Federal Fisheries Act Review[4]	Other
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
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 dependent. 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).

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 *Water Sustainability Regulation.*	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/