

SHORELINE MANAGEMENT GUIDELINES
For Fish and Fish Habitat
Mabel Lake

Prepared For:
Fisheries and Oceans Canada

In Cooperation With:
Regional District North Okanagan

and:

BC Ministry of Forests, Lands and Natural Resource Operations

Prepared By:
Ecoscape Environmental Consultants Ltd.

September, 2011
File No.: 11-710



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PREFACE

The guidelines presented in this report are founded on the beliefs that it is possible and desirable to manage our watersheds and their natural surroundings in a sustainable manner and that sustainable management is the shared responsibility of all stakeholders, including proponents, professionals and all levels of government. This report provides risk-based management guidelines for fish habitat on the shoreline of Mabel Lake under which proponents and qualified professionals can proceed with common, low-risk works without review by Fisheries and Oceans Canada (DFO), but where specific, detailed design and assessment information is required by DFO for review of less common, higher-risk works.

The guidelines presented in this report are based on technical results of shoreline inventories recently completed on Mabel Lake as part of the larger Shuswap Watershed Mapping project. These inventories provided important background information concerning fish habitats that occur on Mabel Lake and fish habitat impacts caused by common development activities. The guidelines are intended to protect and restore important fish habitat values, consistent with conservation and restoration goals of the DFO *Policy for Management of Fish Habitat* (DFO, 1986) and concerns of residents expressed in the *Kingfisher Local Area Plan* (MMM Group and Site 360, 2010). These guidelines do not address development risks to non-fish species (e.g., reptiles), or riparian or upland ecosystems that do not also provide fish habitat (e.g., provincially “red-listed” cottonwood riparian ecosystems on large river floodplains) because the assessment only includes features that are within 50 meters of the high water mark. Additional inventory and mapping projects such as Sensitive Ecosystem Inventory would be required to address concerns related to wildlife species and ecosystems along the shoreline.

A solid understanding of aquatic and riparian fish habitat values, common development activities and the effects of these activities on fish habitat is required to identify and differentiate low and high risk works. Foreshore Inventory and Mapping (FIM) is a standardized, spatially explicit shoreline inventory methodology that was employed to map the shorelines of Mabel Lake. This methodology has been used to map the shorelines of other BC lakes and provides a common basis for integrating environmental information into land use guidance documents.

Guidelines presented in this document are based upon the FIM methodology and data collected during FIM surveys. These guidelines are the final step in an inventory and management framework that has been previously applied to other lakes in the Shuswap, Okanagan and Kootenay regions of BC:

1. Shoreline Inventories following the FIM methodology were completed using a variety of techniques and data was derived from numerous sources (Schleppe, 2009c). These baseline inventories provided an understanding of the current condition of foreshore areas of Mabel Lake.
2. An Aquatic Habitat Index (AHI) was generated using FIM data to determine the relative fish habitat value of mapped shoreline areas (Schleppe, 2009c). This index employed similar methods to previous AHI projects on Shuswap, Mara, Moyie, and Monroe Lakes (Schleppe, 2010a; Schleppe, 2010b).

3. Shoreline management guidelines contained within this document were prepared for mapped shorelines to clarify and streamline review processes for development activities that may impact fish and fish habitat. These shoreline management guidelines will better inform proponents, professionals and government agencies of risks posed to fish and fish habitat by development activities that would alter the lake shoreline.

Key deliverables for this project include a map of the shoreline of Mabel Lake in which individual shoreline segments - or "vulnerability zones" - were colour-themed based on their current relative habitat value. Under this system, red shoreline segments represent the highest value fish habitat areas, receive the highest level of protection and require the most detailed project design and assessment information to support agency and local government reviews. In contrast, green shoreline segments represent areas of lower habitat value or areas that have been significantly impacted by past development where common, low-risk works may proceed under existing guidelines without DFO review. Application of present-day development guidelines to all shoreline segments is expected to maintain current fish habitat values of natural areas while gradually recovering fish habitat values lost to past development impacts. This gradual recovery of fish habitat is required because the extent of development-related impacts that has been documented to occur without appropriate best management practices in place to mitigate these impacts is now noticeable (e.g., extensive substrate modification due to groynes or removal of important riparian vegetation to create "landscaped" areas consisting predominantly of turf). Relative risks of common development activities were also recorded in tabular format for the full range of relative habitat values and tables and flow charts were developed to guide proponents, professionals and practitioners through project assessment, reviews and works.

This report only provides guidance related to conservation and protection of fish habitat values. It does not consider other development factors such as erosion hazards, drinking water quality or navigation as these lie outside of the current scope of work and require data that is not adequately collected following the FIM methods. Also, guidelines and review processes detailed in this report apply only to fish habitat protection requirements of the federal *Fisheries Act* as administered by DFO on Mabel Lake. It remains the obligation of proponent, professionals and other government agencies to ensure compliance with other legislation that may apply to their projects.

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1.0 INTRODUCTION

In recent years, several issues, including environmental degradation, cumulative habitat impacts, recreational use conflicts and water quality concerns have prompted government agencies at various levels to initiate watershed assessment and planning projects. The Regional District of North Okanagan (RDNO) recently initiated the Shuswap River Watershed Sustainability Plan to address concerns of local residents for watershed health. In support of this process, the RDNO, Fisheries and Oceans Canada (DFO) and the BC Ministry of Forests, Lands and Natural Resource Operations (BC MFLNRO) collaborated on a mapping project to determine the type and extent of land development pressures on riparian and foreshore areas of Mabel Lake.

This mapping project supports the aim of the RDNO's *Electoral Area "F" Official Community Plan "To preserve and enhance the unique natural and historic characteristics of the area and to encourage and promote a high standard of environmental stewardship on the part of area residents"* (RDNO, 2004). The *Kingfisher Local Area Plan* (MMM Group and Site 360, 2010) is also supported as it was initiated to address residents' concerns and issues related to growth in the area, particularly the proliferation of private mooring buoys on the Mabel Lake foreshore.

Shoreline management guidelines are intended to clarify and streamline land use decision making processes between different agencies and stakeholders as they relate to fish and fish habitat. This guidance document is based on other similar planning processes for Shuswap and Mara Lakes (Ecoscape, 2011) and Windermere Lake (EKLIMP, 2008). Original authorship credit is given here for portions of this report that are similar to or amended from those or other similar planning processes and documents and will not be referenced further in order to improve readability of this report. Though these templates were utilized to promote consistency between different areas of the province, original authors should be credited for their contributions where appropriate. This document was jointly prepared by government agencies and Ecoscape Environmental Consultants Ltd.

2.0 MANAGEMENT GUIDELINES OVERVIEW

The guidelines that follow represent a risk-based approach to shoreline management. This approach includes mapping of shoreline vulnerability zones, assessment of risks posed by common development activities to fish habitat in mapped shoreline vulnerability zones, recommendation of activity-specific design and assessment standards where these have been developed and endorsed by DFO, BC Interior Area, Habitat Management Program (BCI HMP) staff for use on the Mabel Lake system and recommendation of generic design and assessment standards where endorsed standards do not exist.



2.1 Shoreline Vulnerability Zones and Sensitive Habitat Types

Shoreline vulnerability zones mirror the five class relative habitat value rankings of the Aquatic habitat Index (AHI) for Mabel Lake (Schleppe, 2009c). Under this system, the AHI ranking for an individual shoreline segment represents its current fish habitat value relative to all other shoreline segments on Mabel Lake based on biophysical characteristics, riparian condition, contribution to key salmonid life history stages and existing land use impacts. Though rankings range from Very High to Very Low, all areas of the lake shoreline provide fish habitat and even segments of Very Low relative habitat value contribute to overall salmonid production in Mabel Lake and the larger Shuswap watershed. A key assumption of this classification system is that the vulnerability of a shoreline segment to land use impacts corresponds directly with its value as fish habitat (i.e., the risks to fish habitat are greatest in areas of greatest fish habitat value and therefore these are more vulnerable).

The AHI describes the relative habitat value of the Mabel Lake shoreline and incorporates data from a variety of sources and strengths. For example, field data describing habitat modifications were field verified during this project while other data sets are not as strong due to low sampling effort (e.g., mussel observations were limited and opportunistic). In some shoreline areas, high fish habitat values persist despite degradation by land use, suggesting they contain attributes critical to the maintenance of healthy fish populations (e.g., sockeye spawning or high juvenile rearing areas). Based on their particularly high fish habitat value and sensitivity irrespective of land use impacts, stream deltas, vegetated foreshore areas, sockeye shore spawning areas, and high value juvenile rearing areas were recognized as Sensitive Site Types, similar to Zones of Sensitivity identified in other shoreline guidance documents (Schleppe and Arsenault, 2006).

Detailed mussel inventories are required to establish the distribution of mussel populations in Mabel Lake and to determine the mussel species present. Given the potential presence of the Rocky Mountain ridged mussel - a species of Special Concern under the federal *Species at Risk Act* - presence of mussel beds within shoreline segments was recorded in map segment labels to guide future inventories and to delineate a potential future Zone of Sensitivity. Guidelines were not developed for this Zone of Sensitivity because agency surveys have yet to determine whether Rocky Mountain ridged mussels are present in Mabel Lake. If this species is found to be present, then the *Protocol for the Detection and Relocation of Freshwater Mussel Species at Risk in Ontario-Great Lakes Area* (Mackie et al. 2008) would apply until a local protocol was established.

Shoreline vulnerability zones are best viewed graphically as they relate to specific shoreline areas. Shoreline vulnerability zones on Mabel Lake are illustrated in the attached Figure Binder (see Foreshore Inventory and Mapping (FIM) Figure Binder) and on the Community Mapping Network (see <http://www.cmnbc.ca>). Sensitive site types are also illustrated or labeled in the FIM Figure Binder and on the Community Mapping Network to direct the application of the design, assessment and review standards described below.



2.2 Risks Posed by Common Development Activities

The following common development activities were identified using FIM survey data for Mabel Lake

- Aquatic Vegetation Removal
- Dredging, Infilling and Beach Creation
- Erosion Control and Foreshore Sediment Control Structures
- Boat Launches
- Buoys
- Docks
- Marinas
- Water Withdrawal and Use
- Construction of Pile-supported Structures below the High Water Mark
- Land development within 30 metres of the High Water Mark

The character and extent of these activities varied widely on Mabel Lake, as has been the case for other inventoried lakes of the Okanagan and Shuswap watersheds. To address the diversity of observations, these activities were sub-categorized by location (e.g. above vs. below the lake high water mark), scale (e.g. single family residential vs. commercial, industrial, strata or multi-family), whether they involved new works or maintenance of existing works and other factors related to the level of risk posed to fish habitat or to design and assessment standards that could be applied to new or replacement works (see Table 1).

An assessment of the relative risk posed by each common development activity to fish habitat in each shoreline vulnerability zone was initially completed by Ecoscape Environmental Consultants Ltd. and was based upon similar assessments of risks in other lakes (e.g., Moyie and Monroe and Windermere). The initial risk ratings were refined in a 29 January 2010 workshop attended by DFO BCI HMP and Ministry of Environment (now BC MFLNRO) Thompson and Okanagan Region, Ecosystems Section, staff responsible for development-related fish habitat assessments on the Shuswap Lake system. Activity risk ratings range from Low to Very High and vary depending upon the activity or habitat value present. As mentioned above, the risks to fish habitat are directly related to the habitat value present and therefore land use impact risk ratings increase from areas of Very Low to Very High shoreline vulnerability and reach their maximum in known sockeye spawning habitat (see Table 1).

Minor changes to the 29 January 2010 activity risk ratings were made by DFO BCI HMP staff to limit increases in activity risk between adjacent shoreline vulnerability categories in Table 1 to one rank. For example, if a development activity posed Moderate risk to fish habitat in a shoreline segment with an AHI rank of Moderate, then it could only increase to High risk in a shoreline segment with an AHI rank of High.



Table 1 Shuswap Watershed Activity Risk Matrix, detailing the level of risk that common riparian and foreshore development activities pose to fish habitat of Mabel Lake based on known shore spawning location (an overriding factor) and shoreline segment Aquatic Habitat Index (AHI) rank. Risk levels include Very High (VH), High (H), Moderate (M), Low (L) and Other (blue). See embedded text and notes for additional detail.

| Activity | Activity Risk by Known Shore Spawning Location and AHI Rank ¹ | | | | | |
|---|--|---------------------------------------|--|--|---|-------------------------------------|
| | Known Sockeye Spawning (one location) ¹ | Very High (16% of total shore length) | High (20% of total shore length) | Moderate (26% of total shore length) | Low (34% of total shore length) | Very Low (4% of total shore length) |
| Aquatic Vegetation Removal | | | | | | |
| Removing native aquatic vegetation | VH | VH | VH | VH | H | H |
| Removing non-native/invasive aquatic vegetation | VH | VH | H | M | DFO Pacific ROS: Aquatic Vegetation Removal in Lakes ² | |
| Dredging, Infilling and Beach Creation | | | | | | |
| Dredging (new proposals) | VH | VH | VH | VH | VH | VH |
| Lake infilling (e.g. extension of upland landscaping) | VH | VH | VH | VH | VH | VH |
| Beach creation below lake High Water Mark (HWM) | VH | VH | VH | VH | VH | H |
| Beach creation above the lake HWM | BC Fish Protection Act, Riparian Areas Regulation ³ | | | | | |
| Erosion Control and Foreshore Sediment Control Structures | | | | | | |
| New groyne construction or maintenance of existing groyne | VH | VH | VH | VH | H | H |
| Erosion control (e.g. concrete, rip rap, vegetation, etc.) | Design and Assessment Flow Chart for Lakeshore Erosion Control on the Mabel Lake System ⁴ | | | | | |
| 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 | H | H |
| Upgrade/repair of existing hard surface boat launch with land tenure and within existing footprint | VH | H | H | M | M | M |
| Construction of new boat rail launch or repair/upgrade of existing boat rail launch without land tenure | VH | VH | H | M | M | M |
| Upgrade/repair of existing boat rail launch with land tenure and within existing footprint | H | H | M | M | M | M |
| Buoys | | | | | | |
| Placement of 1-2 mooring buoys (helical screw anchors only) | H | M | DFO Pacific ROS: Small Moorings ² | | | |
| Docks | | | | | | |
| Design and Assessment Flow Chart for Private Moorage on the Mabel Lake System ⁴ | | | | | | |
| Marinas | | | | | | |
| Design and Assessment Flow Chart for Commercial and Strata Moorage on the Mabel Lake System ⁴ | | | | | | |
| Water Withdrawal and Use | | | | | | |
| Waterline - directional drilling | H | H | M | DFO Pacific ROS: Directional Drilling ² | | |
| Waterline - open excavation | VH | VH | VH | H | M | L ⁵ |
| Geothermal heating/cooling - commercial, industrial, strata or multi-family | VH | VH | VH | H | H | H |
| Geothermal heating/cooling - single family residence | VH | VH | H | M | M | M |
| Pile-supported Structures below the HWM | | | | | | |
| Overwater piled structure (e.g. building, deck, etc.) | VH | VH | VH | VH | VH | H |
| Elevated boardwalk located offshore of the lake HWM. | VH | VH | H | H | H | M |
| Land development within 30 m of the HWM | | | | | | |
| BC Fish Protection Act, Riparian Areas Regulation ³ | | | | | | |

- Notes:**
- ¹ Known shore spawning locations and shoreline segment AHI ranks are illustrated in Attachment I and on the Community Mapping Network (see <http://www.cmnbc.ca>).
 - ² DFO Pacific Region Operational Statements (ROS) can be viewed, printed and downloaded from the DFO Pacific Region website at [http://www.pac.dfo-mpo.gc.ca/habitat/os-ao/index-eng.htm#Operational Statements for British Columbia and Yukon](http://www.pac.dfo-mpo.gc.ca/habitat/os-ao/index-eng.htm#Operational%20Statements%20for%20British%20Columbia%20and%20Yukon).
 - ³ Information regarding the BC Fish Protection Act, Riparian Areas Regulation can be viewed, printed and downloaded from the BC Ministry of Environment Riparian Areas Regulation website at http://www.env.gov.bc.ca/habitat/fish_protection_act/riparian/riparian_areas.html.
 - ⁴ Design and assessment flow charts for Lakeshore Erosion Control, Private Moorage and Commercial and Strata Moorage are included as Figures 2-4 of this report.
 - ⁵ DFO supports installation of waterlines by experienced contractors using open excavation (i.e. trenching) techniques in shoreline segments of Very Low AHI rank because harm to fish habitat can be avoided in these areas by following Operational Best Practices detailed in the BC Ministry of Environment document *Best Management Practices for Installation and Maintenance of Water Line Intakes* (see http://www.env.gov.bc.ca/wld/documents/bmp/BMPIntakes_WorkingDraft.pdf).



Prior to this project, activity-specific design and assessment standards existed for a number of the common development activities listed in Table 1 and had been endorsed by DFO BCI HMP staff for use on the larger Shuswap Lake system. These included:

1. **Aquatic Vegetation Removal** - removing non-native/invasive aquatic vegetation
DFO Pacific Region Operational Statement: Aquatic Vegetation Removal in Lakes (reference; see [http://www.pac.dfo-mpo.gc.ca/habitat/os-
eo/vegetation-eng.htm](http://www.pac.dfo-mpo.gc.ca/habitat/os-
eo/vegetation-eng.htm))
2. **Dredging, Infilling and Beach Creation** - Dredging (maintenance of previously dredged areas only)
DFO Pacific Region Operational Statement: Routine Maintenance Dredging (reference; see [http://www.pac.dfo-mpo.gc.ca/habitat/os-
eo/navigation-eng.htm](http://www.pac.dfo-mpo.gc.ca/habitat/os-
eo/navigation-eng.htm))
3. **Dredging, Infilling and Beach Creation** - beach creation above the lake high water mark
BC Fish Protection Act, Riparian Areas Regulation (reference; see [http://www.env.gov.bc.ca/habitat/fish_protection_act/riparian/riparian_are
as.html](http://www.env.gov.bc.ca/habitat/fish_protection_act/riparian/riparian_are
as.html))
4. **Erosion Control and Foreshore Sediment Control Structures** - Erosion Control
BC Ministry of Environment Best Management Practices for Lakeshore Stabilization (reference; see [http://www.env.gov.bc.ca/wld/documents/bmp/BMPLakeshoreStabilizatio
n_WorkingDraft.pdf](http://www.env.gov.bc.ca/wld/documents/bmp/BMPLakeshoreStabilizatio
n_WorkingDraft.pdf))
5. **Boat Launches**
BC Ministry of Environment Best Management Practices for Boat Launch Construction and Maintenance on Lakes (reference; see [http://www.env.gov.bc.ca/wld/documents/bmp/BMPBoat_LaunchDraft.pd
f](http://www.env.gov.bc.ca/wld/documents/bmp/BMPBoat_LaunchDraft.pd
f))
6. **Buoys**
DFO Pacific Region Operational Statement: Small Moorings (reference; see [http://www.pac.dfo-mpo.gc.ca/habitat/os-eo/moorings-ancarages-
eng.htm](http://www.pac.dfo-mpo.gc.ca/habitat/os-eo/moorings-ancarages-
eng.htm))
7. **Docks and Marinas**
BC Ministry of Environment Best Management Practices for Small Boat Moorage on Lakes (reference; see [http://www.env.gov.bc.ca/wld/documents/bmp/BMPSmallBoatMoorage
WorkingDraft.pdf](http://www.env.gov.bc.ca/wld/documents/bmp/BMPSmallBoatMoorage
WorkingDraft.pdf))



8. **Water Withdrawal and Use**
BC Ministry of Environment *Best Management Practices for Installation and Maintenance of Water Line Intakes* (reference; see http://www.env.gov.bc.ca/wld/documents/bmp/BMPIntakes_WorkingDraft.pdf)
9. **Water Withdrawal and Use - Waterline - directional drilling**
DFO Pacific Region Operational Statement: Directional Drilling (reference; see <http://www.pac.dfo-mpo.gc.ca/habitat/os-eo/drilling-forage-eng.htm>)
10. **Land development within 30 metres of the High Water Mark**
BC Fish Protection Act, Riparian Areas Regulation (reference; see http://www.env.gov.bc.ca/habitat/fish_protection_act/riparian/riparian_areas.html)

These were integrated into the Shuswap Watershed Activity Risk Matrix for Mabel Lake as follows:

1. *BC Fish Protection Act, Riparian Areas Regulation*

The *Riparian Areas Regulation* is a provincial statute, enabled by section 12 of the *Fish Protection Act*. DFO has stated clearly that, by conscientiously following the assessment procedure set out in this regulation, qualified environmental professionals and land developers will have applied due diligence in avoiding a harmful alteration, disruption or destruction of riparian fish habitat. Accordingly, references to the *Riparian Areas Regulation* were substituted for all applicable risk ratings in Table 1. It should be noted that the *Riparian Areas Regulation* does not address potential impacts to "red listed" ecosystem or wildlife habitat areas.

2. *DFO Pacific Region Operational Statements*

DFO Operational Statements were developed specifically to streamline the undertaking of low risk activities with the potential to harm fish habitat. Accordingly, references to DFO Pacific Region Operational Statements for *Aquatic Vegetation Removal in Lakes, Small Moorings and Directional Drilling* were substituted for Low activity risk ratings in Table 1. The DFO Pacific Region Operational Statement for *Routine Maintenance Dredging*, applicable to all routine maintenance dredging operations, is not applicable to Mabel Lake as no previously dredged sites were identified so this activity was deleted from Table 1 to avoid confusion.



3. *BC Ministry of Environment Best Management Practices*

BC Ministry of Environment best management practice documents are characteristic of “results based” management regimes that facilitate project compliance with environmental legislation, regulations and policy by informing proponents of their responsibilities, describing design and operational best practices applicable to their projects and recommending the hiring of qualified environmental professionals to plan, advise, carry out and/or monitor works. Despite the availability and use of these documents, foreshore inventory and mapping of Mabel Lake and inventories on other systems such as Shuswap Lake, Mara Lake and Okanagan Lake, have identified widespread fish habitat impacts related to construction of retaining walls, boat launches, docks, marinas and related works (Schleppe, 2010c, Schleppe, 2009b) that were both recent and non-compliant with standard best management practices. Accordingly, these best management practices were reinterpreted in flow chart form to clarify design and assessment standards and specify thresholds for project review by qualified professionals, proponents, and/or DFO BCI HMP staff. As flow charts for Lakeshore Erosion Control (Figure 2), Private Moorage (Figure 3) and Commercial and Strata Moorage (Figure 4) address the full range of activity risks, they were substituted for all applicable risk ratings in Table 1.

The BC Ministry of Environment document *Best Management Practices for Installation and Maintenance of Water Line Intakes* is referenced directly in Table 1 for installation of waterlines using open excavation techniques in shoreline segments of Very Low AHI rank. This is based on observations by DFO BCI HMP staff that experienced contractors can install waterlines in low vulnerability shoreline segments by trenching without causing harm to fish habitat provided that they follow Operational Best Practices detailed in that document.

The following generic design and assessment standards were developed to clarify and streamline review processes for common Low, Moderate, High and Very High risk development activities that may impact fish and fish habitat, but lack existing or endorsed standards:



Low Risk Activities

- Highlighted green in Table 1.
- Pose low risk of harm to fish habitat.
- Harm to fish habitat can usually be prevented if experienced contractors complete works following endorsed best management practices.
- Supervision of works by a qualified environmental professional is recommended to ensure harm to fish habitat does not occur.
- DFO review is not required if works follow endorsed best management practices referenced in activity-specific footnotes to Table 1.
- Project proponents are responsible for ensuring that they comply with fish habitat protection provisions of *Fisheries Act*, section 35(1) (see <http://laws.justice.gc.ca/en/F-14/index.html>).
- Notify DFO 10 working days before starting your work by submission of a completed Project Review Application Form to the BC Interior South Referral Centre at ReferralsKamloops@dfo-mpo.gc.ca, selecting “Notification to DFO” in Box 1 (see <http://www.pac.dfo-mpo.gc.ca/habitat/steps/praf/form-formulaire-eng.pdf>).

Moderate Risk Activities

- Highlighted yellow in Table 1.
- Pose moderate risk of harm to fish habitat.
- Some works will require authorization under section 35(2) of the *Fisheries Act* to legally proceed.
- Harm to fish or fish habitat can usually be prevented if appropriate relocation, redesign and mitigation measures are implemented.
- Professional planning and assessment is required; costs to the proponent may be high.
- Mitigation and compensation costs to the proponent may be high.
- DFO review is not required if a qualified environmental professional certifies and documents that harm to fish habitat will not occur if works proceed as planned; notify DFO 10 working days before starting your work by submission of a completed Project Review Application Form to the BC Interior South Referral Centre at ReferralsKamloops@dfo-mpo.gc.ca, selecting “Notification to DFO” in Box 1 (see <http://www.pac.dfo-mpo.gc.ca/habitat/steps/praf/form-formulaire-eng.pdf>) and including certification of no harm to fish habitat by a qualified environmental professional.
- DFO review is required if a qualified environmental professional cannot certify and document that harm to fish habitat will not occur if works proceed as planned: submit a completed Project Review Application Form and Aquatic Effects Assessment to the BC Interior South Referral Centre at ReferralsKamloops@dfo-mpo.gc.ca, selecting “Request for Project Review” or “Request for a *Fisheries Act* Authorization” in Box 1 (see <http://www.pac.dfo-mpo.gc.ca/habitat/steps/praf/form-formulaire-eng.pdf>).



High Risk Activities

- Highlighted orange in Table 1.
- Pose high risk of harm to fish habitat.
- Many works will require authorization under section 35(2) of the *Fisheries Act* to legally proceed.
- Include significant challenges to prevention of harm through relocation, redesign and mitigation measures or to compensation for fish habitat losses that may occur.
- Professional planning and assessment is required; costs to the proponent may be high.
- Mitigation and compensation costs to the proponent may be high.
- DFO review is required: submit a completed Project Review Application Form and Aquatic Effects Assessment to the BC Interior South Referral Centre at ReferralsKamloops@dfo-mpo.gc.ca, selecting “Request for Project Review” or “Request for a *Fisheries Act* Authorization” in Box 1 (see <http://www.pac.dfo-mpo.gc.ca/habitat/steps/praf/form-formulaire-eng.pdf>).

Very High Risk Activities

- Highlighted red in Table 1.
- Pose very high risk of harm to fish habitat.
- Most works will require authorization under section 35(2) of the *Fisheries Act* to legally proceed.
- Include significant challenges to prevention of harm through relocation, redesign and mitigation measures or to compensation for fish habitat losses that may occur.
- Professional planning and assessment is required; costs to the proponent may be high.
- Mitigation and compensation costs to the proponent may be high.
- DFO review is required: submit a completed Project Review Application Form and Aquatic Effects Assessment to the BC Interior South Referral Centre at ReferralsKamloops@dfo-mpo.gc.ca, selecting “Request for Project Review” or “Request for a *Fisheries Act* Authorization” in Box 1 (see <http://www.pac.dfo-mpo.gc.ca/habitat/steps/praf/form-formulaire-eng.pdf>).
- DFO may determine the risk of harm to fish habitat is unacceptable and not grant *Fisheries Act*, section 35(2) authorization

In cases where multiple activities with differing risk are proposed, the combined risk to fish habitat may increase. In these cases, proponents should default to the highest risk identified and retain a qualified environmental professional to determine whether the overall risk to fish habitat has increased. For development activities not listed in Table 1, proponents are recommended to apply design, assessment and review standards for High risk activities unless advised of a Very High risk by a qualified professional. Additional information regarding DFO assessment standards and review processes is available on the DFO Pacific Region Working Near Water in BC and Yukon website at <http://www.pac.dfo-mpo.gc.ca/habitat/know-savoir-eng.htm>.



Minimum information standards for DFO review include a completed Project Review Application Form and Aquatic Effects Assessment. These are described in detail on the DFO Pacific Region Working Near Water in BC and Yukon website at <http://www.pac.dfo-mpo.gc.ca/habitat/steps/praf/index-eng.htm>. Incomplete forms will not be processed.

2.3 Design Assessment, and Review Standards

Decision-making for activities on Mabel Lake that pose risk of harm to fish habitat will be streamlined if proponents proceed in a stepwise fashion through the flow chart process illustrated in Figure 1. The flow chart process has also been prepared to clarify and streamline interagency referral processes to provide a more streamlined approach to management. This process has been developed to help reduce the number of referrals reviewed by DFO assessors by having proponents self-certify that no fish or fish habitat review is required due, as applicable, to compliance of proposed works or activities with:

- the BC Fish Protection Act, Riparian Areas Regulation;
- a DFO Pacific Region Operational Statement;
- a Design and Assessment Flow Chart pathway indicating “No fish or fish habitat review required”; and/or,
- for Moderate activity risks, a qualified professional’s environmental impact assessment certifying that proposed works will not cause harm to fish or fish habitat.

All agencies, proponents, and stakeholders are advised that plans should not be forwarded to DFO for review until the proponent has met minimum information standards for DFO review in the form of a completed Project Review Application Form and Aquatic Effects Assessment. This step is intended to reduce and streamline the project referral process by increasing efficiency because staff will only have to consider applications that are complete. These minimum information requirements are described in detail on the DFO Pacific Region Working Near Water in BC and Yukon website at <http://www.pac.dfo-mpo.gc.ca/habitat/steps/praf/index-eng.htm>.

3.0 PROJECT CONSIDERATIONS

For works located in shoreline segments with sockeye shore spawning or segments having an AHI rank of Moderate, High or Very High, proponents will require the services of a qualified environmental professional to complete a DFO Project Review Application Form and Aquatic Effects Assessment. Information contained in this report will assist qualified environmental professionals in their work, but additional studies may be required to address site specific issues and limitations of currently available information.

The DFO principle of “no net loss” within the *Policy for the Management of Fish Habitat* (DFO, 1986) applies to all proposals where there is potential for a harmful alteration, disruption or destruction (HADD) of fish habitat. In general, this principle is achieved through application of the following hierarchical mitigation options: (1) avoidance of



impacts; (2) minimization of unavoidable impacts; and, (3) compensation for residual impacts that cannot be minimized.

3.1 Avoidance of Impacts

The first step, avoidance, involves the prevention of impacts, either by choosing an alternate project, alternate design or alternate site for development. It is the first and best choice of mitigation alternatives. Because it involves prevention, the decision to avoid a high value area or to redesign a project so that it does not affect a high value area must be taken very early in the planning process and is advisable as part of a real estate transaction. It may be the most efficient, cost effective way of conserving important habitats because it does not involve minimization, compensation or monitoring costs. Avoidance may include a decision of not to proceed with the project due to the fish habitat values that are present.

3.2 Minimization of Unavoidable Impacts

Minimization should only be considered once the decision has been made that a project must proceed, that there are no reasonable alternatives to the project, and that there are no reasonable alternatives to locating the project within high value habitat. Minimization involves the reduction of adverse effects of development on the functions and values of the habitat at all project stages (including planning, design, implementation and monitoring), to the smallest practicable degree. Considering any planning efforts, DFO must deem a HADD of fish habitat to be acceptable and issue a formal authorization under *Fisheries Act* section 35(2) before work can legally commence (see <http://www.dfo-mpo.gc.ca/Library/231028.pdf>).

3.3 Compensation for Residual Impacts

Compensation is the last resort in the mitigation process and an indication of failure in the two earlier steps. It should only be considered for residual effects that were impossible to minimize. Compensation refers to a variety of alternatives that attempt to offset the unavoidable loss of or damage to habitat functions and values. Habitat compensation may be an option for achieving “no net loss” when residual impacts of projects on habitat productive capacity are deemed harmful after relocation, redesign or mitigation options have been implemented.

After reviewing the project proposal and the potential impacts to fish habitat, DFO may determine that the impacts are not acceptable if the habitat to be affected is critical habitat or compensation is not feasible. Compensation for deposit of a deleterious substance into water frequented by fish will not be considered.

Habitat compensation involves replacing the loss of fish habitat with newly created habitat or improving the productive capacity of some other natural habitat. Depending on the nature and scope of the compensatory works, habitat compensation may require, but not be limited to, several years of post-construction monitoring and evaluation. In the event that functional objectives of the compensation are not achieved (i.e., due to failure



or inadequate maintenance), additional remediation or redevelopment of the compensation works may be required to achieve the compensation objectives. There is no guarantee that projects in high value fish habitats that result in HADD of fish habitat will be authorized under *Fisheries Act* section 35(2) if an application is submitted.

All proponents are advised that data collected within the FIM is available for use and proponents are encouraged to include this information in their planning for proposed activities. The data collected within the FIM does not remove the requirement to proponents to retain a qualified environmental professional to help them develop plans for their activities because it does not include site-specific considerations.

3.4 Existing Works

The Mabel Lake Foreshore Inventory and Mapping project (Schleppe, 2009c) identified extensive impacts from existing structures along the foreshore of the lake. In carrying out this survey, it was identified that many works had proceeded without appropriate permits or approvals in place and that these activities were often not compliant with standard best management practices. In keeping with the national policy objective of DFO of achieving a net gain in fish habitat and in keeping with existing DFO policy and practice, proponents should expect to address existing infrastructure and current best management practices as part of their application. Existing infrastructure should be improved to meet current best management practices as part of mitigation planning for *all* applications. Further, including other mitigative practices such as landscape restoration (i.e., planting native riparian vegetation), improving historic substrate modification (i.e., removal of existing groynes, etc.), and other habitat improvements should all be considered during application planning by proponents and qualified environmental professionals.

3.5 Requirements of Other Agencies

The guidelines presented in this document are best applied during the initial stages of development planning. Proposed works may be subject to other requirements such as local government zoning or permitting, BC Water Act approvals or notifications, BC Land Act tenures, licenses or permissions, or Navigable Waters Protection Act approvals. A number of regulations commonly associated with lakeshore development are referenced in Appendix A. This appendix does not include an exhaustive list of regulations that may be applicable. It remains the responsibility of the project proponent to verify this information and meet all regulatory requirements that may apply to their project. However, if the guidelines presented in this document are followed, subsequent permitting processes should be more streamlined for the proponent.

DFO supports the use of these guidelines by other regulatory agencies to define and communicate design, assessment and review standards for protection of fish habitat on Mabel Lake. DFO recognizes and respects that local governments and other agencies may limit works or activities for reasons other than fish habitat (e.g. limiting construction of elevated fixed decks and ramps with floating docks to commercial and strata marinas in rural settlement areas for aesthetic or other reasons), provided that design, assessment



and review standards for activities that are supported meet or exceed the minimum described in this report.

4.0 PROCESS CONSIDERATIONS

4.1 Monitoring and Adaptive Management

The management guidelines presented in this report represent an assumption of risk by DFO in regards to achievement of “no net loss” of productive fish habitat. However, they also provide an opportunity to shift the BCI HMP program on Mabel Lake from a reactive position that solicits referrals, offers advice and authorizations and tracks correspondence as a measure of program outputs to a proactive position that enables and engages those best-placed to deliver results-based standards; monitors and audits compliance and effectiveness and reports on the status of fish habitat at an ecosystem level through periodic updates to FIM survey data. Ultimately, whether or not this change achieves “no net loss” of productive fish habitat will likely depend on DFO’s preparedness to reallocate staff time that would previously have been spent on referral review and response to compliance and effectiveness monitoring of FIM products and adaptive management of the risk-based guidelines presented in this report.

4.2 Professional Reliance and Accountability

Reliance on qualified professionals to complete environmental assessments that certify whether or not residual harm to fish and fish habitat will occur after avoidance and mitigation measures are applied is the primary source of risk referred to in section 4.1, above. This is due to the fact that a qualified professional’s certification that proposed works will not cause harm to fish or fish habitat would permit works to proceed without DFO review if they are located in a shoreline segment having an Aquatic Habitat Index Ranking of Low, Very Low or Moderate. Though this may be in keeping with the due diligence defense already available to proponents that carry out a work or undertaking that causes harm to fish habitat under section 78(6) of the *Fisheries Act*, it represents an increase in risk relative to the past practice of limiting determinations of harm to DFO assessors.

Professional reliance is the practice of accepting and relying upon the decisions and advice of resource professionals who accept responsibility and can be held accountable for the decisions they make and the advice that they give (PRWG, 2008). Professional accountability is acknowledgement and assumption of obligations under professional legislation and accompanying bylaws, including the potential for investigations and discipline to be imposed by the profession (PRWG, 2008). Accordingly, two options to mitigate the increased risk assumed by DFO in explicitly relying on qualified professionals’ certification that proposed works will not cause harm to fish or fish habitat would be the Department’s committing to advance professional reliance-related complaints against professionals and/or creation of a list of qualified professionals for the purposes of this report.



4.2 Interagency Coordination

In keeping with the DFO Pacific Region Project Review Process, all notifications and requests for project review resulting through the use of these guidelines are directed to the BC Interior South Referral Centre at ReferralsKamloops@dfo-mpo.gc.ca. DFO is mindful, however, of SLIPP recommendations to improve coordinating mechanisms among Government agencies and is currently exploring a one-window approach to project application and review with Front Counter BC (FCBC). Under this approach, Front Counter BC would require a completed DFO Project Review Application Form to accompany provincial applications for works or activities that fall within the scope of these guidelines. If DFO can reach a one-window agreement with Front Counter BC, then a note should be placed on the DFO Pacific Region Working Near Water in BC and Yukon website that submissions to the BC Interior South Referral Centre are no longer required for projects subject to Provincial approvals, licenses or notifications on the Shuswap Lake system.



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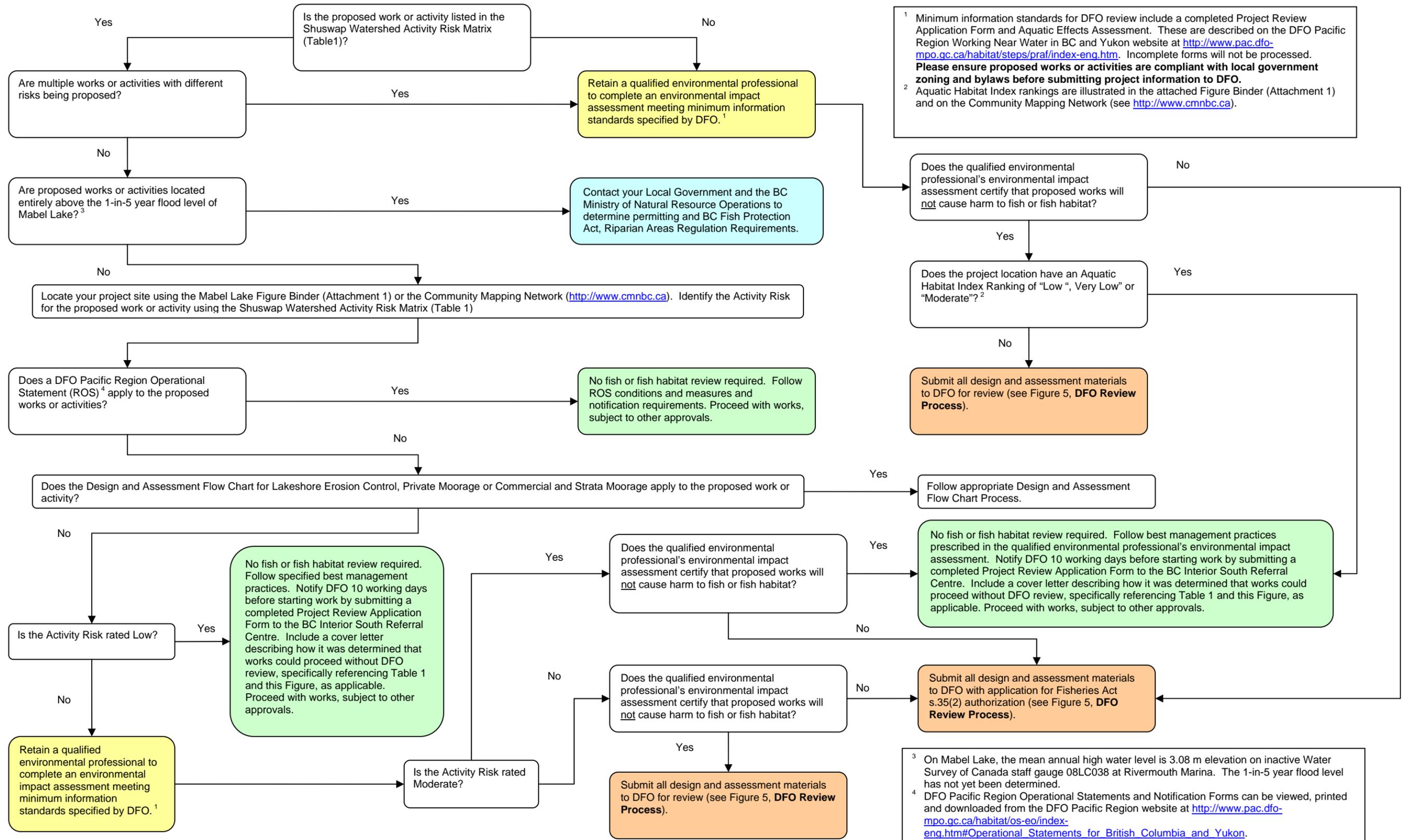
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FLOW CHARTS



Figure 1 Design, Assessment and Review Process Flow Chart for Development Activities that may Impact Fish Habitat on Mabel Lake

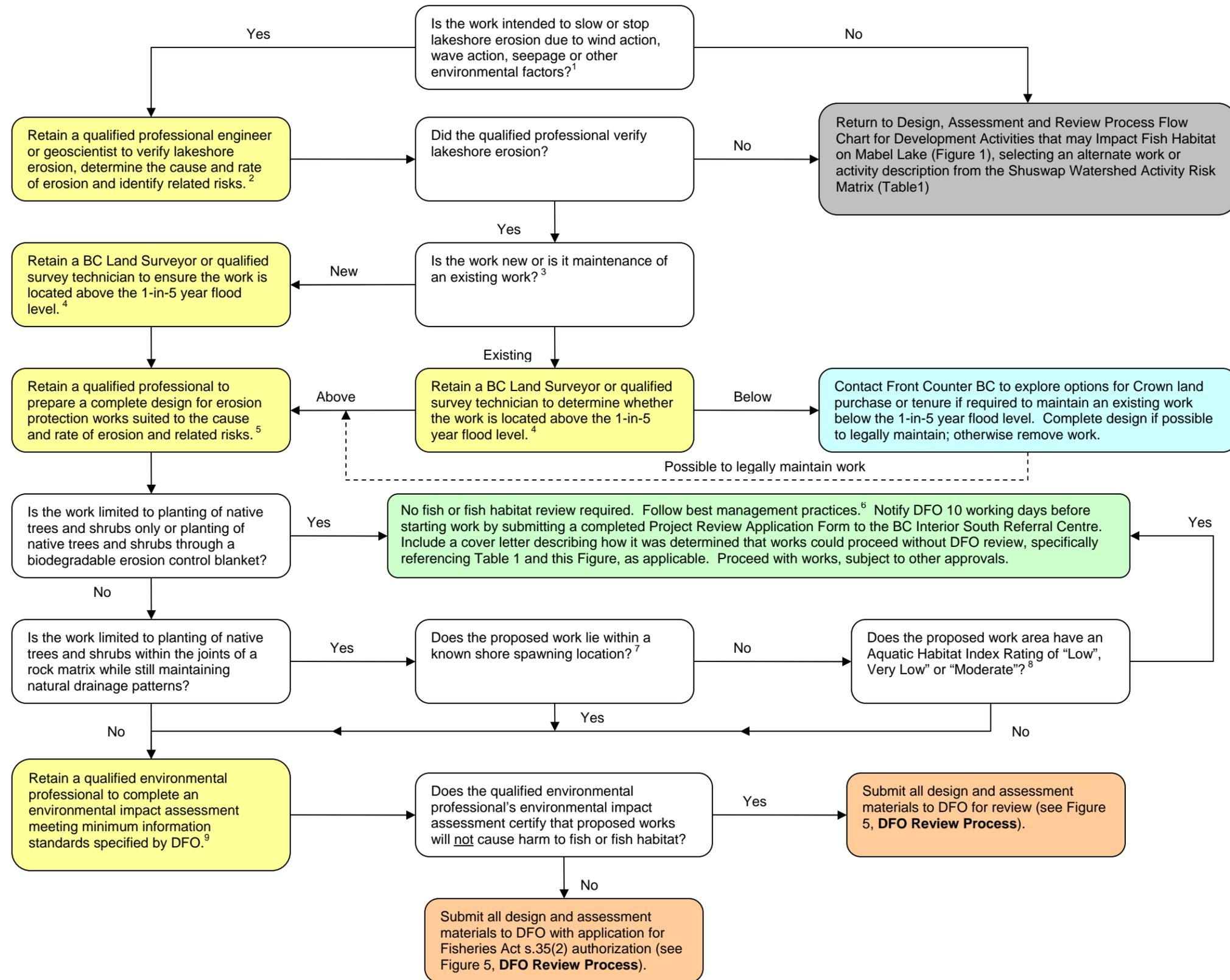


¹ Minimum information standards for DFO review include a completed Project Review Application Form and Aquatic Effects Assessment. These are described on the DFO Pacific Region Working Near Water in BC and Yukon website at <http://www.pac.dfo-mpo.gc.ca/habitat/steps/praf/index-eng.htm>. Incomplete forms will not be processed. **Please ensure proposed works or activities are compliant with local government zoning and bylaws before submitting project information to DFO.**
² Aquatic Habitat Index rankings are illustrated in the attached Figure Binder (Attachment 1) and on the Community Mapping Network (see <http://www.cmNBC.ca>).

³ On Mabel Lake, the mean annual high water level is 3.08 m elevation on inactive Water Survey of Canada staff gauge 08LC038 at Rivermouth Marina. The 1-in-5 year flood level has not yet been determined.
⁴ DFO Pacific Region Operational Statements and Notification Forms can be viewed, printed and downloaded from the DFO Pacific Region website at http://www.pac.dfo-mpo.gc.ca/habitat/os-ao/index-eng.htm#Operational_Statements_for_British_Columbia_and_Yukon.



Figure 2 Design and Assessment Flow Chart for Lakeshore Erosion Control on Mabel Lake



¹ Indicators of lakeshore erosion include large areas of bare soil and steep, high banks at the high water mark (HWM), noticeable recession of the HWM over a period of time, leaning or downed trees with exposed roots at the HWM, large patches of muddy water at the lake margin during high water and large deposits of eroded soil on the lakeshore following high water.

² Erosion-related risks include loss of property and damage or loss of nearshore structures.

³ Maintenance of an existing work is limited to replacement of less than one half of an existing erosion control structure on its existing foundation and must not include any lakeward extension of the existing structure or backfill.

⁴ On Mabel Lake, the mean annual high water level is 3.08 m elevation on inactive Water Survey of Canada staff gauge 08LC038 at Rivermouth Marina. The 1-in-5 year flood level has not yet been determined.

⁵ Many lakeshore erosion protection options are available, including planting of native trees and shrubs, planting of native trees and shrubs through a biodegradable erosion control blanket, planting of native trees and shrubs within the joints of a rock matrix and hard armoring techniques. Additional information is provided in the BC Ministry of Environment document *Best Management Practices for Lakeshore Stabilization* (see http://www.env.gov.bc.ca/wld/documents/bmp/BMPLakeshoreStabilization_WorkingDraft.pdf)

⁶ Applicable Operational Best Practices are detailed in the BC Ministry of Environment document *Best Management Practices for Lakeshore Stabilization* (see http://www.env.gov.bc.ca/wld/documents/bmp/BMPLakeshoreStabilization_WorkingDraft.pdf)

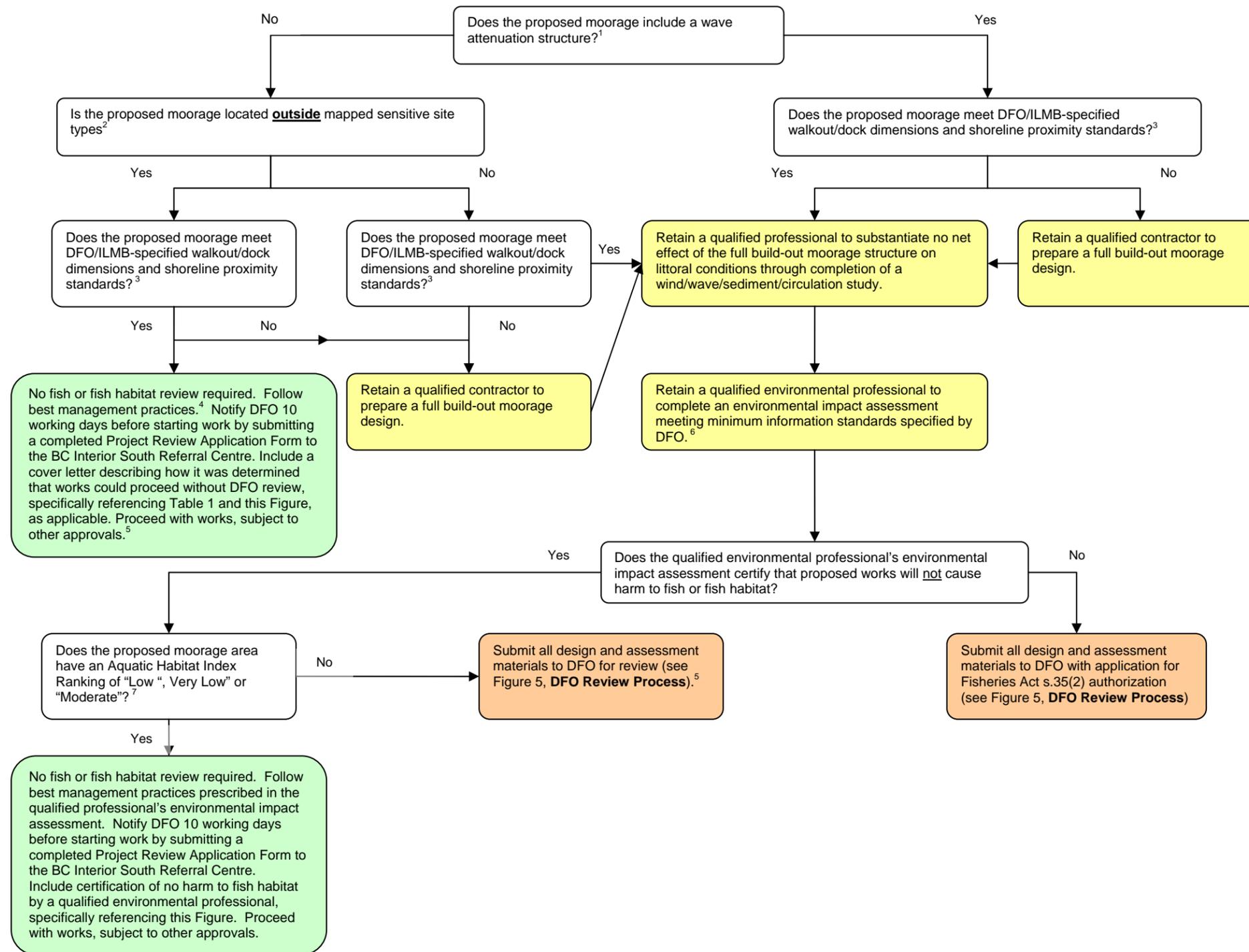
⁷ Known shore spawning locations are illustrated in Attachment I and on the Community Mapping Network (<http://www.cmnbc.ca>).

⁸ Aquatic Habitat Index Ratings are illustrated in Attachment I and on the Community Mapping Network (<http://www.cmnbc.ca>)

⁹ Minimum information standards for DFO review include a completed Project Review Application Form and Aquatic Effects Assessment. These are described on the DFO Pacific Region Working Near Water in BC and Yukon website at <http://www.pac.dfo-mpo.gc.ca/habitat/steps/praf/index-eng.htm>. Incomplete forms will not be processed. **Please ensure proposed works or activities are compliant with local government zoning and bylaws before submitting project information to DFO.**



Figure 4 Design and Assessment Flow Chart for Commercial and Strata Moorage on Mabel Lake



¹ Wave attenuation structures include standalone breakwaters as well as over-wide outer docks and other structures intended to modify wave conditions in the moorage area and/or near-shore environment.

² Sensitive site types include mapped: (a) shore spawning sites, (b) high-value rearing sites, (c) vegetated foreshore areas, and/or (d) stream deltas; see Attachment I or the Community Mapping Network (<http://www.cmNBC.ca>).

³ Draft Integrated Land Management Bureau Thompson Okanagan Strata - Commercial Moorage Guidelines include the following walkout/dock dimensions and shoreline proximity standards:

- o Floating portions of the dock must be located offshore of the 6 meter depth contour at mean annual low water.
- o Access to floating portions of the dock must be achieved by a single elevated fixed deck and ramp that must not exceed 1.5 meters in width. At a minimum, the base of the elevated fixed deck must be located at least 1 meter above the lake 1-in 5 year flood level. The remainder of the dock surface must not exceed 3 meters in width for any other portion of the dock.
- o Supported dock structures must use widely spaced wooden or steel piles that are made of non-toxic materials (solid core docks will not be allowed). Do not use pressure treated wood.
- o Dock structures including any attached or detached boatlift mechanism must be greater than 5 meters from property lines. (Generally, property lines are projected perpendicular to shoreline.) If property is adjacent to a dedicated public beach access or park - a 6 meter offset is required. Greater setbacks should be considered for longer docks or where adjoining single family residential property.
- o The placement of the dock shall be undertaken in a manner that:
 - o is consistent with the orientation of neighbouring docks
 - o is sensitive to views and other impacts on neighbours
 - o is sensitive to increased boat traffic on neighbours
 - o avoids impacts on access to existing docks and adjacent properties
- o No roof or covered structures are to be placed on the dock or the boat lift.
- o Boat Lifts:
 - o No overhead boat lift mechanisms - utilize post style or facsimile that is supported from the bottom of the lake or to dock.
 - o No overhead structures.
 - o No roof or covered structures.
 - o Must be located at least 5 meters from property line as lifts are considered as part of moorage structure.

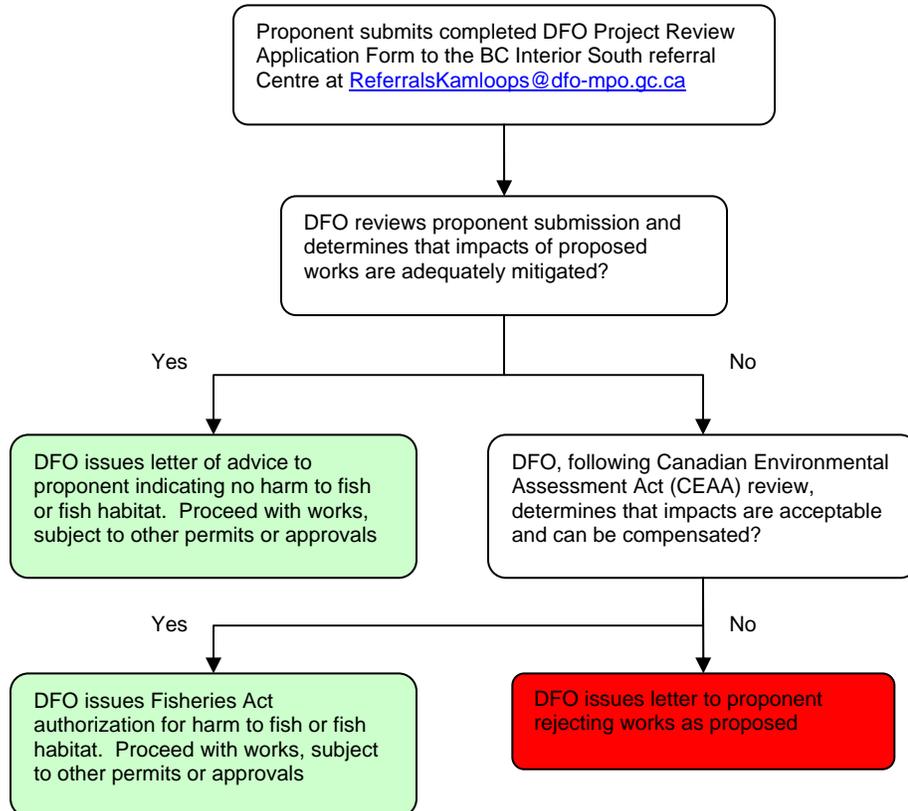
⁴ Follow Operational Best Practices detailed in the BC Ministry of Environment document "Best Management Practices for Small Boat Moorage on Lakes" (see http://www.env.gov.bc.ca/wld/documents/bmp/BMPSmallBoatMoorage_WorkingDraft.pdf)

⁵ DFO supports proponents receiving term and tenure-type considerations from ILMB where a fish or fish habitat review is not required for proposed works or where an applicant has received a letter of advice from DFO related to proposed moorage works. To ensure protection of fish habitat and meet present-day best practice standards, all new, renewal and replacement tenures for commercial and strata moorages will be subject to this flow chart process.

⁶ Minimum information standards for DFO review include a completed Project Review Application Form and Aquatic Effects Assessment. These are described on the DFO Pacific Region Working Near Water in BC and Yukon website at <http://www.pac.dfo-mpo.gc.ca/habitat/steps/praf/index-eng.htm>. Incomplete forms will not be processed. **Please ensure proposed works or activities are compliant with local government zoning and bylaws before submitting project information to DFO.**

⁷ Aquatic Habitat Index Ratings are illustrated in Attachment I and on the Community Mapping Network (<http://www.cmNBC.ca>).



Figure 5 Fisheries and Oceans Canada Project Review Process

Attachment 1
FORESHORE INVENTORY AND MAPPING
FIGURE BINDER

Limited copies of this Attachment were produced under contract to Fisheries and Oceans Canada. Project mapping is also available on the Community Mapping Network (<http://www.cmnbc.ca>)



Appendix A

Additional Legal Requirements

This Appendix was reproduced from the Windermere Lake Shoreline Management Guidelines entirely. All credit should be given to the original authors of that document.



Laws and regulations provide the regulatory ‘teeth’ to uphold environmental protection and management. Applicable legislative requirements must be met for a project to be in compliance with the law. Legal requirements have been presented here in the following categories: Federal, Provincial, Regional District and District of Invermere. For each of these jurisdictions, a list of pertinent legislation bylaws and/or plans; and contact information (web site links) has been provided. The reader is cautioned that other legislation (not listed) may apply to their development, and they are encouraged to consult with the appropriate agency prior to proceeding with any proposed works.

1. Federal Legislation

All federal legislation is administered by the parliament of Canada (federal government).

Canada Migratory Birds Convention Act

This Act implements an internationally recognized Convention between Canada and the United States to protect various species of migratory game birds, migratory insectivorous birds and migratory non-game birds including herons. The taking of nests or eggs of these birds is prohibited, except for permitted scientific or propagating purposes.

Fisheries Act

The *Fisheries Act* is administered by the federal DFO and is one of the most important pieces of legislation for managing aquatic resources in Canada. The fish habitat provisions of this Act enable the federal government to protect marine and freshwater habitats supporting those species that sustain fisheries, namely fish, shellfish, crustaceans and marine mammals.

Navigable Waters Protection Act

This act is administered by Transport Canada and is primarily applicable to protecting, maintaining, and developing opportunities for the public to access and use waterbodies for navigation and recreation. Any activities that may affect movement of people or goods, near or on water are affected (i.e. dock/marina construction, dredging, shoreline development).

Pesticides Act

The *Pesticides Act* is intended to 1) prevent and mitigate harmful effects to the environment and human health, and 2) rationalize and reduce the use of pesticides. The Act promotes the analysis, assessment and control of the effects of the use of pesticides through specific activities intended to widen knowledge about these products (environmental monitoring, for example).

Species at Risk Act

This act prevents Canadian indigenous species, subspecies and distinct populations from becoming extirpated or extinct, provides for the recovery of endangered or threatened species and encourages the management of other species to prevent them from becoming at risk.



Canadian Environmental Assessment Act (CEAA)

The CEAA requires federal departments to conduct environmental assessments (EA) for prescribed projects and activities before providing federal approval or financial support. The EA is a planning tool used to identify potential effects of projects or activities on the environment. This includes the air, water, land and living organisms, including humans.

Indian Act

The *Indian Act* provides legislation relating to Indians and Lands Reserved for Indians. The Indian Act is administered by the Minister of Indian Affairs and Northern Development.

2. Provincial Legislation

All provincial government legislation within BC is administered by the legislative assembly of British Columbia (provincial government).

Land Act

The *Land Act* is the main legislation governing the disposition of provincial Crown (i.e. public) land in British Columbia. Crown land is any land owned by the Province, including land that is covered by water, such as the foreshore and the beds of lakes, rivers and streams. The *Land Act* is administered by the Ministry of Sustainable Resource Management.

Wildlife Act

The provincial Ministry of Environment administers the *Wildlife Act*, which includes legislation relating to the conservation and management of wildlife populations and habitat, issuing licenses and permits for fishing, game hunting, and trapping. A provision of the *Wildlife Act*, which may be pertinent to shoreline development is the prohibition, to take, injure, molest, or destroy a) a bird or its egg; b) the nest of an eagle, peregrine falcon, gyrfalcon, osprey, heron, or burrowing owl; c) or the nest of any other bird species when the nest is occupied by a bird or its egg.

Water Act

The *Water Act* is the primary provincial statute regulating water resources. Under the *Water Act*, a stream is defined as “a natural watercourse or source of water supply, whether usually containing water or not, and a lake, river, creek, spring, ravine, swamp and gulch.” Section 9 of the *Water Act* requires that a person may only make “changes in and about a stream” under an Approval or Notification where required; or under a Water License or Order.

Weed Control Act

The B.C. *Weed Control Act* imposes a duty on all land occupiers to control designated noxious plants. The purpose of the Act is to protect our natural resources and industry from the negative impacts of foreign weeds.

