LAKE WINDERMERE MANAGEMENT PLAN

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All quotes in the margins were submitted during the consultation process.

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EXECUTIVE SUMMARY

Lake Windermere has many uses and values including: cultural values for First Nations, a source of potable water for surrounding residents, fish and wildlife habitat, linkages to the Columbia River Wetlands, and high value recreational opportunities. Increasing development and use have led to concerns that the human-caused impacts on the lake may exceed its ecological carrying capacity and degrade drinking water quality.

The Lake Windermere Management Plan (LWMP) was initiated by the Regional District of East Kootenay (RDEK) in November 2008 to address lake-related issues following the adoption of the Lake Windermere Official Community Plan (OCP). The District of Invermere (DOI) is a partner in the planning process, which included meetings with an Advisory Group, two sets of public meetings, and consultation with the Akisqnuk First Nation and Shuswap Indian Band.

The LWMP contains information on the biophysical and social characteristics of Lake Windermere and its surroundings. The lake is highly valued by the public for its healthy environment, clean water, diverse year-round recreation opportunities, sense of community, spiritual values, and as a primary economic driver for the region. Some of the major concerns about the lake include: habitat loss, water quality deterioration, motorized uses affecting human enjoyment and the environment, lack of public access to the lake, and the challenges of lake management.

The following is the **vision** statement of the LWMP:

Lake Windermere has high water quality, providing drinking water and supporting healthy and diverse habitats for fish and wildlife. The lake, in its spectacular setting, supports a wide range of recreational pursuits which are accessible to everyone. The surrounding communities offer a high and enjoyable quality of life for all residents and visitors; everyone works together to ensure that human activities and behaviour respect the environment and human safety. The authority for management of the lake is simplified and coordinated, including enforcement of regulations and guidelines. Lake Windermere is a key economic asset for the Columbia Valley, helping to attract and retain residents, businesses, and tourists.

The following **goals** are elaborated upon with objectives in the LWMP:

Goal 1: Protect and enhance the **environmental** health and integrity of the lake.

Goal 2: Ensure the continuation of diverse and safe **recreational** opportunities.

Goal 3: Encourage and support the development of a **community** that will work together to respect and balance the various interests on the lake.

Goal 4: Clarify and strengthen responsibilities for **management** and **enforcement**.

In order to address the challenges of potentially conflicting objectives, the following **principles** were prepared as an underlying basis for the LWMP:

- Focus on enforcing existing regulations related to boating more than on establishing new ones, and develop voluntary guidelines and codes of conduct related to boating practices before requesting additional boating regulations.
- Ensure that the development of waterfront land and the foreshore respects environmental resources and addresses social concerns.

- Shift the focus of recreation on the lake to more public use and more non-motorized uses, e.g., walking and fishing from piers and docks, public beaches, public boat launches for small watercraft, rental of non-motorized craft.
- Make efforts to reduce the amount of motor boating at peak times, since it is perceived to be excessive to lake users.
- Strive to have fewer motor boats moored on the lake for long periods of time at marinas, docks and mooring buoys.

The key **recommendations** of the LWMP are as follows:

Lake Boating and Use Plan – identifies designations and recommendations for uses on the water:

- Establish three "no motorized boating" areas to respect environmentally sensitive areas and swimming areas.
- Establish areas that are "slow – no wake" and maximum speed of 10 kph, where there is significant boating congestion causing safety concerns. These same locations are also "no tow" areas except to get children to and from the shoreline.
- The remainder of the lake is designated a Responsible Boating area, with guidelines identified in the LWMP.
- Guidelines are provided for management of boating to increase safety and reduce negative impacts.

Winter Use Plan – identifies designations and recommendations for winter uses on the ice:

- Continue operation of the Whiteway, with agreements among agencies as required, and provide washrooms, doggy bags and garbage/recycling containers for lake users.
- Relocate the Whiteway farther east to accommodate the favoured fishing hut locations south of Invermere.
- Encourage fishing huts in locations that reduce potential conflicts with use of the Whiteway.
- Establish codes of conduct for more responsible motorized use of the lake in winter.

- Work with the users of fishing huts to identify codes of conduct for safe and appropriate practices, and work towards an informal system of self regulation.
- Work with others as needed to identify responsibilities for management, enforcement and emergency services on the frozen lake.

Water Structures and Public Access Plan – identifies locations of existing and proposed marinas, boat launches, public docks and mooring buoys:

- The RDEK and DOI will zone the surface of the lake to control the location of water structures.
- If structures are proposed by the Akisqnuk First Nation on the foreshore fronting the Columbia Lake Indian Reserve, the DOI and RDEK will work with the Akisqnuk to promote the objectives, principles and recommendations of this lake management plan, recognizing the interests of the Akisqnuk, the broader community and the need for environmental protection.
- New private **marinas** or the expansion of existing private marinas to accommodate more boats are not generally supported. Existing marinas may need upgrading at times. New or expanded marinas may be considered if they also help to achieve public objectives identified in this Management Plan.
- A new marina for public use in Invermere is supported, preferably as a replacement for the public marina at the north end of the lake. One concept for this is a marina at the foot of 3rd Avenue, with a boat launch, public dock, fuel dock, temporary moorage, and parking at Rotary field.
- Cap the number of fueling stations on the lake at two.
- For any new major development on the lake, encourage the inclusion of a public boat launch and temporary mooring for day use.

- Pursue opportunities for **multiple ramps for small boats** (non-motorized or small motor boats not requiring a trailer) distributed around the lake, with parking where possible.
- Design and build boat launches to minimize impacts to habitat. The zoning of the lake will include regulations on the placement and number of **mooring buoys**.
- All mooring buoys shall be located between 12 and 30 metres from the natural boundary, and a minimum of 12 metres from any other mooring buoy.
- Docks are preferred over buoys for the mooring of watercraft.
- Encourage and support the construction of **public docks** for activities such as fishing, renting and tying up small non-motorized boats, viewing, and swimming.
- **Private docks** must be accessory to an existing principal use on the waterfront parcel, maximum one dock per waterfront parcel.

Foreshore Management and Use – provides recommendations and identifies guidelines for foreshore development and enhancement:

- The RDEK and DOI will zone the surface of the lake and establish regulations to manage water structures.
- Consider negotiating a head lease with the Province, in the name of DOI and/or RDEK for management of the foreshore, including marinas, docks and mooring buoys.
- Establish a Foreshore and Aquatic Development Permit Area (DPA) for the entire lake up to the natural boundary, for protection of the natural aquatic environment, its ecosystems and biological diversity, to be implemented through the RDEK and DOI OCPs, and requiring all structures, except for mooring buoys, to obtain a DP prior to construction.
- In the absence of a DPA, consider requesting that the Province designate the lake an "application only" area for the purpose of tenuring and reviewing foreshore structures, including individual docks.

- Adopt the EKILMP Guidance Document recommendations through this LWMP as a guide to new construction on the foreshore (this does not apply to existing structures).
- Encourage the Province and DFO to enforce their own regulatory requirements, to support EKILMP guidelines, DP guidelines, and best management practices for all foreshore works, and to take action on illegal foreshore works that have negative impacts on habitat.
- Encourage community and individual lakefront property owners to enhance habitat along the foreshore, per guidelines and references in the LWMP.
- Establish mechanisms in the community to report on foreshore construction projects to ensure that all such projects obtain approval for the work.
- Encourage all agencies to promote and use available information and guidelines for the placement, size, and design of new foreshore works.
- The following uses, not related to mooring, are not acceptable on the foreshore: beach houses, storage sheds, patios, sun decks, and hot tubs. In addition, no camping, beach creation, groyne construction, infilling, private boat launches, or substrate disturbance, are acceptable on the foreshore, unless the purpose is to enhance habitat.
- When **marina** tenures are up for renewal, work with the owners to encourage amenities that support the objectives of this Management Plan.
- For new comprehensively designed lakefront subdivisions, one larger community dock is supported in lieu of a number of small private individual docks or a private marina.
- New **community day use docks** for pick-up / drop-off, swimming and fishing are supported.
- New community docks with slips for overnight use are generally not supported.

- Encourage individual waterfront owners to consider shared day use docks in the interests of having one larger dock that extends farther into the lake, rather than a number of individual docks that are in relatively shallow water with higher fish habitat values.
- Private moorage (including docks, lifts, boathouses, and other structures) is subject to the guidelines in the LWMP.
- Consider boat launch and parking fees at all public boat launches (for boats on trailers), with fees varying with boat size, and separate fees for launching and parking.
- Encourage distribution of information regarding ramps suitable for small boats.
- **Mooring buoys** must comply with federal government requirements with respect to size, colour and identification.
- It is recommended that mooring buoys be secured with ropes, not chains. If chains are used, they should be maintained taut or semi-taut to minimize lakebed scouring.
- Explore mechanisms for managing mooring buoys, such as through a head lease with the Province. This might include a registration system for buoys, using the fees to manage unregistered and non-compliant buoys. In the allocation of mooring buoys, consider existing buoys that comply with requirements first, and give priority to sailboats with keels since they are so much more difficult to launch. Additional buoys, if available, may be allocated by lottery.
- Encourage private developments to inform the public that beach areas below the natural boundary are available for **public use**.
- Do not allow new developments to have beaches that are managed as if they were "private" in terms of access from the water.
- If the weir at the lake outlet is to be rebuilt, consider a walkway on all or part of it as an attraction.

Upland Use and Management – provides recommendations for the upland including Development Permit Areas:

- Revise the designations in the RDEK Lake Windermere OCP to reduce the potential for subdivision of private lots with no community sewer along the lakeshore, unless the subdivision furthers the objectives of this plan.
- Establish a Riparian Development Permit Area (RDPA) in the RDEK and the DOI for the entire Lake Windermere shoreline for new development within 100 metres (328 feet) of the natural boundary. Associated guidelines are identified.
- Develop public information materials on the values and resources of the lake, and the measures residents can take to reduce their impacts, and work with others to distribute these materials widely on an ongoing basis.
- Encourage and support bylaws as needed that work towards banning harmful products used for landscape maintenance in the lake's watershed.
- Investigate within RDEK the application of a voluntary riparian tax exemption system that local governments can use under the *Local Government Act* to compensate riparian landowners who choose to protect eligible riparian land through a conservation covenant. (The DOI already has this in place).

- Encourage public walkways along the shoreline.
- Identify upland waterfront locations with particular values for public use and recreation. Consider purchasing such properties for public use, with subdivision of a portion of the upland if necessary to finance the purchase.
- If the marina at the north end of the lake is relocated, encourage restoration of the shoreline at the current marina site due to its importance for fish, and encourage a park/interpretive area with low-impact trails in that location.
- Work persistently and collaboratively with all stakeholders to ensure that all subdivisions around the lake have appropriate sewage treatment. Community sewage treatment systems are preferred.

- Encourage MOT to enforce the removal of barriers and other encroachments, and the posting of visible on-site identification of legal public access points to the lake.
- Encourage MOT to require any new developments to provide public access to the lake that is convenient, useable and attractive, preferably with some parking on site or nearby.
- Ensure that farmers within the watershed of Lake Windermere are aware of funding for, and encourage agricultural practices that enhance natural ecosystems and protect environmental resources.
- Encourage the Province to enforce regulations where poor agricultural practices have caused negative impacts on watercourses or groundwater.
- Investigate the establishment of a boat launch at the north end of Columbia Lake.
- Encourage CPR to cover rail cars carrying coal dust through the area.

Environmental Quality – provides recommendations for working with others to protect and improve environmental quality:

- Encourage the Province to continue to support water quality monitoring, and to compile and communicate the results widely, including to the media and other public forums, in collaboration with community groups.
- Encourage a study on the environmental and hydrological impacts of the weir and options for the future.
- Encourage the federal or provincial government to reinstate a water level monitoring station on Lake Windermere, and to study the water balance, including surface and groundwater inputs and water withdrawal, and based on these analyses, to make recommendations for managing the water level.
- Discourage the granting of additional water licences for irrigation as a precautionary measure until information is available on how much water is withdrawn compared to licences.

- Encourage and support education to the public regarding environmental values, including aquatic macrophytes and their habitat values, factors causing their increase, and the risks of spreading exotic aquatic macrophytes.
- Encourage a study of aquatic macrophyte abundance and species for comparison with the 1999 data set.
- Recognize and make use of the Lake Windermere Project's resources, including water monitoring equipment and experience, extensive library, and encourage its continued support through the Lake Windermere Ambassadors or Lake Management Committee.

Implementation of the LWMP will be the responsibility of RDEK and DOI, with support from all other agencies that have a role in lake management. The following will be some of the implementation measures.

- Support the establishment of a Lake Management Committee, potentially composed of Lake Windermere Ambassadors, other citizens and local government, subject to a Terms of Reference and appointment by RDEK and DOI. Coordinate with various levels of government in outreach activities and sharing of information.
- Establish a protocol and responsibilities for stewardship and enforcement, including observation, recording and reporting, with the understanding that the relevant government agency will respond when needed.
- Establish methods for monitoring compliance with the LWMP and the effectiveness of the LWMP in meeting its objectives through a series of performance measures.
- Incorporate the lake designations and other policies of this plan into the RDEK Lake Windermere OCP and the DOI OCP.
- Implement bylaws within RDEK and DOI to zone the surface of the lake.
- If necessary, apply to Transport Canada for the proposed changes to boating use on the lake.

- Establish a public education program, with initial and ongoing components, to convey the provisions of the LWMP to the public.
- Work with the Province to ensure that all applications for foreshore and Crown Land tenures on and around the lake are referred to local government for comment and collaboration.
- Explore and analyze the implications of obtaining a head lease for foreshore tenures, and if appropriate, acquire a head lease managed by DOI, RDEK or another party.
- Work with the Akisqnuk First Nation and the Shuswap Indian Band on obtaining agreement in principle for this LWMP, and encourage them to incorporate the provisions of the LWMP into their own land use and foreshore planning and development decisions.
- Explore opportunities for obtaining funding for implementation of the LWMP, with potential sources including grants, corporate sponsorships, partnerships, fees and charges.
- Encourage requiring the installation of water meters and a reporting system on water use, especially for water licences from the lake.
- If MOT access points are enhanced for public access, establish an agreement with MOT for RDEK to maintain them.
- The various agencies involved in EKILMP agree to abide by this LWMP in their own planning and management processes. Should they wish to take an action or make a decision which is contrary to the LWMP, it is recommended that they undertake public consultation.

  The priority for the RDEK and DOI will be implementing the recommended local government regulations and establishing the Lake Management Committee to lead the non-regulatory lake management measures.

"All of the values here are based on the resources. If not managed properly, the resources will be destroyed with a major cost to the valley. "

1.0 INTRODUCTION

1.1 Plan Context

Lake Windermere, a shallow lake which is actually a widening of the Columbia River, is located within the upper Columbia Valley (see Figure 1). Three jurisdictions surround the lake; Regional District of East Kootenay (RDEK), District of Invermere (DOI), and Columbia Lake Indian Reserve #3 (Akisqnuk First Nation). Lake Windermere has many uses and values including: cultural values for First Nations, a source of potable water for surrounding residents, fish and wildlife habitat adjacent to the Columbia Wetlands, and high value recreational opportunities.

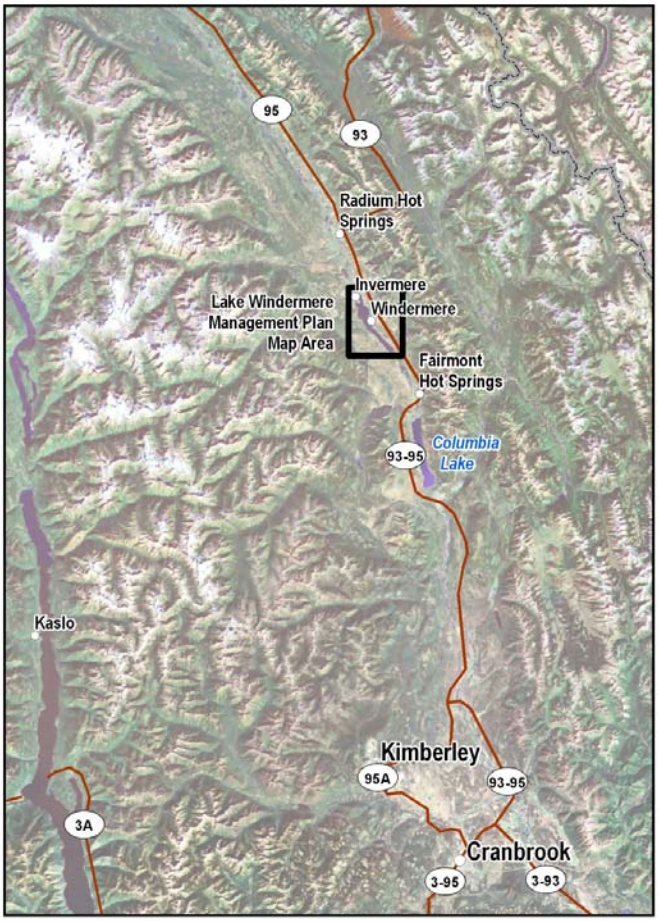


Figure 1: Study Area Location

Development has increased significantly in the past two decades, placing demands on the lake and the surrounding upland areas. There are concerns that the human-caused impacts on the lake may exceed its ecological carrying capacity and degrade drinking water quality. Current planning policy and development regulations pertaining to shoreline development are not suited to managing the high rate of growth and development in the area.

The Lake Windermere Management Plan (LWMP) was initiated by the RDEK in November 2008 following the adoption of the Lake Windermere Official Community Plan (OCP). During the development of the OCP, a number of issues related to the lake were raised by concerned residents. The scope of these issues was determined to be too large and significant to deal with during the OCP process. The Regional District has partnered with the District of Invermere for the lake management plan initiative, and it is understood that both local governments will adopt the LWMP.

The plan area for the LWMP is Lake Windermere up to and including the natural boundary (i.e., high water mark). That is the area for which specific development and lake management designations will be applied in this plan. Since the lake functions in relationship with the surrounding upland, those upland resources and uses are considered to the extent that they are relevant to the LWMP. There is no specific delineation of the extent of upland consideration.

The management of the foreshore is a multi-jurisdictional responsibility and is regulated by local, provincial and federal legislation and regulations. The percentage of foreshore within the RDEK is 55%, within the District of Invermere 20%, and within the Columbia Lake Indian Reserve #3, 25%.

A significant amount of work has already been undertaken in advance of the LWMP process:

- An Official Community Plan (OCP) for the Regional District portion of Lake Windermere was completed in 2008 with a process that incorporated significant input from the public and stakeholders; the

OCP recommends the preparation of a Management Plan for Lake Windermere.

- Section 16 Map Reserves under the *Land Title Act* are in place for the portion of the lake under Regional District (RDEK) and District of Invermere (DOI) jurisdiction. This prevents the Province from granting new foreshore tenures, and the reserve is intended to be in place until local government plans and regulations are updated.

Other background work is summarized in section 1.4.

1.2 Plan Purpose

The purpose of this project is to prepare a Management Plan for Lake Windermere that will guide the long-term management of the lake by directing local government planning of the lake and shoreline and providing advice to other levels of government.

The objectives include the following:

- Conduct a comprehensive analysis and synthesis of information on environmental, social and cultural resources and values associated with Lake Windermere,
- Engage the public and stakeholders in a planning process that will inform and solicit input on existing conditions and potential management strategies, and
- Prepare a Lake Management Plan containing policies and recommendations for lake use, management, and development that are practical, enforceable and realistic.

1.3 Planning Process

The preparation of this plan commenced in February 2009 using a participatory process that consisted of a series of meetings with a local Advisory Group, and public sessions. The Advisory Group was composed of volunteer representatives of various geographic areas and interests in the community, and four meetings were held with them at key stages in the process. Their role was to provide comments on plan

content and the public consultation process, and to serve as a communication link between the planning process and the community.

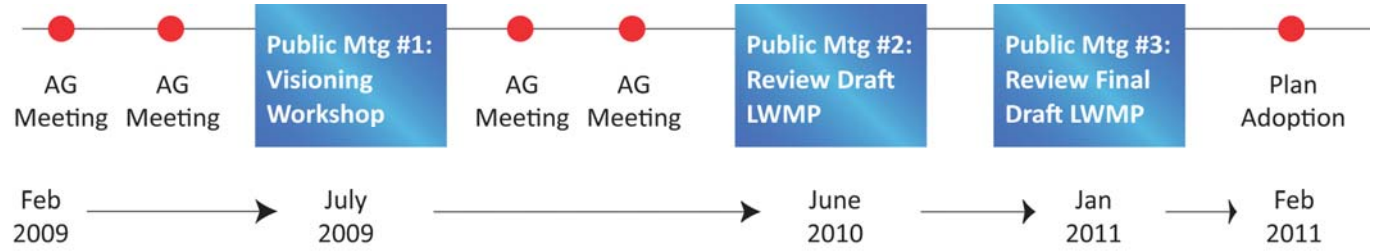


Figure 2: Consultation Process

Two public sessions were held in the community during the preparation of the plan. The first session in July 2009 introduced the plan purpose and process and involved two informal workshops on the values, concerns, vision/objectives and plan ideas of participants. The public was notified using newspaper ads, a posting on the RDEK website, and emails/phone calls to known community groups and residents' associations. A comment form was distributed at the workshop and on the RDEK Website. After a relatively low initial response, the form was distributed widely among the boating community, and over 600 forms were received.

At a second set of public sessions in June 2010, a draft Management Plan was presented at open houses in Windermere in the afternoon, and Invermere in the evening. The public was notified about this meeting using newspaper ads, a posting on the RDEK and DOI websites, and emails to all who provided email addresses on the earlier comment forms (over 500). Opportunities were also provided for review of and input on the draft Management Plan through the RDEK website.

The consultant and RDEK staff met with representatives of the Akisqnuk First Nation and Shuswap Indian Band during the planning process in recognition of their traditional and continued interest in and use of Lake Windermere.

1.4 Past Studies and Background Information

A number of studies provide important background information for the Lake Windermere Management Plan.

Regional Growth Strategy (RGS)

Adopted by the Regional District in 2004, the RGS is a policy document that establishes principles for evaluating land use changes and developing community plans throughout the Regional District. The RGS vision statement encourages "growth where it is socially, environmentally and economically sustainable and respects the character of each subregion". The RGS contains two types of policies: those that apply to the whole Regional District and policies that reflect subregional planning objectives. The Columbia Valley Subregion interests are as follows:

Services

- Support legislative change that would enhance regional government's ability to manage development and improve water and sewage services in unincorporated communities.
- Encourage the establishment of Local Community Commissions or alternative governance options to enhance participation in local decision making.
- Consider seasonal population levels in determining the need for policing and other services.

Environmental Protection

- Protect wildlife corridors and habitat connectivity between the Columbia River wetlands and Kootenay National Park.
- Protect the Columbia River wetlands.
- Support initiatives to monitor use and manage motorized recreation on Columbia and Windermere Lakes.

Lake Windermere Official Community Plan (OCP)

The OCP for Lake Windermere was adopted by the RDEK in August 2008 as Bylaw No. 2061, 2008. The OCP is a guide to the future growth of the community, and it includes goals, objectives and policies that guide land use and development, as well as land use designations. The OCP process incorporated significant input from the public and other stakeholders.

The following are the OCP objectives related specifically to Lake Windermere.

1) To promote partnership opportunities between the Regional District and other government and non-profit organizations to work toward best management practices for the lake,
2) To support the development of a comprehensive Lake Management Plan for Lake Windermere,
3) To identify the jurisdictions responsible for the management of the foreshore of Lake Windermere, and
4) To protect water quality for the purpose of drinking water, recreation and aquatic life.

Policies in the OCP provide more detailed recommendations on water zoning, shoreline treatment, water structures and marinas, boat launches, public access to the lake, Crown land, and the Lake Windermere Project. Most of the residential lots along the lakeshore are designated Residential Low Density (R-SF). According to the Upper Columbia Valley Zoning Bylaw No. 900, the minimum parcel area requirements, based on the level of servicing, are as follows for single family dwellings:

- Community water and community sewer – 555 m^2 (5975 ft^2),
- Community water or community sewer – 1390 m^2 (14962 ft2),
- On-site water and on-site sewage disposal – 1670 m^2 (17976 ft^2).

The OCP and other documents provide an initial understanding of local issues, community concerns and resident desires for the area. It appears that there is good public knowledge of land use planning and environmental issues, and strong support for more land use and environmental controls. Some of the specific lake management concerns include:

- Widespread public concern about the sustainability of the lake as an important water source,
- The need to protect environmental resources and values, particularly water quantity and quality, wildlife habitat, and vegetation,
- Boat traffic congestion and shoreline and upland development, and their effects on the rural character and the lake's attraction and value to residents and tourists,
- The collapse in the burbot (*Lota lota*) fishery, with speculation on the reasons including increased competition from the invasion of bass, low spawning adult numbers, loss of habitat, decreased food sources, over predation (including over fishing) and the construction of downstream dams,
- The complexity of the multiple jurisdictions and the unique roles of the Akisqnuk First Nation and Shuswap Indian Band in the planning process, with respect to other provincial and municipal agencies, and to each other.

District of Invermere Official Community Plan (DOI OCP)

The District of Invermere OCP was adopted by the DOI in August 2001 as Bylaw No. 1085, 2001. The following are some of the policies that are relevant to Lake Windermere.

Chapter 4 contains policies regarding the natural environment. One of the key objectives is to ensure that filling of the foreshore of Lake Windermere does not occur and that the public continues to have access to the lake.

The lake foreshore is defined as an Environmentally Sensitive Area and is a DP area. All properties within 7.5 metres of the visible high water mark of Lake Windermere are affected by the DP requirements. The objectives and the requirements are within section 4.1 of the OCP. The DOI OCP also has a DP for steep slopes and this captures additional areas along the lake shoreline.

Chapter 10 of the OCP addresses a Lake Management Strategy as follows:
"The health of Lake Windermere is of great importance to Invermere and the region. The preservation and protection of this wonderful amenity is required to ensure that the quality of life that all residents and visitors enjoy is maintained. A Lake Management Strategy is underway that will provide Council, the Regional District, residents and other agencies with a framework that will help preserve this natural resource."

Lake Windermere Management Strategy

This strategy for Lake Windermere was contracted by the District of Invermere (Urban Systems, 2001). It contains some useful background information and maps, however it is out of date. This Management Plan makes use of some of the background information from the Strategy, particularly with respect to the physical characteristics of the lake.

EKILMP

Since 2006, the Regional District, District of Invermere, First Nations, federal/provincial agencies, and non-government organizations have participated in the East Kootenay Integrated Lake Management Partnership (EKILMP). EKILMP's vision is for productive and healthy lake ecosystems in the East Kootenay Region, with balanced land and water uses that support and sustain traditional, environmental, community, recreational, and aesthetic values.

EKILMP's mission is as follows:

- Through partnership, information sharing and optimizing available resources, the EKILMP wishes to develop integrated, collaborative approaches to lake management, in order to address the current and future activities in the watershed in ways that sustain the ecological health, social and economic values of lakes in the East Kootenay.

Through EKILMP, which has spent most of its time on the technical aspects of ecological health, Lake Windermere was selected as a pilot project for a comprehensive Lake Management Plan. As part of the EKILMP process, Sensitive Habitat Inventory Mapping and associated reports have been completed. These include Foreshore Inventory and Mapping, Fish and Wildlife Habitat Assessment, and a Shoreline Guidance Document. They are described in the Fish and Wildlife Habitat section.

Columbia River and Wetlands

The Columbia Wetlands is a large wetland and river system located between several major communities in the East Kootenay portion of B.C. These wetlands are one of the largest wetland complexes in Canada, and are recognized as a wetland of international importance by the United Nations under the RAMSAR Treaty. The system stretches 150 kilometres from Invermere in the south, to Golden in the north, along the Upper Columbia River. The system is a complex mix of federal, provincial, municipal and private lands. Provincial lands in the wetlands are managed as the Columbia Wetlands Wildlife Management Area (WMA); federal portions are managed as three National Wildlife Areas. There are also significant areas of private lands in the system. Lake Windermere contains a portion of the WMA at the south end, with more north of the lake.

The Vessel Operation Restriction Regulations (the Regulations) of Transport Canada provide for the establishment of restrictions to navigation in Canadian waters. On June 28, 2008, amendments were made to the Regulations which restrict the navigation of vessels in the Columbia River and Wetlands between Fairmont Hot Springs and

Donald Station (north-west of Golden), B.C. in order to protect environmental values, as follows:

- A year-round prohibition on the operation of power-driven vessels in the wetlands of the Columbia River.
- A year-round prohibition on towing persons on water skis, surfboards or other similar equipment in the main channel of the Columbia River at any time.

First Nations, local governments, and recreational user groups indicated support for this initiative. A number of residents of the area have indicated that an absolute prohibition on power-driven vessels in the spring and early summer, which was requested by some residents, unreasonably interferes with their access to the river. Typically these users operate low-powered motors up to and including 15 kilowatts (20 horsepower). Transport Canada is currently considering a revised proposal for a year-round 15 kilowatt (20-horsepower) limit on power-driven vessels operating in the main channels of the Columbia River.

The *Federal Policy on Wetlands Conservation*, which is in part a response to Canada's signing of the Ramsar Convention, clearly commits federal departments to a precautionary approach when considering actions that could impact upon Canada's remaining wetlands. The stated objective of the Federal Policy on Wetlands Conservation is to "promote the conservation of Canada's wetlands, and to sustain their ecological and socio-economic functions, now and in the future".
Though current usage of the wetlands by power-driven vessels is limited, the potential for significant harm is enough to justify the invocation of the Precautionary Principle. The proposed Regulations are consistent with the Government of Canada's commitment to protecting unique highly productive ecosystems and the integration of sustainable development in its plans, policies, and programs.

Data Collection for the Lake Windermere Project

The Ministry of Environment in association with a local environmental group, Wildsight, has been collecting baseline data as part of the Lake Windermere Project for five years on water quality and quantity. The results are discussed in the Water Quality section. Wildsight also conducted boat counts from 2005 to 2008.

Lake User Survey

A mail survey was conducted of all households and property owners from Fairmont to Invermere (Lake Windermere Project, 2005). The response rate was 16%, yielding 610 completed surveys. The majority of respondents were from Calgary (48%), and owners of recreation property (56%). There were 449 respondents who owned 838 watercraft, mostly power boats. The average amount of boat use was 13 days per summer. The average amount of swimming activity, mostly at private beaches, was 19 days per summer.

The results indicate a need for public education regarding: maintaining septic systems, water conservation, shoreline protection and legislation, and the impacts of pesticides. The themes of concern to respondents were:

- Watercraft congestion,
- Impacts of rapid development, july 2009 - 235
- Absence of adequate waste treatment on the east side of the lake,
- Extensive aquatic plant growth, and
- Inadequate public boat launches.

As expressed in the survey, the public seemed ready to embrace stewardship and a long-term strategy for the lake.

East Side of Windermere Lake Foreshore Policy

Adopted by the RDEK in 1993, the Foreshore Policy provided information concerning the use of foreshore lands along the east side of Lake Windermere and identified options for future management and foreshore development. The Foreshore Policy was adopted as an interim measure in anticipation of the completion of an East Side of

Lake Windermere Official Community Plan in the next couple of years. A draft Official Community Plan was completed in 1996, but was never adopted by the Board. The foreshore policy will be repealed and replaced with the LWMP.

1.5 Definitions and Abbreviations

The following are some of the definitions and abbreviations used in this document:

Definitions

- Acre feet – the volume of water that would cover one acre (4,047 sq m) at one foot (30 cm) deep. One acre foot is equivalent to 325,851 gallons.
- Community water system - a system of waterworks serving more than one parcel that is owned, operated and maintained by a local government or improvement district as defined by the *Local Government Act*, or a Strata corporation as defined by the *Strata Property Act*, or a water utility, as defined by the *Water Utility Act*; AND for systems owned, operated and maintained by a Strata corporation or private water utility for which a Certificate of Public Convenience and Necessity (CPCN) has been issued by the Comptroller of Water Rights for the Ministry of Environment; AND which is approved under the *Drinking Water Protection Act* and any other provincial regulations that may apply.
- Community sewage system - a system of sewage collection, treatment and disposal where the treatment method serves more than one parcel and is: a) approved under the Sewerage System Regulation (B.C. Reg. 326/2004); or b) approved under the Municipal Sewage Regulation (B.C. Reg. 129/99); AND which is established and operated under the *Health Act* and regulations or *Environmental Management Act* and regulations or other provincial legislation that may apply.
- Density – the number of residential dwelling units allowed within a specified area of land.

- Development Permit Area - an area designated pursuant to the *Local Government Act* where approval of a development permit is required before development can proceed.
- Environmentally Sensitive Areas – an area or site with environmental attributes worthy of attention or special care such as: creeks and streams; lake shorelines; wetlands; and wildlife habitats.
- Eutrophic - a body of water with high primary productivity due to excessive nutrients, especially nitrogen and phosphorous, often from sources of pollution on adjacent lands. The high organic production rates may overcome the natural self-purification processes; effects include algae blooms, poor water quality, oxygen deficiency in bottom waters, and reduced survival for fish and invertebrates.
- Littoral zone – the marine ecological realm that experiences the effects of tidal and/or longshore currents and breaking waves to a depth of 5 to 10 metres (16 to 33 feet) below the low water level, depending on the intensity of storm waves. The zone is characterized by abundant dissolved oxygen, sunlight, nutrients, generally high wave energies and water motion, and, in the intertidal subzone, alternating submergence and exposure.
- Mesotrophic – the trophic state of a lake that falls along the continuum between oligotrophic and eutrophic.
- Natural Boundary - the visible high water mark of any lake, river, stream or other body of water where the presence and action of the water are so common and usual, and so long continued in all ordinary years, as to mark on the soil of the bed of the body of water a character distinct from that of its banks, in vegetation, as well as in the nature of the soil itself.
- Oligotrophic – waters that are poor in dissolved nutrients and plant life, and rich in dissolved oxygen at all depths.
- Personal Watercraft - a recreational motorized watercraft that the rider sits, kneels or stands on, rather than inside of, as in a boat; common types are Jet-skis, Seadoos, and Wave Runners.
- Riparian Area - the land adjacent to the normal high water level in a stream, river, lake or pond and extending to the portion of land

that is directly influenced by the presence of the watercourse or water body.

- Sewage treatment method - a treatment method for domestic sewage typically for private individual homes (or in the case of Type 3 for developments), classified as Type 1, Type 2 or Type 3 where:

  a) Type 1 is treatment by septic tank only,

  b) Type 2 is treatment that produces an effluent consistently containing less than 45 mg/L of total suspended solids and having a 5 day biochemical oxygen demand of less than 45 mg/L, and

  c) Type 3 is treatment that produces an effluent consistently containing less than 10 mg/L of total suspended solids and having a 5 day biochemical oxygen demand of less than 10 mg/L, and a median fecal coliform density of less than 400 Colony Forming Units per 100 mL.

- Watercourse –any natural or man-made depression with well-defined banks and a bed 0.6 metres or more below the surrounding land serving to give direction to a current of water at least six months of the year or having a drainage area of 2 square kilometres or more upstream of the point of consideration, or as required by a designated official of the BC Ministry of Environment.

- Yacht - yacht-certified boats, as designated by the National Marine Manufacturer's Association, comply with established standards and safety regulations, and cover all models 26 feet in length and over (except racing craft and pontoons) marketed in the U.S.A. for non-commercial use.

Abbreviations

- ALC - Agricultural Land Commission
- ALR - Agricultural Land Reserve
- DOI – District of Invermere
- DFO – Department of Fisheries and Oceans (Canada)
- DP – Development Permit
- DPA - Development Permit Area
- EKILMP - East Kootenay Integrated Lake Management Partnership
- HI – Habitat Index
- IHA - Interior Health Authority
- ILMB – Integrated Land Management Bureau (Ministry of Agriculture and Lands)
- LGA - Local Government Act
- LWMP – Lake Windermere Management Plan
- MOE – Ministry of Environment
- MOF - Ministry of Forests and Range
- MOT - Ministry of Transportation and Infrastructure
- OCP - Official Community Plan
- RDEK – Regional District of East Kootenay
- WMA - Wildlife Management Area
- ZOS - Zones of Sensitivity.

2.0 Plan Area Overview

2.1 Introduction

Lake Windermere is located in the Rocky Mountain Trench, with the District of Invermere situated at the north end of the lake along the west shoreline (see Map 1). The lake forms part of the Columbia River Valley and is a widening of the Columbia River rather than a “true” lake. The lake is bounded to the west by the Purcell Range of the Columbia Mountains and to the east by the Kootenay Ranges of the Rocky Mountains. To the north and south lie the internationally significant Columbia River Wetlands. These wetlands, which are part of the Pacific Flyway, are designated by the “Ramsar Convention”, an intergovernmental treaty that embodies the commitments of its member countries to maintain the ecological character of their wetlands of international importance and to plan for the "wise use", or sustainable use, of all of the wetlands in their territories.

The lake is 17.7 kilometres long with an average width of 1.1 kilometres; its average elevation is 800 metres. Lake Windermere was formed at the end of the last Ice Age, as glacial meltwater pooled within a scoured and reshaped valley to form two lakes, Columbia Lake and Lake Windermere. During this post glacial period, deposits along the valley floor accumulated as glacial till, glaciofluvial sand and gravel, and glaciolacustrine sand, silt and clay. Other postglacial deposits include colluvium and landslide material, loess deposits, and sand and gravel fans and terraces.

The river valley is a physically diverse area, encompassing steep mountains, valley bottoms, and large areas of wetlands. The river valley is characterized by a mixture of coniferous and deciduous trees, including Douglas-fir, white spruce, cottonwood, and willow shrub. Sedge, bulrush and a number of aquatic plant communities proliferate in the wetlands. Mixed forest and grassland occur farther up the valley and along the river terraces. Due to the physical diversity, the watershed is home to numerous plant and animal species.

The Columbia River's gentle pitch through the Columbia Valley provides high quality marsh habitat. The north and south ends of the lake provide habitat for fish (both sport and coarse fish), osprey, numerous waterfowl, water-dependent mammals such as beaver, river otter and muskrat, and a variety of ungulates including moose, deer, and elk.

The climate in the valley bottom is relatively dry because the Selkirk and Purcell Mountain
Ranges to the west create a barrier against moist maritime Pacific air. Spring and fall are drier than summer or winter. Precipitation levels increase as elevation rises up the valley slopes. The Rocky Mountains protect the area from cold, continental arctic air that covers the prairies during winter. Winters are generally mild, but severe cold spells occur when Arctic continental air spills over the Rockies. The climate of the area, with its relatively mild winters and generally dry valley bottom, make it desirable for humans as well as a suitable environment for a variety of flora and fauna.

2.2 Physical Characteristics

Lake Characteristics

Lake Windermere is a large, shallow lake with a surface area of 1,610 hectares (3978 acres) (see Figure 3). The lake's mean (average) depth is 3.4 metres with a maximum depth of 6.4 metres. The total annual fluctuation in depth of the lake is approximately 1.5 metres/year. Regular winds through the valley, coupled with the shallow nature of Lake Windermere, ensure that little if any stratification occurs and waters are well mixed throughout the ice-free season. The lake has an extremely rapid flushing rate of approximately 47 days.

	Parameter Amount
Volume	55.19 x 10^6 m^3
Surface Area	1,610 ha
Littoral Area	Approx. 1,530 ha
Drainage	1,340 km^2
Maximum Depth	6.4 m
Mean Depth	3.4 m
Length	17.7 km
Average Width	1.1 km
Shoreline Perimeter	36.3 km

Figure 3: Physical Characteristics of Lake Windermere.

Inflow to Lake Windermere is primarily from the Columbia River at the south end. This portion of the river connects Columbia Lake to Lake Windermere and, therefore, Columbia Lake's outflow is a factor in assessing the quantity and quality of the water entering Windermere Lake. A number of small creeks also contribute flow; the largest creeks flowing directly into Lake Windermere are Windermere, Madias, Abel and Goldie Creeks. Dutch Creek is a larger creek flowing into the Columbia River upstream of Lake Windermere.

Foreshore

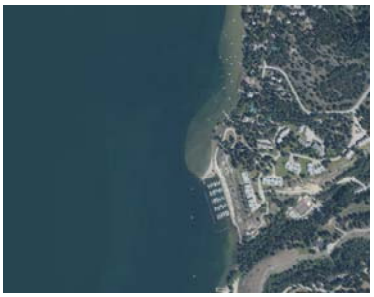
The foreshore is the land lying below the natural boundary of a lake, stream or the ocean. The natural boundary (equivalent to the high water mark) is distinguished by the change in the character of the soil and vegetation from the upland to the foreshore. Beaches are considered to be part of the foreshore since they lie below the natural boundary. Aquatic Crown land is all the land, including the foreshore, from the natural boundary out to the limits of provincial jurisdiction, i.e., for Lake Windermere aquatic Crown land is the entire bed of the lake up to the natural boundary.

Some of the factors governing the use of foreshore and aquatic Crown land in B.C. are as follows:

- The Province owns nearly all freshwater and saltwater foreshore;
- Although land adjacent to the foreshore may be privately owned, in common law the public retains the privilege or "bare licence" to access the foreshore;
- Individuals cannot build on or develop aquatic Crown land, including Crown foreshore, without the Province's authorization, even if they own adjacent property or "upland"; and
- Permission to use Crown land is obtained by application to the Province.

Foreshore development has the potential to change the natural shoreline of the lake. Structures along the foreshore may alter natural patterns of erosion (removal of land) and accretion (deposition of land) which may in turn have negative impacts on fish and wildlife habitat,

e.g., littoral drift has been changed by break walls on the lake. Conversely, these structures may also serve to protect shoreline areas from erosion thus serving to maintain or promote habitat. A video of the entire shoreline is available at http://squamish2010.ca/mapguide2010/kootenay/Kootenay_frameset.php.



In August 2006, members of EKILMP, including staff from the Department of Fisheries and Oceans, Ministry of Environment and Wildsight, conducted a detailed inventory of the foreshore of Lake Windermere (see Map 2). The objective of the inventory was to provide an overview of the lake foreshore habitat condition. Information was collected on foreshore morphology, land use, riparian condition and anthropogenic alterations (Interior Reforestation Co. Ltd., 2007). The foreshore inventory also included a field survey of retaining walls around the lake.

The results show that railway, residential, private recreational, parks and commercial uses have compromised the integrity of over half of the foreshore area of Lake Windermere. Anthropogenic alterations include riparian vegetation removal and construction of foreshore modifications, including retaining walls, docks, groynes, boat houses, marinas and boat launches. Retaining walls in particular have been built along substantial portions of the residential and private recreational areas, with nearly half of these constructed below the natural boundary. There are concerns that these modifications are fragmenting and degrading foreshore habitats that are relied on by a variety of aquatic and terrestrial species. Despite these foreshore impacts, nearly half of the foreshore of Lake Windermere remains undisturbed.

The foreshore inventory serves as a benchmark by documenting land use and riparian habitat condition, which is useful for the development of regulations, standards, policies and education materials. Raising public awareness to support community stewardship of the natural values of Lake Windermere is a key to successful lake management.

Water Quality

The greatest concern to the community using Lake Windermere is water quality. Water quality is the basic gauge for measuring environmental health and ecosystem integrity. The Ministry of Environment (MoE) previously developed water quality objectives for Lake Windermere in 1985 (McKean and Nordin). These objectives were based on preliminary working criteria for water quality and all available data on water quality and lake and watershed characteristics. The designated water uses for Lake Windermere were drinking water, aquatic life, recreation and irrigation. The provincial objective for Lake Windermere was that no water treatment, in addition to disinfection, should be required for drinking water.

The MoE recently completed a draft Water Quality Assessment and Objectives for Lake Windermere (First Update dated August 2010), a summary of which is contained in this section. Recent water quality monitoring was conducted between 2006 and 2009 to provide current data. The purpose of this was to ensure that development near the lake is not having negative impacts on water quality, and to review the guidelines on which the 1985 objectives were based, revising these as necessary.

The sampling involved field parameters and water chemistry from three stations in the centre of the lake (north, central and south); monitoring for E.coli and fecal coliforms at Invermere, Windermere and Althalmer beaches; and sampling Windermere Creek and the Columbia River inflow to Lake Windermere for bacteriology and general water chemistry.

Based on the results of water samples collected between 2006 and 2009, it does not appear that human land use and development are having significant impacts on Windermere Lake water quality. Windermere Lake is shallow and well mixed, with a water residence time of approximately 47 days. These factors, combined with the amount of inflow received from the Columbia River, allow Windermere Lake to effectively assimilate nutrients.

Phosphorus and nitrogen values at the three main lake stations were similar to, or had declined compared to historical data and neither of

these parameters is a concern at this time. Turbidity values were highest in Windermere Creek, which may have been due to the impacts of forestry activity within the watershed. Temperature values exceeded the Water Quality Guideline during the summer months (June – September). Temperature and dissolved oxygen (DO) values indicate that the water column is well mixed.

The pH of Windermere Lake appears to be slightly basic, consistent with historic values. This does not appear to be caused by human influence. Conductivity levels were typical of natural levels and remained fairly consistent over time. Sulphate levels were highest at the mid-lake station, resulting from inputs from Windermere Creek. Elevated concentrations of microbiological indicators were noted at both Athalmer and Invermere beaches. This is likely due to the beaches being located in embayments, the high recreational use of these areas and potential contributions from septic systems along the east shore of the lake.

Water quality results from the three main lake stations did not display much variation over the three year monitoring period. It is possible that impacts from non-point sources of pollution may be more evident in near-shore areas.

The influences on water quality in Lake Windermere are noted as the following:

- Forest harvesting and mountain pine beetle – the Windermere Creek watershed has experienced the most logging,
- Agriculture, though this is not extensive in the area – ranching is the primary activity with cultivated land being used for mainly hay and alfalfa,
- Year-round recreation and development, and
- Wildlife, especially given the extensive bird species using the Columbia Wetlands.

The water quality objectives for Windermere Lake generally have been met. Temperature exceeded the water quality guidelines for the protection of aquatic life; however these elevated temperatures appear to be natural. Average temperatures to protect aquatic life have been recommended for Windermere Lake.

Objectives for the following variables were added or modified since the 1985 assessment: phosphorus, microbiological indicators, turbidity, total organic carbon, temperature and dissolved oxygen. These new or modified Water Quality Objectives will prevent the impairment of water quality from non-point sources of contaminants (see Figure 4).

Parameter	Site	Objective
Turbidity[1]	0200051, 0200052, E262793	≤ 5 NTU (maximum)
		≤ 1 NTU (average)
	0200051, 0200052, E262793	5 NTU (95th percentile)
Temperature[2]	0200051, 0200052, E262793	20 °C June (average)
		25 °C July (average)
		23 °C August (average)
E. coli[3]	Bathing Beaches; Drinking Water Intakes	≤77 CFU/100 mL (geo. mean)
		≤10 CFU/100 mL (90th percentile)
Phosphorus[4]	0200051, 0200052, E262793	10 ug/L (maximum)
TOC[5]	Near Drinking Water Intakes	4 mg/L (maximum)
DO	0200051, 0200052, E262793	≥5 mg/L (instantaneous minimum)
		≥8 mg/L (average)

Figure 4: Proposed Water Quality Objectives for Windermere Lake

1. During the clear-flow period (August 16 through April 30) maximum turbidity at any time should be <5 NTU and mean turbidity (based on a minimum of five weekly samples collected within a 30-day period) during the clear-flow (non-freshet) period should be < 1 NTU. During the turbid-flow period (May 1 through Aug 15), the 95th percentile turbidity should not exceed 5 NTU (based on a minimum of five weekly samples collected in a 30-day period).
2. For the protection of aquatic life, the average water temperature (measured in the top and bottom of the water column) should not exceed 20 °C, 25 °C, and 23 °C, in June, July, and August, respectively.
3. To protect primary-contact recreation, the geometric mean for E. coli should be < 77 CFU/100 mL. To protect drinking water sources, the 90th percentile E. coli count should be < 10 CFU/100 mL near

drinking water intakes. These statistics are to be calculated from at least five weekly samples collected within a 30-day period.

4. Monitoring to check for attainment of the objective should take place as soon as possible after ice-off to determine if any internal P loading is occurring over winter.
5. To protect drinking water quality total organic carbon (near water intakes) should not exceed a maximum of 4 mg/L at any time.

A minimum monitoring program is recommended in the MoE report, to determine if water quality objectives are being achieved.

With regard to septic systems, previous work on soil suitability for septic systems indicated unsuitable soils in some areas around the lake (see Map 3). At least one registered on-site wastewater practitioner has indicated that some soils in the area may be more suitable for on-site septic systems than Map 3 suggests.

A sensitivity model for the lakes in the Cariboo Regional District of BC was developed to assist with lake management. The model used three ratings to classify water quality sensitivity - high, moderate and low. Lakes with low sensitivity have a relatively high capability to assimilate additional phosphorus without a detrimental effect on lake water quality. Based on the sensitivity model, Lake Windermere, except for mean depth and watershed activity, falls into the low water quality sensitivity rating. By the same model, however, it may also be susceptible to localized problems since the lake has both an irregular shore line and a shallow littoral zone.

Water Quantity

The community has concerns about the water quantity in the lake, particularly in the face of climate change. Little information is available on water quantity for Lake Windermere. The Water Survey of Canada used to operate a water station at the north end of the lake at Athalmer (station 08NA004). Water quantity is not currently monitored in the lake. Increased demands on water resources throughout the watershed could have an impact on water levels in the lake over the long term. Such demands include an increasing population with greater demands for water, and resort developments and golf courses with high irrigation requirements.

A common public perception is that the lake depth is decreasing. It is assumed that this is due to lower water levels, potentially caused by climate change and water use, less flow into the system, and/or more sediment accumulation on the lake bottom. There have been no scientific studies on this topic.

There is a weir at the north end of the lake which has been there since the early 1900s. It was likely built so the lake could accommodate steamboats. The weir has a lower section on the east side to allow for boat passage. Some members of the public have suggested raising this weir as a way of increasing the water level in the lake. Some of the challenges related to this include:

- This would require analysis of the impacts on fish and wildlife, aquatic macrophytes, beaches, and shoreline condition, flood hazard, among other topics,
- There is no source of funding for such a project,
- An organization would need to take "ownership" of the weir, which would involve overseeing the capital costs and the operation and maintenance of the weir over time. There is currently no agency with responsibility for the structure, nor a foreshore tenure for the weir.

Flood and Torrent Hazards

Floodplain mapping has been undertaken by the Ministry of Environment for Lake Windermere (see Map 4). This mapping of the 200 year floodplain has been incorporated into the RDEK Upper Columbia Valley Floodplain Management Bylaw No. 1034. Under Section 4.02 (Floodplain Specifications), development proposed for the lake must comply with a minimum construction elevation of 802.5 metres Geodetic Survey of Canada datum (metres above sea level) and a 7.5 metre setback from the natural boundary of the lake. The DOI also uses a flood construction level of 802.5 m adjacent to the lake.

Hazards from torrents were identified in the Lake Windermere OCP (see Map 4). These have the potential to affect downstream land uses and lake water quality.

2.3 Habitat and its Management

Aquatic Macrophytes

Aquatic macrophytes or aquatic plants (often called “weeds”) exist in Lake Windermere largely because it is not a typical lake, but more like a large wetland with its fine substrate and shallow waters. The lake is ideally suited for aquatic plants due to its shallow waters and warm temperatures.

Aquatic macrophytes are indicators of lake productivity, and they provide excellent habitat for fish, birds and other species. This is because aquatic macrophyte habitat is rich in aquatic invertebrates and plankton, which are at the base of the food chain. Lake Windermere is a “virtual botanical garden” of aquatic plants, with a wide diversity of species including some that are rare (Rick Nordin, pers. comm.). A major concern is the introduction of invasive exotic species, which can take over new areas and displace native species. These are spread primarily by boats and by birds. Biologists indicate that public education is key to the management of aquatic macrophytes. There does not appear to be widespread appreciation of the importance of these plants.

The changes in diversity and abundance of aquatic macrophytes within a lake naturally wax and wane over time; long-term trends can be used as a tool to determine changes in trophic status and water quality health. This is the case especially at the north end of Lake Windermere where development is more prevalent. With an increase in lake nutrients, one would expect an increase in aquatic macrophyte productivity.

An assessment of aquatic macrophyte abundance was completed in 1999 (Courtney). The assessment was based on a review of aerial photography, and comparing the extent of aquatic macrophyte beds to

historical air photos. It appeared that the major aquatic macrophyte beds remained fairly constant compared to previous years.

The public perception is that the aquatic macrophytes are spreading from the south towards the north, and they are a nuisance to boaters. There has not been a scientific study to confirm or deny this. Some jurisdictions manage aquatic macrophytes around docks or marinas. Methods include bottom barriers, cutting with machines resembling giant lawn mowers, dredging, or managing the sediment transport to prevent deposition of fine materials. Some of the plants are floating and others are rooted in the bottom. Cutting the plants can cause them to root again, therefore fragmentation by boat motors may further their spread.

DFO does not support the extensive removal of aquatic macrophytes in Lake Windermere due to the habitat values. DFO will consider aquatic macrophyte removal consistent with the EKILMP guidelines, current and applicable DFO guidelines such as Regional Operating Statements and after considering the impacts to fish and fish habitat of any proposals to remove aquatic macrophytes.

Fish and Wildlife Habitat

A fish and wildlife habitat assessment of Lake Windermere was conducted by EKILMP so that shoreline management guidelines could be prepared using scientifically based rankings and identification of Zones of Sensitivity (ZOS) (Interior Reforestation Co. Ltd., 2008). The assessment involved: historical air photo analysis, field work and sampling, literature review, segment ranking for fish and wildlife using a Habitat Index (HI) analysis, and identification of fish and wildlife ZOS. Fish, bird, wildlife habitat/occurrence and aquatic invertebrate presence/absence data was obtained over a one-year period during the summer and fall of 2007 (see Map 5).

The historical air photo analysis revealed that in 1968 approximately 61% of the shoreline had already been disturbed and that by 1995 an additional 13% of the shoreline was disturbed (totalling 74% of the shoreline).

The fisheries sampling showed that a diversity of species inhabit the foreshore including seven native species (i.e., bull trout, kokanee[1], mountain whitefish, sculpin [most likely torrent sculpin], largescale sucker, redside shiner and northern pike minnow, of which the first three are considered sport fish) and two non-native species (i.e., largemouth bass and pumpkinseed fish). Based on the literature and historical findings, an additional seven species likely inhabit the lake (i.e., burbot, longnose dace, longnose sucker, peamouth chub, prickly sculpin, rainbow trout, westslope cutthroat trout). Some of these species are considered provincially and/or federally sensitive species (bull trout and westslope cutthroat trout) or regionally significant species (burbot) due to population declines.

Of all species, the redside shiners were most abundant, representing 88% of the fish community sampled. Largemouth bass followed, representing 6% of the total community. Sport fish (i.e., bull trout, burbot, mountain whitefish, westslope cutthroat trout, rainbow trout, kokanee) were either non-existent or were found in relatively low numbers. These fish are believed to be suffering population declines as a result of several human induced factors. They are also only expected to use the lake as a migration corridor through to their spawning grounds and for rearing. It is likely that largemouth bass and northern pikeminnow have replaced these historical sport fish as the key predators in the lake. The lake outlet downstream to Athalmer was identified as a culturally significant and important area for fish, requiring further study.

The wildlife study found 57 different species of birds, of which 54% were migratory species. Generally, the greatest diversity of birds occurred at sites offering undisturbed habitat structure, particularly vegetation components (including emergent aquatic vegetation, riparian vegetation, wetlands, native grasslands and forest). A literature review of badger and great blue heron habitat requirements indicated that these sensitive species could be negatively affected by development.

[1] Kokanee are considered a “native” species in the 2008 report, however they were introduced into this lake several decades ago.

A Conservation Data Centre query identified several potential sensitive species in the area, including: 1 nonvascular plant, 74 vascular plants, 8 invertebrates, and 24 vertebrates. Although detailed inventories for nesting birds and other plant and animals species were not conducted, the foreshore is expected to be important to many species, due to its diversity of high quality habitats. Wildlife trees were an additional habitat feature noted at several locations around the lake; these are considered important to wildlife and are deserving of protection.

The Habitat Index (HI) analysis used the physical characteristics of the shoreline and biological data to quantitatively rank the Ecological Value for each of the shoreline segments. The HI was designed in such a way that positive habitat features, such as shore type, extent natural, vegetation bandwidth and wetlands, added to the habitat value, while features such as docks, marinas and retaining walls decreased habitat value. Index parameters were weighted based upon their importance or overall contribution to fish and wildlife habitat. Results indicate that approximately 65% of the shoreline is Very High or High, 3% is Moderate and 32% is Low or Very Low value habitat. The areas of highest value generally occur along the undeveloped sections of the lake, or where disturbances were considerably set back from the shoreline. Residential areas generally had the lowest rankings.

The Ecological Potential for each of the segments was also determined by running the HI index with the negative instream structures removed (i.e., docks, groynes, marinas, boat launches and retaining walls). This provided a ranking showing what increases in value could be experienced with restoration. This analysis determined that with removal of instream structures such as retaining walls or groynes, the amount of shoreline ranked as Very High or High could be increased by 15% (or 5.0 km), the extent of shoreline ranked as Medium could be increased by 17% (or 6.0 km). Restoration would benefit all habitat types to some extent. Some additional opportunities for restoration include: native plant species revegetation efforts, stabilizing eroding bankslopes, replacing culverts with bridges at tributary crossings, removing wildlife barriers (e.g. fences), re-establishing lakeshore wetland features, and removing structures located on the land along the foreshore (e.g., decommissioning roads or railways).

Several habitats were identified as being highly important to fish and wildlife and sensitive to development. These ZOS habitats include: wetlands, creek mouths, native grasslands, wildlife habitats and corridors, gravel/cobble spawning habitat, biologically productive areas and unimpacted/natural areas. A discussion on the significance and sensitivity of each of these habitats is provided and all ZOS have been mapped. The intent of each ZOS is to highlight potential sensitive areas for fish and wildlife that may require assessment prior to development or where development should be limited.

Overall, this study revealed that there are still important and ecologically viable ecosystems in the area. With appropriate planning these can be maintained for the benefit of humans and animals. The results of this assessment are intended to increase the effectiveness and coordination of foreshore management activities at Windermere Lake, leading to improved ecosystem structure and function and integration of human use with environmental protection. Specifically, these results and the associated recommendations were intended for use in a guide which would direct decisions on areas where future developments could occur, areas requiring protection and suitable areas for restoration.

Shoreline Management Guidelines

Shoreline management guidelines for fish and wildlife habitats were prepared by EKILMP as a follow-up to the foreshore inventory and fish and wildlife habitat assessment (Interior Reforestation Co. Ltd., 2009). The guidelines are focused around the protection, conservation and restoration of important fish and wildlife values. EKILMP believes the guidelines will help focus where and how new development could be located and built on the lake while sustaining priceless natural public assets and maintaining the economic viability of the area. Current development pressures are considerable, and without appropriate guidance, the natural values of the area could continue to be eroded.

"Education not regulation on recreational use is the way to success The lake is for everyone."

Guidance in this document is provided through shoreline mapping which outlines different habitat value zones around the lake based on a Habitat Index analysis and measured Key Habitat Area features (see

Map 14). This approach provides a science-based assessment of habitat values. There are four zones with colour coding as follows:

- Red: very high or high existing ecological values that overlap with key habitat areas, identified as conservation / no development areas, 49% of the shoreline,
- Orange: key habitat areas, key habitat areas for fish and/or wildlife, most development proposals will trigger the requirement for an environmental assessment, 6% of the shoreline,
- Yellow: very high and high current ecological values, low risk development may proceed, high risk development will trigger the requirement for an environmental assessment, 27% of the shoreline,
- Grey: moderate, low and very low current ecological values, there is already significant impact from development, potential for development / redevelopment and restoration, 18% of the shoreline.

The risks of selected development activities have been determined for each zone, identifying activities which require additional review or consideration. A flow chart has been developed based on activity risk, which outlines the review process at a broad scale (see Appendix A).

This report only provides direction relating to fish and wildlife habitat values, and does not consider other development factors (such as erosion hazards, drinking water quality, navigation, social or economic considerations). Although some mention is made regarding potential permits required, the guidelines do not fully outline the regulatory permitting process.

2.4 Population and Land Use

First Nations

There are two First Nations with strong ties to Lake Windermere, the Akisqnuk First Nation and the Shuswap Indian Band.

The Akisqnuk First Nation is a member of the Ktunaxa Nation. The Ktunaxa are a culturally and linguistically unique group which has occupied the lands within the plan area for more than ten thousand years. The Ktunaxa people were nomadic and travelled throughout their traditional territory on a seasonal basis to correlate with the peak availability of plant and animal resources. The Lake Windermere area and the Columbia River are part of the Ktunaxa Creation Story (www.ktunaxa.org/who/creation/html). The current Columbia Lake Indian Reserve #3, located on the south-east shoreline of Lake Windermere, was established by the Indian Reserve Commission under the *Indian Act*.

The Akisqnuk will likely plan additional on-reserve development in the future. Given that the Reserve has a significant amount of lakefront, it is reasonable to expect that the planning will include proposals for additional foreshore development and lake access.

The Shuswap Indian Band is a member of the Shuswap Nation, an Interior Salish group. The Shuswap Indian Band lives in the Windermere Valley and is sometimes referred to as the Kinbasket people. The current Shuswap Indian Reserve, located north of Lake Windermere, was established by the Indian Reserve Commission under the *Indian Act*. The development arm of the Shuswap Indian Band is involved in water and sewage utilities that service both on-reserve and some off-reserve developments on the upland north east of Lake Windermere. The Shuswap Indian Band have a boat launch and interpretive features north of Athalmer Bridge, outside the plan area adjacent to the Columbia Wetlands WMA.

Settlements

Settlement around Lake Windermere is concentrated at the north end of the lake. Along the north and northwest shore is the District of Invermere, containing a community of multi-family and single family developments. These are owned and occupied by year-round residents as well as some part-time recreational property owners, the latter mostly near the lakeshore. The residential development in Invermere ranges from older and newer single-family neighbourhoods to some multi-family complexes, some of which are along the shoreline.

The northeast shoreline, which is within the RDEK, is also highly developed. A high percentage of the property in this area is recreational. There are some older subdivisions of cottages, some now being redeveloped, along the shoreline. There are also large relatively new planned developments; these are mostly upland, with some extending down to the shoreline. The historic town-site of Windermere is located near the centre of the lake on the east shoreline.

Small pockets of development also exist along the west shore at the south end of the lake, and within the Akisqnuk First Nation Reserve on the east shoreline.

Farther away but within the watershed and upstream of the lake, there are various other settlements, including resorts such as Fairmont and several golf courses. The runoff from golf courses and other manicured landscapes has been a concern due to the use of fertilizers and other chemicals. Some of the golf courses and residences have been working to reduce their nutrient runoff, however this approach is not universal.

Demographics

Rapid development occurred around Lake Windermere in the late 1990s due to the growing popularity of the area as a recreation, tourism and retirement centre. Alberta's strong economy and the growth of the City of Calgary have been key factors in increased development around the lake. The Lake Windermere area has increasingly become recreation and investment oriented with the

majority of new residential units being used for seasonal, rental or second home purposes. The 2006 Census results indicate that the permanent population represents approximately 0.8 persons per dwelling unit, which is far below the provincial average of 2.28 persons per dwelling unit.

From 1989 to 1996, 60% of purchasers in the Radium to Fairmont corridor were from Alberta, and non-resident purchasers were the majority of buyers of waterfront locations. Property market activity increased significantly between 2000 and 2005, with mean residential prices doubling in the overall area. (How Growth in the Recreation and Resort Property Market is Driving Change in the East Kootenay Region, Real Estate Foundation, 2006). From 1995 to 2005, property values increased on average by approximately 300%.

Almost all of the residential growth in the Lake Windermere area has occurred within the DOI and on the east side of the lake. New development has shifted from being primarily low density single family to an increasing demand for a range of densities and multi-family development, due to lower capital and maintenance costs. In late 2008, development slowed due to a struggling global economy, however as the economy improves, it is expected that interest in development around Lake Windermere will be renewed.

The number and location of permanent residents may be changing. It is expected that as the population ages and the popularity of small communities for retirement increases, so too will the number of permanent residents living around the lake. This may result in a more dispersed population of permanent residents around the lake than the current settlement pattern. However, it is expected that the recreational property market will continue to be strong.

Agricultural Land

The majority of undeveloped land east of Highway 93/95 is within the Agricultural Land Reserve (ALR) as are most of the lands on the west side of the lake (see Map 6). Agriculture in the area primarily includes crops, Christmas tree production, other types of nurseries, alfalfa, and cattle ranches. Opportunities for farming are limited by the terrain, lack

of irrigation infrastructure, and encroaching non-agricultural development.

ALR lands will serve to limit future non-agricultural development in the uplands. Lands within the reserve are regulated by the Agricultural Land Commission and are intended for agricultural uses. The public has indicated support for maintaining agricultural land uses around the lake for numerous reasons including: maintaining the rural atmosphere of the area, supporting the farming community, retaining green space, preserving wildlife habitat, and maintaining areas for outdoor recreation. There are also concerns that phosphorus loading from agricultural sources and natural runoff from agricultural areas are a major nutrient source for lakes. The RDEK has no jurisdiction over agricultural-related phosphorus inputs.

Water and Sewage Treatment

The District of Invermere has a municipal water system and a sewage collection, treatment, and disposal system. Some of the developments within the RDEK are serviced by the following community systems:

- Kinbasket Water and Sewer Company Ltd. – owned by the Shuswap Indian Band, this utility provides water and sewage treatment to its own reserve, and works in partnership with the RDEK to provide water and sewer services to off-reserve developments. The water is drawn from deep aquifers.
- Windermere Water and Sewer Company Inc.– this private utility, using water drawn from Lake Windermere, provides water and sewage treatment to some of the developments on the east side of the lake. With recent upgrades to infrastructure, the utility has the capacity to service additional developments. The utility is working in partnership with the RDEK to service some existing and new developments on the east side of the lake.
- RDEK – the regional district's water systems service Holland Creek, Timber Ridge, Rushmere and Windermere town-site.
- Other Private Utilities – there are other private water and sewer systems servicing specific developments (e.g., Akiskinook, Terra

Vista, Coldstream Landing). The overall situation is that some developments in the RDEK have community water and sewer systems, some have water only, and several areas have neither community water nor sewage treatment and are dependent on private wells and on-site sewage treatment systems (see Map 7).

The subdivisions without community sewage systems are a concern with respect to the potential for leaching of sewage into Lake Windermere. These developments use domestic septic fields for wastewater disposal, and some of these subdivisions are located on soils with poor suitability for septic fields, due to limited water percolation rates and nutrient absorption capacities. Some property owners have installed new Type 2 or Type 3 sewage treatment systems which provide a high level of treatment. However, the 2005 Lake User Survey indicated that some property owners, particularly those accustomed to urban living, are unaware of the need to service their septic systems.

Another concern is that smaller summer cabins around the lake are increasingly being redeveloped as larger full-time homes, in some cases using the septic systems that were designed to support smaller, seasonal cabins. While sewerage regulations limit the number or rooms to those of the original dwelling, year-round use has the potential to shorten the lifespan of existing septic fields.

Larger building footprints may also reduce the amount of permeable surfaces for water percolation and therefore phosphorus absorption. An associated increase in stormwater runoff may cause channelling and slope failure as well as increase the amount of nutrients entering the lake.

A further complicating factor is that many temporary accommodation units are being rented or leased on a semi-permanent or permanent basis. These units are being occupied almost continuously during the summer months and occasionally during the winter. The continuation of these trends could lead to a higher permanent population inhabiting areas that do not have the capacity to adequately manage the sewage.

The Guidelines for Canadian Drinking Water Quality (GCDWQ) are used by Health Authorities and other agencies to assess the safety of drinking water from surface sources and to help determine treatment

needs. All water suppliers using surface water must provide disinfection. The GCDWQ recommends surface water must also be filtered, unless it meets four exclusion criteria. To help determine if a water system is capable of being kept safe from pathogens, the IHA developed the "4.3.2.1.0 Drinking Water Objective." The objective is derived from the GCDWQ and other industry and regulatory practices:

- 4 refers to the inactivation of viruses,
- 3 refers to the removal or inactivation of parasites,
- 2 refers to two treatment processes for all surface water or unprotected groundwater,
- 1 refers to maintaining a turbidity of less than 1 NTU, and
- 0 refers to indicators of bacterial contamination either Fecal Coliform or E. Coli bacteria.

The 43210 Drinking Water Objective does not detect or remove any other chemicals.

A number of the surface water systems in the Lake Windermere area do not meet the 43210 objective because of their treatment processes, therefore there are risks associated with the surface water. Some of the water systems experience turbidity; a water quality advisory has been in effect for several water systems for some time because the turbidity parameter is often exceeded. The Windermere Water and Sewer Company and the RDEK Rushmere water systems do meet the 43210 objective, and other water systems are actively working to address this issue and to meet the water quality objective.

2.5 Water and Lake Use

Lake Water Use

The Water Stewardship Division of the Ministry of Environment provides licences for the use of lake water. Figure 5 provides a summary of the current licences and approved applications for Lake Windermere as of December 2009.

Type of Licence	Number of Licences	Quantity	Units
Domestic	18	54.5	cubic metres/day
Irrigation	8	1,964,325	cubic metres/year
Land Improvement	3	6,167	cubic metres/year
Stock Watering	3	320,705	cubic metres/year
Waterworks	17	16,593	cubic metres/year

Figure 5: Water Licences

Lake Use

Lake Windermere has two seasons of use: summer and winter. Summer is the primary season for recreating on the lake. The predominant summer uses are motor boating and associated towing activities, non-motorized boating, swimming, and beach use. Winter uses include fishing in huts, Nordic skiing, skating, snowmobiling, and driving across the lake. This section reviews summer use first, beginning with the infrastructure that supports the use.

Marinas

There are 12 marinas on Lake Windermere, including Coldstream Landing, which is under construction (see Figure 6 and Map 9). Although most of the marinas have existed for many years, there is a trend towards increasing numbers of marinas and slips. In 2001, the lake had 250 slips; in 2005 there were 628.

There are also some incomplete projects and pending applications. Coldstream Landing has approval to build 32 slips and with those complete, there will be 692 overnight slips on the lake. Applications for Canterbury Point for 20 slips and for an expansion to Trethewey have not been accepted to date.

Pete's Marina is the only public marina, and it is located in an environmentally sensitive area where strong currents make launching difficult, and it is surrounded by private land that is slated for development. The marina has many years remaining on its foreshore lease, however the upland portion of the marina is owned by the DOI, and it is on a year-to-year lease. The DOI hopes to relocate the marina. The condominium development at the north end of the lake is interested in a private marina where Pete's is now.

Crown Land File #	Marina	Private/ Public	Number of Slips	Length of Operation	Type of Tenure	Is it at Capacity?
0337989	Akiskinook	private	110	17 years	Lease (Strata mgmt)	Probably
4401233	Windermere Community Association Docks	private	28	22 years	Licence	No - 32 Berth capacity
0335514	Cardiff Cove	private	15	30 years	Licence	No - expansion desired
4403387	Hidden Bay Marina	private	45	10 years	Lease	Probably
	Terra Vista	private	79	33 years	Tenure - 5 year renewal term	
4402953	Shadybrook Resort	private	75	40 years	Licence - applying for Lease	Probably
347714	Timber Ridge	private	111 5 (day)	25 years	Lease	Probably
4403391	Indian Beach	private	53	25 years	Lease	Probably
0278645	Pete's Marina (Lake Windermere Garage Ltd.)	public	27	22 years	Lease	Probably
4420480	Invermere Bay	private	39	30 years	Lease	Probably
44020931	Trethewey	private	88	14 years	Licence	application for expansion submitted Feb 2009
4404527	Coldstream Landing	private	32	2 years	Licence	Probably
4404819	Canterbury Point application, Section 16	private	20	New	on hold	Probably

Figure 6: Marinas

There are differences in accessibility of the marinas to the public from the upland. About half of the marinas are accessible to the public from the upland on public roads. These include: Windermere Community Association, Cardiff Cove, Hidden Bay, Pete's Marina, Trethewey, and

Canterbury Point. The other marinas, Akiskinook, Terra Vista, Indian Beach, Shadybrook, Timber Ridge, Coldstream Landing, and Invermere Bay, are only accessible from the upland through private land.

Except for Invermere Bay and Pete's Marina, all of the marina facilities are located along the east side of the lake. The greatest concentration of marinas is north and south of Windermere. Most of the private marinas provide boat launches, docks and on-water boat moorage during the summer months. The demand for boat slips far exceeds supply. In most cases, one has to own property within a development to qualify for a boat slip. Only two marinas on the lake sell fuel: Shadybrook and Pete's Marina.

Most of the marinas have licences of occupation or foreshore leases. Numerous additional licences of occupation exist along the east and west sides of the lake for private boathouses, the intake pipes for the Windermere water system, and public beaches (see Map 8). While these licences may permit structures on the foreshore, if permission is obtained, they do not permit the licence holder to restrict the use of or access to the adjacent foreshore including beaches.

Boat Launches

In addition to the private boat launches, there is one official public boat launch, at Pete's Marina (see Map 9). As mentioned previously, this is not an ideal location. In addition to the boat launches identified, there are places where boats are launched on an informal basis, including at the foot of 3rd Avenue in Invermere, where the DOI has a right-of-way down to the waterfront. There is also launching at some of the public access points / road rights-of-way. Baltac Road is one of the few deeper water launches, however there is minimal space for parking. Boats are also launched at the foot of Ash Street, Trethewey, Calverly Beach, and Coy Road. The DOI has a tenure for a boat launch in Taynton Bay at Kinsmen Beach, however this was closed due to boat congestion combined with swimmers in the area.

The 2001 Lake Strategy conducted an analysis of potential boat launch locations based on a set of criteria. Based on the analysis, no one location met all of the criteria. James Chabot Provincial Park and

Kinsmen Beach met the same number of criteria. Based on input from the public associated with the preparation of the strategy, a boat launch at Kinsmen Beach was not supported. Local residents use this area extensively and they did not want to see more boat traffic introduced into the area. James Chabot Provincial Park was the preferred location according to that study, however the sensitive bird habitat (adjacent to an osprey feeding area) and proximity of a public swimming beach were noted as limiting factors.

Mooring Buoys

Because boat slips are so limited in supply in relation to demand, many boaters have set up mooring buoys on the lake (see Map 9). In addition to the mooring area identified, there are many other locations with mooring buoys, some of which belong to the owner of the adjacent private property, and others which are placed by boaters who don't own property on the waterfront.

Mooring buoys are a concern across the province, since people are permitted to place them provided that they meet the Private Buoy Regulations in the *Canada Shipping Act*, 2001. Some of the requirements in the regulations include: not interfering with navigation, selection of certain types of sizes of buoys, and specific identification markings with owner's name and contact information. The mooring buoys are scattered in various locations on Lake Windermere, with a significant concentration of them in the Baltac Road area. There were numerous complaints about the buoys raised during public consultation. Typically a high percentage of private buoys don't conform to the regulations (Transport Canada, pers. comm.).

Number of Boats

Another topic repeatedly raised by the public was concern about boat congestion on the lake. The Lake Windermere Project conducted boat counts on selected days from 2005 to 2008 from a high point of land from which most of the lake is visible. Counts were conducted on selected weekdays and weekends between the May long weekend and Labour Day. The counts were completed from 10 a.m. through 5 p.m. once on the hour, for a total of 8 counts per day. These numbers were used to generate a maximum and median number of boats for each day.

The type of watercraft was also noted in each count. Figure 7 illustrates the average counts for each type of watercraft for the three years with sufficient data. The primary notable trend is an increase in the number of personal watercraft (i.e., Jet-skis, Seadoos, Wave Runners). These are a concern to most other types of lake users due to their speed, noise, odour, and conduct of some users.

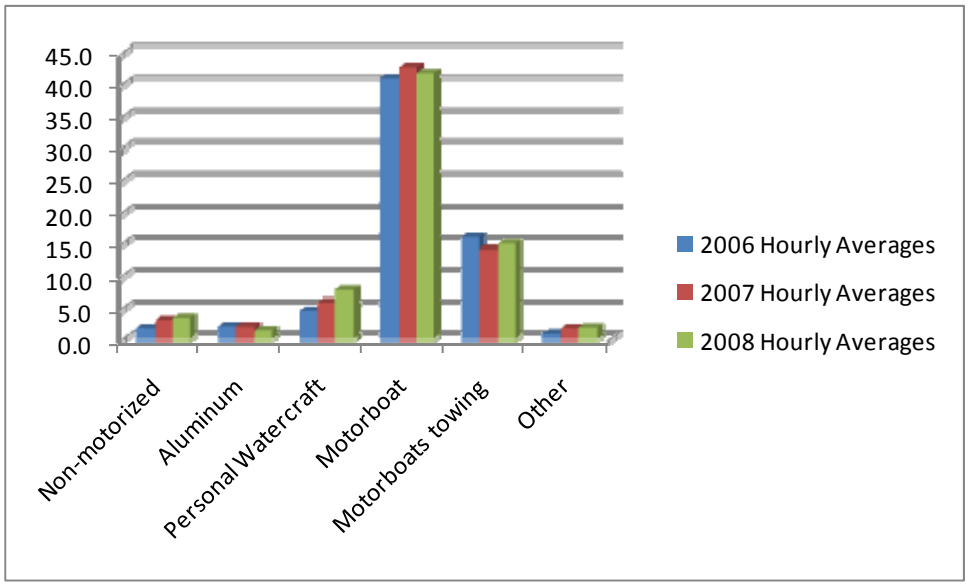


Figure 7: Trends in Types of Watercraft

Further analysis was conducted by Shadybrook Marina personnel by correlating the counts of motor boats with fuel sales, then extrapolating those figures to estimate the maximum and median number of boats on the lake every summer day from 2006 to 2008 (see

Figure 8). These figures are likely relatively accurate since Shadybrook sells the majority of the fuel on the lake, and calculations using the formula were similar to the boat counts conducted by Wildsight.

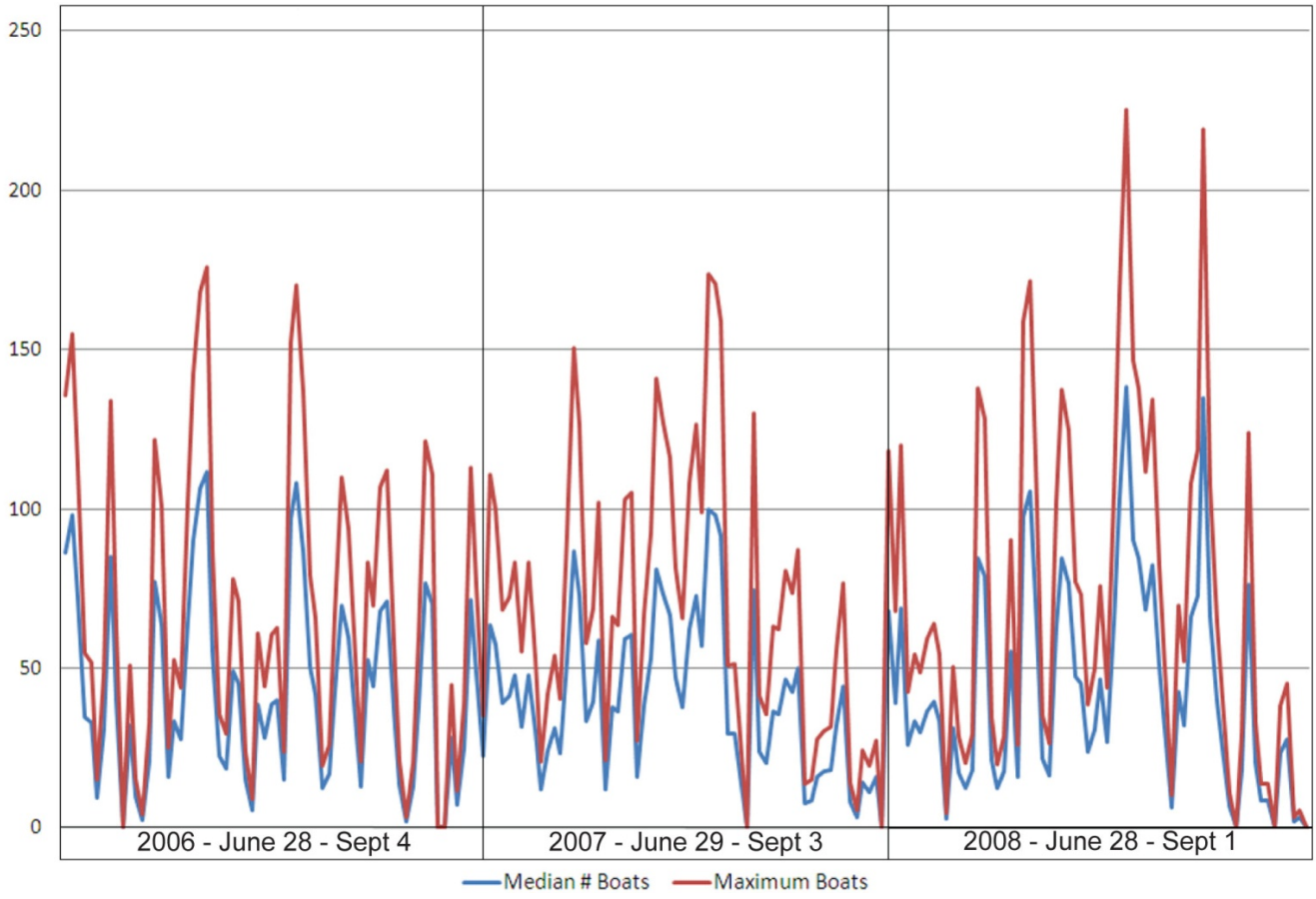


Figure 8: Boating Use

Observations related to the analyses above are as follows:

- According to Shadybrook Marina personnel, the quality of the **motor boating** experience is diminished when the number of motor boats exceeds 125. In 2006 and 2007 there were 9 such days each year. In 2008 there were 13 days with that many boats. This is highly subjective, however it correlates with general comments about the number of days with excessive boats from the perspective of motor boaters. Swimmers and non-motorized boaters likely have a lower tolerance.

- Even on the busiest days, there are good conditions for boating and other activities available before 11 a.m. and after 7 p.m when there are generally fewer motor boats on the lake.

There is some self regulation that occurs naturally since boating is not as enjoyable when the lake is overcrowded. People will choose to wait for a quiter time. Another trend is that non-motor boaters such as kayakers sometimes use the wetlands north of the lake, partly to avoid the motor boats.

Boating Characteristics

The types of boats and recreational activities on Lake Windermere have changed significantly over the past few decades. Whereas prior to the real estate boom, according to long-time residents, small motor boats, sailboats and non-motorized boats such as canoes and kayaks were prevalent, now wake boats are the norm. The purpose of these boats is to produce as large a wake as possible to support the activities of skiing, wakeboarding and wake surfing.

The trends in boating, which are common throughout the B.C. Interior and in fact North America, are often associated with gatherings of people, loud music, and a party atmosphere. This type of boating and associated behaviour is not appreciated by those who aren't involved in or interested in these activities. On the other hand, boating and associated tourism activities are a primary component of the area's economy.

It is important to recognize that most of the boats on the lake don't have washrooms. This makes the accessibility of tie-up locations with public washrooms an important infrastructure opportunity, with the potential for associated tourism-related attractions.

Inappropriate boating behaviour is a hindrance to other motor boaters, as well as to those who seek more quiet experiences. As of September 2009, everyone who operates a motorized pleasure craft must carry proof of competency on board at all times. This new regulation is expected to make it somewhat easier to manage for boating safety.

"My biggest concern is excessive numbers of boats which could result in collisions."

There are other boating regulations that have been in place for many years. One of the most relevant is that speed is limited to 10 km/h within 30 m from shore, except for: waterskiing, where the boat follows a trajectory perpendicular to the shore, rivers, and in waters where another speed is prescribed under a schedule to the regulations. This regulation is not well known or respected among motor boaters.

Enforcement is challenging since there are limited resources available. The RCMP has a boat moored on the lake, and is responsible for enforcing boating regulations and alcohol consumption. Conservation officers are responsible for enforcing fishing regulations and other environmental infractions.

Some of the other trends in boating and lake recreation include the increasing use of personal watercraft. These are subject to the "proof of competency regulations" for boating, except for rentals, which require a rental safety checklist instead (this is the case for rental boats as well). There are two businesses near Lake Windermere that rent personal watercraft. An additional concern with personal watercraft is that they venture where boats cannot, potentially causing environmental impacts in wetlands and other habitats.

There are some types of boats and activities that are becoming common elsewhere that have not yet appeared on Lake Windermere, including:

- Houseboats: these are boats that typically have sleeping, cooking, and bathroom facilities on board.
- Cigarette Boats: these are long, fast, noisy boats with long noses that are gaining popularity in the Okanagan. Wake boats (the primary type of motor boat on the lake) are a maximum of 25' long and 320 HP, which is significantly less than cigarette boats.
- Towing at Night: Wake boats now come with powerful light systems that make night time surfing possible. This raises safety and noise concerns.

- Alaska Airboats: these boats are now being manufactured in Cranbrook. The engine turns a large fan on the flat-bottomed boat, enabling it to travel quickly through rivers and up onto beaches.

It is important to consider boating from a regional perspective. Many boaters on Lake Windermere are from Fairmont, and they come to Lake Windermere since Canal Flats is the closest boat launch on Columbia Lake and it is farther to drive there than to Lake Windermere. A boat launch at the north end of Columbia Lake could help to alleviate boat pressure on Lake Windermere, however there are challenges related to the railway tracks, Columbia Lake Provincial Parks, and First Nations' concerns. If a boat launch on Columbia Lake could be achieved, it would help to distribute boats between the two lakes. Many of the other smaller lakes in the region do not permit motor boats.

Swimming and Beach Use

Certain areas are extremely popular for swimming, floating in the water with various inflatables, and beach activities. The most popular locations are Kinsmen Beach and James Chabot Park which have been reported to have about 300 and 150 visitors respectively on warm summer days (Wildsight, 2005 – 2007). Windermere Public Beach is the next most popular site, with about 60 people reported on warm summer days. The various private beaches are typically used much less. Special events would of course boost any of these numbers.

There is no swimming pool in Invermere, so the lake is the only location for swimming, including training for serious swimmers. A group of triathletes train at Kinsmen Beach.

Fishing

There is not much fishing on Lake Windermere in the summer. This is primarily because the density of boats makes fishing challenging. There is some fishing for bass in the early morning and evening. Other than the burbot fishery being closed, the lake has a "general quota" for fishing and most people don't catch their limit.

Winter Uses

Traditional winter uses of Lake Windermere are fishing, snowmobiling and driving on the frozen lake. There are also two organized events: curling and golf.

Residents place huts on the ice for fishing; a party atmosphere sometimes accompanies the use of these huts. The fishing huts are sometimes fairly large, elaborate structures, often with stoves. Many of the ice fishers drive to their huts. It is typical for there to be about 30 huts on the lake in the winter. Some of the issues related to the fishing huts are: garbage, access by vehicles, disposal of human waste, and the fact that each year there is at least one hut that sinks because it is not removed before break-up. Bonfires are another traditional use of the lake, sometimes lit by gatherings of ice fishers. This likely causes some contaminants to enter the water.

There is no agency with responsibility for managing the ice huts. The Conservation Officers informally keep track of the huts and their owners if they have the time available for this. The Province has indicated that they do not likely have the capacity for managing the huts (Harry Mitchell, pers. comm.).

In addition to driving vehicles to fishing huts, there is a so-called "winter road" crossing the lake. The main route is from Kinsmen Beach to Windermere, however there is easy access onto the lake in many locations. This is not actually a sanctioned "road" according to the Ministry of Transportation. ICBC basic and optional insurance does include coverage for driving on frozen lakes.

Questions have been raised about the liability associated with the use of this route. Not only are there concerns with vehicle loss or damage, but now that non-motorized use of the lake is increasing, there is an increased risk of accidents harming lake users. The DOI has a gate limiting access at Kinsmen Beach, however the bolt has been cut repeatedly. The Invermere Fire Department and ambulance services won't venture onto the ice with their vehicles. The RCMP has snowmobiles and ice rescue service is also performed by the Windermere Fire Department.

In recent years a “Whiteway” has been established on the lake. It is a large maintained loop at the north end of the lake to support Nordic skiing and skating. Initiated by user groups and partially funded by the DOI and RDEK, this has been extremely popular and successful, however infrastructure is minimal. People take their dogs onto the lake, and the DOI is planning to install garbage/recycling containers and dog bags in the future. Washrooms would also be a benefit since the loop is quite long. Frequent users have indicated that the Whiteway has reduced inappropriate behaviour on the lake. There are some complications in management due to the fact that most of the Whiteway is beyond DOI jurisdiction. To support winter use of the lake, the DOI also plows and maintains a skating rink at Kinsmen Beach.

Water Access

Public access to the foreshore of Lake Windermere is an important concern for local residents and visitors. As more homes are constructed in the area, demand for access to the lake for recreational purposes increases. As recreational use of the lake increases, so too does the need for infrastructure such as parking and sanitary facilities. Increased development along the shoreline may reduce opportunities for the public to access the foreshore as well as reducing the land available for supporting facilities.

Parks and other public lands adjacent to the foreshore exist at several locations around the lake. James Chabot Provincial Park and Kinsmen Beach are located at the north end of the lake within the District of Invermere. On the east side of the lake are the regional park at Windermere and the Windermere cemetery. The southeast corner of District Lot 4616 on the west side of the lake is Crown land west of Westside Road with a small portion along the southern boundary of the lot extending across the railway tracks to the lake shore. Windermere Lake Provincial Park (Sunshine Ranch) is located on the west shore near the south end of the lake.

There are also numerous theoretical public access points (see Map 10). Most of these consist of 20 metre wide public road rights-of-way, or other access points that were required during subdivision. Most of the upland around the lake is private, and one of the requirements for

subdivision is lake access. In incorporated communities, such as DOI, this requirement is 20m of public access for every 200 metres of subdivision along the shoreline. In unincorporated rural areas, the requirement is 20m of public access for every 400m of shoreline. In many cases, these public access points are not only unusable, they are also indiscernible for the following reasons:

- the access does not correspond to topographical features, e.g., it is a steep slope,
- the space is too small for public use,
- the public access is not identified as such,
- adjacent landowners have "taken over" the access with their own improvements or barriers to public access,
- the road right-of-way is used for other purposes, such as parking, making it unavailable for public use.

In some cases, resident associations dissuade others from using public access points.

Although the MOT has detailed maps of all of the public access points, little is done to manage these unless there is a complaint. Through the Windermere Foreshore Initiative project, MOT is attempting to address issues along the lake at Columbia Avenue in order to protect public access and address trespass concerns.

2.6 Lake Management

Foreshore Tenure

Any permanent structure constructed on the foreshore requires approval from the Province (ILMB), through Front Counter B.C. Individuals, corporations, societies and local governments may apply to ILMB for a foreshore tenure to use the lands (and water) waterward of the natural boundary. Tenures can be a licence of occupation or a foreshore lease, which may be granted for developments such as: private wharves or docks, floating structures, retaining walls, water intakes, boathouses, and marinas.

In theory the public still has access privileges to the foreshore once a private foreshore lease has been issued. The private development of the foreshore should not prevent public access to or along the shoreline, although public access may be locally restricted due to safety considerations. Unfortunately, many private developments provide the "impression" that the foreshore is not available for public use.

There are a significant number of tenures and structures on the northern half of the lake, both on the east and west sides, however a low percentage of the existing structures have been legally constructed. In 2008, the Ministry of Environment conducted a compliance review of shoreline tenures around the province. On Lake Windermere, 23 properties were randomly selected for review. On these properties, there were 55 modifications which should have had authorizations, 11 authorizations had been granted between 2003 and 2008 under the *Land Act* or the *Water Act*, and 7 of the works were compliant with the terms and conditions of the permit. Although some permits may have been granted prior to 2003, the results confirm the low level of compliance with tenure requirements.

There is some uncertainty regarding foreshore and riparian rights with respect to the Columbia Lake Indian Reserve. The Akisqnuk First Nation believes that the foreshore fronting the Reserve is under their jurisdiction. Whatever the legal status and jurisdiction is of the foreshore, this plan acknowledges the interests of the Akisqnuk in managing the foreshore fronting the Reserve for the purposes of economic development and environmental stewardship.

Riparian Rights

Just as there are methods for providing public access to the foreshore, the ownership of waterfront property is associated with a bundle of common law rights to the foreshore called "riparian" or "littoral" rights, including the following:

- Right of unimpeded access to and from every point along the waterfront to deep water for the purposes of navigation. As a result, third-party improvements cannot be constructed along a waterfront property if they interfere with landowner's access.

- Right to protect private property from erosion, so long as protective works are constructed entirely on private land.
- The right to acquire land that may build up in front of private property through natural processes of accretion, deemed to be depositions to the upland.

Riparian rights do not preclude the requirements for provincial approval for development on the foreshore. Where possible, public access along the foreshore must still be provided for within the tenure agreement.

CPR Legal Survey Lots

In addition to the railway right-of-way, Canadian Pacific Railway (CPR) owns legal survey lots along the tracks on the west side of the lake. These lots are private property and according to ILMB, the CPR has riparian rights and the right to control rail crossings at these locations. Much of the access to the lake from the west is therefore constrained by the CPR's control of rail crossings.

CPR will consider proposed railway crossings on a case-by-case basis and, if approved, will require that the applicant enter into a private crossing agreement. Pedestrian crossings are easier to achieve than vehicular crossings, often because of fewer safety considerations as well as the reduced amount of land they require on either side of the tracks. On Lake Windermere, because the tracks are often directly adjacent to the foreshore, the provision of private crossings may be difficult due to the combination of safety and environmental considerations.

Lake Windermere Project

The Lake Windermere Project (LWP) was developed in 2005 and represents the interests and actions of more than a dozen partners, including all levels of government, local non-government organizations, and the public. The project emphasis is the protection and enhancement of the quality of Lake Windermere by means of inter-agency cooperation, scientific water quality monitoring, and through public education and engagement.

In its final year, the Lake Windermere Project is handing the program over to the community under the direction of the Lake Windermere Ambassadors (Ambassadors), a group of citizens representing a cross-section of stakeholders including the business community, Chamber of Commerce, local government, First Nations, recreation (area golf courses and ski hills), second homeowners, local residents, and youth.

The mandate of the Ambassadors is the protection of the lake in perpetuity. The tools created by the Lake Windermere Project will enable the community to continue water quality monitoring and delivering water stewardship education programs beyond the completion of the program in 2010. The Ambassadors have committed to directing future water quality monitoring, ensuring the policies and guidelines resulting from LWP are followed, and continuing to engage the community in a water stewardship dialogue.

The Ambassadors are an established community group with interests in implementing the management and stewardship goals and objectives reflected in the Lake Management Plan.
They are requesting to be designated as the Lake Management Committee discussed later in this plan subject to appointment by the Regional District of East Kootenay and the District of Invermere. Expert resources have been identified by the Ambassadors, and are willing to assist the community, e.g., the University of Waterloo, Water Governance and Policy Group, the POLIS Project on Ecological Governance, and the Columbia Basin Trust.

3.0 ANALYSIS

3.1 Public Consultation

"The lake is a place to find restful moments, enjoy the natural habitat, recreate sensibly with friends and family."

The public consultation process that accompanied the preparation of the LWMP occurred in two phases. There were two public workshops in July 2009, with website information and distribution of a comment form. The second phase involved two public open houses, in Windermere and Invermere in June 2010, to present the draft plan. The initial public workshops generated information which has been directly incorporated into perceptions about the lake, described later in this section, as well as the vision and objectives in section 4.0.

The comment form which was distributed at the first set of public workshops and on the RDEK website yielded 607 responses. The high return rate was partly the result of distribution of some misinformation by boaters regarding the purpose of the LWMP. The anticipated challenge obtaining interest and participation by boaters was solved by this occurrence.

The responses represented a range of lake users and primary interests. Common themes were evident throughout the responses particularly with respect to the valued aspects of the lake and concerns about the lake. The most valued aspects of the lake are its recreation opportunities, clean water, healthy environment, social connections, and its role as the economic base for the region. Common concerns are the impacts of activities and upland uses on water quality, safety in the water, the lack of public access to the lake, and the challenges related to management and enforcement.

Respondents were also asked to identify their level of support for a range of potential management options that could be applied to the lake. The following are the most supported and least supported options.

Most Support (in order of number of people in support)

I value the healthy water for drinking, recreating and wildlife"

- Continue water quality monitoring and analysis
- Monitor and manage weed growth
- Continue new community sewer systems
- Community sewer required for any new development over 5 lots
- Public education program
- Enforce requirement for all foreshore works to obtain approval
- Construct a new public boat launch
- Require all marinas to adopt and publicize best management practices regulations
- Develop environmental management guidelines for agricultural land
- Better lake access and more public beaches – part of negotiation for any new developments

Least Support (in order of number of people in opposition)

- Prohibit water skiing or similar towing
- Limiting power driven vessels to electric battery motors
- Keep boats out of the water as much as possible, e.g. at night, storage
- Fuel boats only on land, not on the lake
- Limit engine power, e.g. maximum needed for water skiing
- No new structures of any kind
- Daily designated times for no motors or slow no-wake (e.g. 7:30 pm to 11:00 am)
- Maximum size boat motor (e.g. what's needed to water ski)
- Limit wake height
- No personal watercraft (jet skis)

Attitudes

"The majority of my time spent in Windermere is on the lake (boating) and in the past few years there seems to be overcrowding on the water, creating safety and environmental concerns."

The numerous open-ended questions on the comment form provided ample opportunity for respondents to express their attitudes about Lake Windermere. Many people voiced attitudes of care and concern, and a willingness to participate in changing behaviours and management to improve conditions for people and the environment. A minority of respondents expressed opposition to a management plan, and beliefs that property owners should have greater rights to the use of the lake than others. The concept that the lake is not an "owned" resource is not apparent to all lake users.

3.2 Most Valued Aspects of the Lake

"We value our lake as both an environmental asset and a wonderful source of recreation for everyone"

Many residents are passionate about Lake Windermere. Although people define some values differently, based on their own interpretations and perceptions, generally there is significant consensus about the values. The following is a summary of the most valued aspects of the lake, based on public workshops, comments on the public surveys, and input from the Advisory Group:

- **Environment**: the lake is valued for its clean water, healthy environment, rich ecosystems, natural spaces, fish and wildlife, biodiversity, and as a drinking water source; it is also recognized as a climate regulator;
- **Recreation**: the lake is appreciated for the diverse, year-round recreational activities that it supports, with uses including: boating, fishing, swimming, hiking, star-gazing, enjoying wildlife nature, Whiteway skating and skiing, fishing in huts, and snowmobiling; the characteristics of the lake that support the recreational experiences include: scenic vistas, quiet, peacefulness, relative safety, and pleasant summer water temperature;
- **Social**: the lake and its setting bring people together as a community; there is an identifiable lake "culture", and long-time families feel a strong connection to the area; for others the lake is a source of spiritual renewal, a link to historic values, and a base for education opportunities;

- **Economic**: Lake Windermere is one of the primary economic drivers of the region, partly for the characteristics noted above and also due to its proximity to Calgary; the tourism/ecotourism opportunities help to support the local economy.

3.3 Concerns about the Lake

"I'm worried that the quality of the lake is deteriorating in so many ways"

Many residents also have significant concerns about Lake Windermere. Even though people may have different interests, there is significant consistency in their concerns. The following is a summary of concerns about the lake, based on public workshops, comments on the public survey, and input from the Advisory Group:

- The following **activities** and **land uses** are of concern due to their potential impacts:
  - Leaching from septic systems can cause water pollution; the lake smells in spring when there has been minimal flow;
  - Motor boating can have negative effects on human use and enjoyment, as well as on wildlife, water quality and air quality due to noise, speed, large wakes and occasional erratic use (concerns include safety for swimmers, shoreline erosion, potential for collisions due to excessive numbers), fuel spills, and engine exhaust; rentals are of particular concern since renters tend to be less familiar with codes of conduct and the values of the lake and renters don't require a Boat Operator License;
  - Personal watercraft have similar impacts to boats, with the primary concerns being noise, speed, and air pollution; some specific issues are safety (e.g., users sometimes try to ride the wakes of boats) and environmental impacts since they can go where boats can't go; rentals are of particular concern since renters tend to be less familiar with codes of conduct and the values of the lake;
  - Proliferations of mooring buoys cause safety concern for lake users, and they "shrink" the perceived width of the lake;

- Lack of education can contribute to improper behaviour on boats (e.g., alcohol, overloaded boats, reckless driving), which in turn causes concerns about safety and habitat impacts;
- Fertilizer use on residential areas and golf courses can cause water pollution from the leaching of nutrients into the lake;
- Agricultural runoff can also leach nutrients and pathogens into the lake water;
- Stormwater runoff from roads and parking lots can affect water quality;
- Boats stored on the lake (and often unused for long periods) can leak fuel into the lake;
- Winter concerns include water quality impacts from bonfires, dog droppings, fishing huts not being removed, and vehicles sinking.

- **Environmental** impacts of concern include: habitat loss, water quality deterioration (including eutrophication), increases in invasive species and invasive fish, declining native fish populations, and climate change (drop in water levels);
- **Other concerns** include: lack of a proper public boat launch, limited public beaches, limited public access to the lake, encroachment on public accesses, challenges balancing private and public access and use, lack of public boat storage which could help to reduce the number of boats on the lake, the railway limiting access to the lake on the west side, high density developments funnelling people and boats to the lake, encroachment on Crown land, lack of temporary moorage especially near Invermere, lack of compliance with boating regulations, and increasing weeds (aquatic macrophytes) which are an annoyance to motor boaters;
- **Management concerns** include: the challenges of there being many different stakeholders, with a wide range of attitudes and knowledge about the lake; the complexity of jurisdictions , and a lack of capacity to adequately enforce rules and regulations;
- **Winter management concerns** include: a need for more infrastructure such as washrooms, waste, recycling, and dog bags;

safety concerns with vehicles and recreation on the lake; minimal emergency services on the lake in winter; liability issues; the Whiteway spans two jurisdictions making management more difficult, and there is a lack of enforcement responsibility for fishing huts and driving on the lake.

Second Round of Public Consultation

At the second round of public consultation, a draft LWMP was presented, and the draft LWMP was also posted on the RDEK website. Notification of the meetings and website posting was through ads in the press, and emails were sent to over 500 addresses provided in the first round of consultation. Public input was received through workshops in Windermere and Invermere, attended by approximately 90 people. In addition there were nine written comment forms submitted, and about 40 letters / emails. The information received through this process was used to refine the LWMP text and maps.

3.4 Recreational Carrying Capacity

One of the initial objectives of this plan was to analyze the "recreational carrying capacity" of the lake, particularly in terms of boating use. Although "carrying capacity" appears on the surface to be straightforward and easy to understand, it is a complex concept that is difficult to define, enforce and manage. Research on recreational carrying capacity dates back to the early 1960s with efforts to adapt physical and biological capacity concepts to determine sustainable levels of recreational use of land and water areas. There are numerous definitions of carrying capacity in the literature.
Physical carrying capacity is often defined in terms of absolute space standards, e.g., the maximum number of boats, or boats per area, that can be accommodated at one time on a lake. Carrying capacity is exceeded when there are more boats in use on the lake than can occur in a "safe" and "efficient manner."

Social carrying capacity refers to impacts of use levels/intensity on the quality of recreational experiences. Measures of social carrying capacity capture the user's tolerance for varying densities of use and

perceptions of the quality of the recreational experience. Satisfaction is influenced by numbers and types of encounters between users.

Ecological carrying capacity is concerned with impacts of recreational use on the natural environment, defined as the maximum levels of use in terms of numbers and types of activities before an unacceptable or irreversible decline in ecosystem values occurs.

What typically occurs on lakes is cumulative impacts of all types combining to cause a sense that a lake is near a "breaking point". It is at this time that increased management is required. When the social break point occurs prior to the biological break point, the environment benefits.

Lake problems are usually the result of an interrelated and changing mix of conditions and behaviours. Often there is a lack of scientific data to distinguish the impacts of boating from those caused by other human activities, e.g., non-point pollution. There are serious questions concerning the scientific validity of methods used for determining "the" carrying capacity (use limits) of inland lakes. Many recreation studies have determined that there are wide variations in people's perceptions of crowding, and simple counts of the number or density of users do not correlate very well with these perceptions.

Essentially, there are two primary approaches to establishing and managing carrying capacity; a quantitative approach, and a multi-faceted management approach. Formula-based carrying capacity models are based on expert opinion, and can't be transferred between lakes. Many managers believe that carrying capacity is a decision-making concept rather than a scientific concept, and that a numerical approach is often used as a gross simplification of a range of underlying problems.

Quantitative Approach

The 2001 Lake Management Strategy used a quantitative approach to evaluate carrying capacity. The methods essentially involved calculation of a lake surface area per boat which was considered to be the maximum for the lake, and calculation of the number of boats likely to be on the lake at peak times based on the number of boats (from waterfront lots and launches), amount they were used, and timing of the use. Using a standard of one boat per 10 acres as the carrying capacity, the study calculated the instantaneous boat capacity as 250 boats and the capacity in user days at 45,000.

The quantitative carrying capacity models range from 4 to 40 acres/boat depending on the types of boats (e.g., motor boats require more space than non-motorized), uses (e.g., waterskiing requires more space), characteristics of the lake, and various other factors (see Bibliography). The wide range itself is indicative of the subjectivity involved.

Whereas the quantitative approach to establishing carrying capacity was prevalent from the 1960s to the 1980s, the approach began to change in the 1990s. Researchers began to focus on ecological and recreational quality and a multi-faceted management approach, rather than fixed estimates of maximum allowable use or density.

Multi-faceted Management Approach

This approach recognizes that many quite distinct "capacities" can be defined depending on management objectives, the relative importance and values of distinct stakeholder groups (e.g., waterfront landowners, public access site users, environmental groups), the types of uses (e.g., boating, fishing, swimming, kayaking), and the level and type of management of the area (time or space zoning of use, levels of enforcement, speed and wake restrictions, land use controls around the lake, existence and size of access sites).

"Develop a strategy to maintain lake quality without being too restrictive to boating recreation. Some restrictions would make sense."

This new direction suggests that carrying capacities can be managed through identification and monitoring key indicators of environmental and recreational quality, to determine the impacts of recreational boating use. The emphasis is on the desired condition, not on limiting

or restricting use. Management has been able to mitigate the potential negative impacts though a combination of facilities, services, education, and enforcement.

Managing the carrying capacity of lakes requires: (1) scientific information on physical and biological conditions, and amounts and patterns of boating use, (2) determining the preferences and values of various stakeholders, (3) setting management objectives, (4) management actions that include use/access limits as only one of many alternatives, and (5) monitoring of resource conditions and user/visitor satisfaction over time. This requires ongoing communication, negotiations, and partnerships among different user groups, the boating industry, local governments, and natural resource agencies that have responsibility for protecting and ensuring access to inland lakes.

The carrying capacity literature also notes that restricting or prohibiting use on one or several lakes in a region can increase pressure and congestion on nearby lakes that offer similar boating opportunities, thereby transplanting impacts. It is therefore important to manage lakes with a regional perspective.

3.5 Impact Analysis

Potential Impacts on Water Quality

Lake Windermere water quality has the potential to be affected by various natural and human-caused sources of nutrients and other contaminants. Lake Windermere's overall water quality would require a very large nutrient input to result in a noticeable increase in productivity. This is due to the large volume of water that enters the lake and the rapid turnover. On the other hand, localized sources of nutrient input could have a fairly rapid and noticeable impact on the nearshore areas of the lake.

Sewage flow into the lake is a concern in terms of the potential for negative impacts. This could result not only in increased algal growth in the nearshore but also cause an increase in bacterial contamination.

The IHA guideline for unzoned areas is for a minimum 1 ha lot size with no community services. In zoned areas, the IHA guidelines defer to local government zoning for parcel sizes. The small lot size permitted in the RDEK zoning bylaw for on-site water and on-site sewage disposal (1670 m2, 0.16 ha, 17976 ft^2) is a concern.

Runoff from storm drains and lakeside properties are another potential source of water quality deterioration. Contaminants would include nutrients from fertilizers, petroleum products, road salt, and pesticides and herbicides. These non-point sources of pollutants are becoming increasingly common in lakes similar to Lake Windermere.

The creeks flowing into Lake Windermere can contribute nutrients from their respective sub-watersheds. A particular concern is Dutch Creek. Several decades ago, it flowed directly into Columbia Lake, then it changed course to flow into the Columbia River upstream of Mud Lake and Lake Windermere. Dutch Creek has significantly more volume than the creeks that flow directly into Lake Windermere, and the creek has a high silt load in the spring.

A concern raised by residents on the west shoreline is impacts from the railway (CPR). Residents indicated that coal dust affects air quality and water quality in that area. Rail cars filled with coal are not covered as they pass through, and the coal dust blows off. It is reported that the dust retardant isn't effective by the time the rail cars reach this region.

Boats can also cause impacts on water quality as a result of increased turbidity in shallow waters, and contamination from fuels, particularly fuel spills or engine leaks. The sediments on the lake bottom become sinks for hydrocarbons. These occurrences can also have negative impacts on fish and wildlife habitat.

Potential Impacts on Fish and Wildlife Habitat

Recreation and development can have negative impacts on fish and wildlife habitat in a number of ways, both directly and indirectly. Direct impacts on aquatic environments include development or alterations to habitat (e.g., removal of marshlands that support waterfowl, alterations to spawning/rearing grounds for fish).

Impacts from recreation might include the disturbance of waterfowl during nesting periods, either by boats or swimmers. This can result in the abandonment or destruction of nests and can decrease survival rates of immature waterfowl. This is one of the reasons that the 10-hp restriction was implemented in the Columbia River Wetlands, where the highest-value breeding habitat in the area is located. Less obvious effects include other noise pollution (which can disturb nesting waterfowl) and light pollution from communities (which can affect the movement of migrating birds, especially at night). As a result of these disturbances, bird populations may decline due to reduced numbers of breeding pairs, increased desertion of nests, reduced hatching success, and decreased juvenile survival.

Improper culverting, in-stream works and contributions of sediment can negatively affect the viability of streams and shorelines for salmonid production. Windermere Creek is of particular concern due to its high value for kokanee production and because of the potential for impacts from the community of Windermere. The introduction of nutrients can benefit fish growth by increasing available food sources, but can also result in winter or night kills due to oxygen depletion caused by plant respiration. Increased fishing pressure can also result in a reduction in fish populations, although stocking programs are often employed to maintain existing populations.

Potential Impacts on Vegetation

Due to the number of contributing factors that make Lake Windermere an ideal habitat for aquatic macrophyte growth, it is unlikely that development or recreation will have significant impacts on plant habitat within the lake. Exceptions to this might include dredging projects. However, even in this event, the wind and river-driven currents in the lake would likely recolonize cleared areas relatively quickly. If nutrient levels increase significantly in the future, algae blooms may occur which will decrease water clarity and perhaps restrict aquatic macrophyte growth in some areas. Any potential benefit to recreation, since boaters dislike aquatic macrophytes, would be offset by the negative aesthetic impact of the algae blooms. Another

potential impact on the aquatic plant community is the introduction of invasive species.

Mooring buoys can have negative impacts on aquatic macrophytes and mussel/shellfish beds when the chain used to anchor the buoy scours the bottom of the lake. DFO has concerns about the cumulative impact of mooring buoys (B. MacDonald, DFO, pers comm.).

3.6 Trends

It will be important for the LWMP to recognize and address the trends on and around Lake Windermere. The following is a summary of the key trends:

- Shift from non-motorized to motorized recreation,
- Larger boats with larger wakes,
- More mooring buoys, many of which do not meet federal regulations,
- Increase in residential development around the lake, especially second homes and recreation properties, leading to more people using the lake, particularly on summer weekends and holidays,
- Extensive fractional and time share ownership in the valley, also leading to more people using the lake,
- Increase in short-term property rentals, along with a decrease in RV sites and motel units,
- More structures blocking access along the foreshore,
- Increasing conflicts between private and public interests,
- More people concerned and knowledgeable about the environment, and
- Decreasing lake depth due to lower water levels and more sediment on the lake bottom.

4.0 Guiding Statements

4.1 Vision

"Let's be a positive example of a community working together to protect their most valuable resource"

The following is a vision statement related to Lake Windermere, based on community input and analysis. It is expressed in the present tense since it represents how it is hoped that the lake will be described in the future.

Lake Windermere has high water quality, providing drinking water and supporting healthy and diverse habitats for fish and wildlife. The lake, in its spectacular setting, supports a wide range of recreational pursuits which are accessible to everyone. The surrounding communities offer a high and enjoyable quality of life for all residents and visitors; everyone works together to ensure that human activities and behaviour respect the environment and human safety. The authority for management of the lake is simplified and coordinated, including enforcement of regulations and guidelines. Lake Windermere is a key economic asset for the Columbia Valley, helping to attract and retain residents, businesses, and tourists.

4.2 Goals and Objectives

The following are the goals and objectives for the LWMP. These are based on community input and analysis. Each goal is followed by more specific objectives on ways to achieve the goal. More detailed recommendations are provided in section 5.0.

Goal 1: Protect and enhance the **environmental** health and integrity of the lake.

- Respect the lake as a source of potable water, and manage the water quality accordingly.
- Ensure that the water quality supports safe recreation on the major beaches.

- Maintain sufficient water quantity for a healthy, functioning ecosystem.
- Protect and enhance habitat diversity and function.
- Protect, restore and enhance the quality of the shoreline to improve ecosystem functioning.

Goal 2: Ensure the continuation of diverse and safe **recreational** opportunities.

- Ensure that a wide range of motorized and non-motorized activities can safely occur on the lake .
- Ensure that the public has diverse opportunities to enjoy the lake, including access to the foreshore and to lake activities.
- Encourage and promote safe boating practices and codes of conduct.
- Provide access for boaters to Invermere for day use activities.

Goal 3: Encourage and support the development of a **community** that will work together to respect and balance the various interests on the lake.

- Pursue a commitment from all government stakeholders to work together, including federal, provincial, RDEK, DOI, the Akisqnuk First Nation and the Shuswap Indian Band.
- Encourage and support public education efforts that provide information on the characteristics of the lake environment, and the actions and behaviours necessary to retain those characteristics.
- Continue to involve the public in planning and management processes.

Goal 4: Clarify and strengthen responsibilities for **management** and **enforcement**.

- Ensure that recommendations and policies are realistic, practical and enforceable.
- Improve the management of summer and winter uses of the lake.
- Support the establishment of or designate an organization with responsibilities for lake stewardship and public education, such as the Lake Windermere Ambassadors.

5.0 The Plan

5.1 Principles and Plan Structure

Principles

The LWMP recommendations were challenging to prepare due to some underlying inconsistencies among the goals and objectives. On the one hand, there is a desire for more public access to and use of the lake. At the same time, there are concerns that the lake is already overcrowded and that overuse is having a variety of negative impacts. Another discrepancy is a desire for more regulation to manage use and development versus interests in reducing the amount and complexity of regulations.

"If water quality or quantity concerns were to reach a critical level, senior levels of government could step in."

In order to address the challenges of potentially conflicting objectives, the following principles were prepared as an underlying basis for the LWMP:

1. Focus on enforcing existing regulations related to boating more than on establishing new ones, and develop voluntary guidelines and codes of conduct related to boating practices before requesting additional boating regulations.
2. Ensure that the development of waterfront land and the foreshore respects environmental resources and addresses social concerns.
3. Shift the focus of recreation on the lake to more public use and more non-motorized uses, e.g., walking and fishing from piers and docks, public beaches, public boat launches for small watercraft, rental of non-motorized craft.
4. Make efforts to reduce the amount of motor boating at peak times, since it is perceived to be excessive to lake users.
5. Strive to have fewer motor boats moored on the lake for long periods of time at marinas, docks and mooring buoys.

Plan Structure

The following sections outline the recommendations of the LWMP. The structure is as follows:

- Lake Boating and Use Plan – identifies designations and recommendations for uses on the water,
- Winter Use Plan – identifies designations and recommendations for winter uses on the ice,
- Water Structures and Public Access Plan – identifies locations of existing and proposed marinas, boat launches, public docks and mooring buoys,
- Foreshore Management – provides recommendations and identifies guidelines for foreshore development and enhancement,
- Upland Use and Management – provides recommendations for the upland including Development Permit Areas,
- Environmental Quality – provides recommendations for working with others to protect and improve environmental quality.

5.2 Lake Boating and Use Plan

One of the key planning tools of the LWMP is the opportunity to designate portions of the water for particular uses. The plan supports a non-regulatory, voluntary approach to the proposed boating restrictions advanced through public education. If this is unsuccessful, then an application to Transport Canada for a change in federal boating regulations may be required. The following are the proposed designations, recommendations and rationale (see Map 11):

No Motorized Boating Areas

5.2.1 Establish three "no motorized boating" areas to respect environmentally sensitive areas and swimming areas.

Discussion/Rationale

These are areas where there are significant safety considerations due to swimming, or environmental concerns, i. e., Kinsmen Beach, James Chabot Beach, and the wetlands at the south end of the lake.

Slow No-wake Boating Areas

5.2.2 Establish areas that are "slow – no wake" and maximum speed of 10 kph, where there is significant boating congestion causing safety concerns.

5.2.3 These same locations are also "no tow" areas except to get children to and from the shoreline.

Discussion/Rationale

The identified areas include Taynton Bay to the mouth of Abel Creek, and 60 m on the east shoreline. In these areas, there is a high level of activity in the water and greater public interest in swimming and non-motorized boating.

This will have the added benefit of reducing impacts to shoreline structures from waves, and reducing disturbances to waterfront residents. As with regulating non-motorized areas of the lake, the authority to regulate boat speed resides with Transport Canada, however a voluntary approach will be tried before pursuing regulatory changes.

Responsible Boating Area

The remainder of the lake is designated a Responsible Boating area, with guidelines as follows:

5.2.4 Encourage and support all marinas to adopt and publicize boating regulations and management plan designations, safe boating practices and codes of conduct for Lake Windermere, applicable to motor boats and personal watercraft.

5.2.5 Support the ongoing distribution of this same information to all property owners, renters, lake visitors, resident associations, related businesses, and local media.

5.2.6 Establish the following as a Boat Traffic Code of Conduct for Lake Windermere:

- Predominant travel pattern for high speed boat travel and all types of towing (slow and fast) – north/south only,

- Discourage towing east/west,
- Discourage towing directly from the beach, except to accommodate small children,
- Travel east/west with extreme caution, especially when the lake is busy,
- For tubing or surfing, always go to large open areas of water,
- When person being towed falls, no high speed turns; go immediately to idle and spin slowly,
- Use safety precautions for fuelling; fuel on land where possible,
- Minimize music, noise and lights at night – consider those on shore trying to sleep – noise and lights carry a long way across the water.

Boating Management

5.2.7 Discourage the rental of Personal Watercraft, and encourage rental of non-motorized boats instead.

5.2.8 Encourage a reduction in the time boats are moored on the water and an increase in the capacity and efficiency of boat storage on land, e.g., dry boat stacking, boat cooperatives.

5.2.9 Explore ways to prohibit the following types of boats and activities on Lake Windermere: houseboats, “cigarette” boats, and no towing at night. Potential tools include disallowing “yacht-certified” boats as designated by the National Marine Manufacturer’s Association, establishing a maximum boat length of 25 feet and maximum engine of 6.5 litres, not to exceed 425 horsepower, and implementing these restrictions through Transport Canada regulations.

5.2.10 Encourage Transport Canada to expand the requirements for a Boat Operators License to include personal watercraft operators, and renters of boats and personal watercraft.

5.2.11 Should the above recommendation not come to pass, and in the interim, work with the local watercraft rental companies so that

they review boating protocols and the Boat Traffic Code of Conduct for Lake Windermere with all of their customers.

Discussion/Rationale

The proposed boating codes of conduct are acceptable to responsible boaters.

Personal watercraft and boat renters may be more problematic than owners since they are generally less knowledgeable about the lake and safe practices.

Lake Windermere is too small for the boats and activities recommended for prohibition. It is easier to preclude uses in advance rather than trying to eliminate them once they are established.

5.3 Winter Use

The primary winter use area is the Whiteway (see Map 12). The following are the recommendations and rationale for winter use:

5.3.1 Continue operation of the Whiteway, with agreements among agencies as required, and provide washrooms, doggy bags and garbage/recycling containers for lake users.

5.3.2 Relocate the Whiteway farther east to accommodate the favoured fishing hut locations south of Invermere.

5.3.3 Encourage fishing huts in locations that reduce potential conflicts with use of the Whiteway.

5.3.4 Establish codes of conduct for more responsible motorized use of the lake in winter, e.g., control speed, no driving along the Whiteway, stop prior to crossing the Whiteway and proceed with caution, respect closed gates and signs, maintain control of vehicles at all times, no leaking vehicles, discourage motorbikes due to noise. Use a variety of tools to implement the codes of conduct, e.g., signs, brochures, news releases, website information.

5.3.5 Work with the users of fishing huts to identify codes of conduct for safe and appropriate practices, and work towards an

informal system of self regulation. Potential codes of conduct include: manage waste appropriately, no open fires on the lake, minimize driving on the Whiteway, remove hut and all associated materials by March 15.

5.3.6 Work with others as needed to identify responsibilities for management, enforcement and provision of emergency services on the frozen lake.

Discussion/Rationale

Management of the Whiteway will require a coordinated effort among the RDEK, DOI and the user groups that initiated it.

The frozen lake is a significant community asset, however it requires better management.

It is important that vehicles on the frozen lake are managed responsibly for safety and liability reasons, especially with increasing winter use.

Fish huts require better management to address a variety of potential impacts to the lake.

5.4 Water Structures and Public Access Plan

Structures on the water include marinas, boat launches, docks, and mooring buoys. Where these structures are available for public use, they support public access onto the lake. This section (see Map 13) provides recommendations and the rationale for the **location** of structures on the water and public access onto the lake. Recommendations related to the management, planning and design of structures are in section 5.5.

General

5.4.1 The RDEK and DOI will zone the surface of the lake to control the location of water structures.

5.4.2 If structures are proposed by the Akisqnuk First Nation on the foreshore fronting the Columbia Lake Indian Reserve, the DOI and RDEK will work with the Akisqnuk to promote the objectives, principles and recommendations of this lake management plan, recognizing the interests of the Akisqnuk, the broader community and the need for environmental protection.

Marinas

5.4.3 New private marinas or the expansion of existing private marinas to accommodate more boats are not generally supported. It is acknowledged that existing marinas may need upgrading at times to remain useful and relevant. New or expanded marinas may be considered if they also help to achieve public objectives identified in this Management Plan.

5.4.4 A new marina for public use in Invermere is supported as a relocation of the marina at the north end of the lake. One concept for this is a marina at the foot of 3rd Avenue, with a boat launch, public dock, fuel dock, temporary moorage for those visiting Invermere, parking at Rotary field, and possible boat/vehicle concierge service.

5.4.5 Cap the number of fueling stations on the lake at two (one existing, one hopefully to be relocated).

5.4.6 For any new major development on the lake, encourage the inclusion of a public boat launch and temporary mooring for day use.

Discussion/Rationale

New private marina slips are inconsistent with the principles of shifting the focus to more public recreation on the lake, storing fewer boats on the lake, and reducing boat traffic at peak times. A reduction in the number of slips would provide numerous benefits.

The DOI is open to considering a new marina at the foot of 3rd Avenue, preferably as a replacement for the existing public marina at the north

end of the lake. The parking lot could be at Rotary field which is a short distance away and rarely used in summer. The proposed marina site is an old steamship docking area, so it has historically been used for a similar function in the past. The upland may require some fill to enhance the turn-around for vehicles. The DOI is willing to consider foreshore restoration and enhancement as compensation for impacts. There would be a need to survey the land and clarify ownership, since part of the site is owned by CPR, and part by DOI. A day use marina in this location would provide boaters with access to washrooms, restaurants, stores, and tourist attractions. To avoid the potential impacts of large vehicles and boat trailers passing through Invermere's town centre, there is an alternate route available using 10th Ave., 13th St., 7th Ave., and 14th St.

More fuelling stations are not desirable due to the potential impacts on water quality and fish and wildlife.

Boat Launches

5.4.7 In addition to the proposed new public boat launch discussed above, pursue opportunities for multiple ramps for small boats (non-motorized or small motor boats not requiring a trailer) distributed around the lake, with parking where possible. Some of these may be suitable only for small car-top non-motorized boats. Potential locations include: James Chabot Provincial Park (re-establish a small launch at the previous site, recognizing that it is seasonal due to water depth), Pete's Marina location, Taynton Bay, Baltac Road, Windermere at the foot of Government Street, and Ash Street.

5.4.8 Design and build boat launches to minimize impacts to habitat, e.g., some may be more appropriate as paved ramps to prevent churning of sediments, others may have less impact as native soil.

Discussion/Rationale

Distributed public boat launches would reduce congestion at key locations. Parking valet services to off-site parking lots would make these more viable.

If there were better public boat launches, the demand for mooring buoys and marinas would decrease, which would help to keep more boats out of the water.

Mooring Buoys

5.4.9 The zoning of the lake will include regulations on the placement and number of mooring buoys.

5.4.10 All mooring buoys shall be located between 12 and 30 metres from the natural boundary, as measured horizontally.

5.4.11 Mooring buoys must be a minimum of 12 metres from any other mooring buoy as measured in any direction.

5.4.12 Docks are preferred over buoys for the mooring of watercraft.

Discussion/Rationale

The public accepts mooring buoys on the lake, however there are concerns about the placement, spacing and number of mooring buoys in some locations. Extensive groupings of mooring buoys reduce the perceived size of the lake and the area usable for activities.

Public Docks

5.4.13 Encourage and support the construction of public docks for activities such as fishing, tying up small boats, viewing, and swimming. In addition to the proposed public pier/dock in Invermere, explore opportunities for public docks at other locations. Some potential locations include: the reinstatement of a public pier/dock at the foot of Government Street in Windermere; and a small dock in Taynton Bay for public access onto the water and to enable boats to tie up temporarily for visits to the washrooms, restaurants, shops and tourist facilities in Invermere. Parking fees at day slips could be used to help

cover costs and encourage the provision of amenities on land, e.g., trails, washrooms, tourist attractions.

5.4.14 Encourage rentals of canoes, kayaks, and other small non-motorized boats near public docks.

Individual Private Docks

5.4.15 Private docks must be accessory to an existing principal use on the waterfront parcel.

5.4.16 A maximum of one dock shall be permitted per waterfront parcel.

Discussion/Rationale

Public docks can help to support increased public access to the lake that is less expensive and has less impact on environmental resources and recreation values. Private docks should be limited to protect habitat values and minimize intrusion into the usable lake area.

5.5 Foreshore Management

Foreshore management relates to the planning and management of the physical characteristics of the shoreline, including structures and public use of the foreshore. This section (see Map 14) provides recommendations and the rationale for these topics:

Foreshore Structures – All

5.5.1 The RDEK and DOI will zone the surface of the lake and establish regulations to manage water structures.

5.5.2 Consider negotiating a head lease with the Province, in the name of DOI and/or RDEK for management of the foreshore, including marinas, docks and mooring buoys.

5.5.3 Establish a Foreshore and Aquatic Development Permit Area (DPA) for the entire lake up to the natural boundary, for protection of the natural aquatic environment, its ecosystems and biological diversity, to be implemented through the RDEK

and DOI OCPs. Through this mechanism, require all structures, except for mooring buoys, to obtain a DP prior to construction.

5.5.4 In the absence of a DPA, consider requesting that the Province designate the lake an "application only" area for the purpose of tenuring and reviewing foreshore structures, including individual docks.

5.5.5 Adopt the EKILMP Guidance Document recommendations through this LWMP as a guide to new construction on the foreshore (this does not apply to existing structures). The EKILMP guidelines are summarized in section 2.3 and Appendix A of this LWMP.

5.5.6 Encourage the Province and DFO to enforce their own regulatory requirements on the foreshore, to support EKILMP guidelines, DP guidelines, and best management practices for all foreshore works, and to take action on illegal foreshore works that have negative impacts on habitat.

5.5.7 Encourage community and individual lakefront property owners to enhance habitat along the foreshore fronting their property. Provide easy access to the guidelines and references noted in this section.

5.5.8 Establish mechanisms in the community to report on foreshore construction projects to ensure that all such projects obtain approval for the work.

5.5.9 Encourage all agencies to promote and use the following information and guidelines for the placement, size, and design of new foreshore works including: marinas, docks, ramps, structures, and mooring buoys (for retaining walls and shoreline stabilization, see section 5.6):

- Use foreshore inventory mapping to assist in planning and decision-making regarding development applications (see Map 5).
- Explore the potential for use of existing mooring facilities that comply with the objectives of this plan prior to proposing new facilities.

- Consider the use of marine railways rather than docks for private boats; these are preferred by DFO in terms of impacts on habitat.
- Applicants should refer to the Fisheries and Oceans Canada The Dock Primer (Prairies Edition) and the Living by Water Guidebook (livingbywater.ca), and Guide to Green Boating (georgiastrait.org) for additional dock, boating, and foreshore development guidelines.
- All structures in the Foreshore and Aquatic Development Permit Area shall:
  - minimize or eliminate impact on the foreshore and water wherever possible;
  - be sited away from fish spawning and rearing habitat areas;
  - not use wood treated with creosote, CCA, paint or other chemical treatments that are toxic to many aquatic organisms, including fish, and that have significant negative effects on aquatic environments. Instead, applicants should use untreated Western Redcedar, pre-cast concrete, or steel.
  - in the case of docks, private mooring buoys and community moorage facilities, such structures shall be removable, such as floating docks, and not permanent (i.e. no concrete, pile or crib docks).
- All structures must be set back a minimum of 5 m (16.4 ft) from the side parcel boundaries projected perpendicular to the shoreline from the upland property line.

5.5.10 The following uses, not related to mooring, are not acceptable on the foreshore: beach houses, storage sheds, patios, sun decks, and hot tubs. In addition, no camping, beach creation, groyne construction, infilling, private boat launches, or substrate disturbance, are acceptable on the foreshore, unless the purpose is to enhance habitat.

Private Community and Public Marinas

5.5.11 When marina tenures are up for renewal, work with the owners to encourage amenities that support the objectives of this Management Plan, e.g., more boat storage on land, public launching facilities, more naturalized shoreline, more beach available for public use. July - 302

5.5.12 For new comprehensively designed lakefront subdivisions, one larger community dock is supported in lieu of a number of small private individual docks or a private marina.

Community Day Use Docks (Private and Public)

5.5.13 New community day use docks for pick-up / drop-off, swimming and fishing are supported.

5.5.14 New community docks with slips for overnight use are generally not supported.

5.5.15 The maximum upward facing surface area of a community day use dock should generally be 80 m2 (861 ft2).

Individual Private Docks

5.5.16 Encourage individual waterfront owners to consider shared day use docks in the interests of having one larger dock that extends farther into the lake, rather than a number of individual docks that are in relatively shallow water with higher fish habitat values. Applications for shared day use docks from a group of local waterfront owners are preferred over applications for individual docks, as properly sited shared docks generally cause fewer disturbances to the foreshore than multiple individual docks.

5.5.17 The maximum upward facing surface area of a private individual dock should generally be 20 m2 (215.3 ft2).

5.5.18 Private moorage (including docks, lifts, boathouses, and other structures) is subject to the following:

- Private moorage will not impede pedestrian access along the beach portion of the foreshore.
- The siting of new private moorage shall be undertaken in a manner that: is consistent with the orientation of neighbouring private moorage, is sensitive to views and other impacts on neighbours, and avoids impacts on access to existing private moorage and adjacent properties.
- The zoning bylaw will set out detailed provisions related to use, siting, setbacks, size, configuration, width, materials, and projections for private moorage.
- Encourage the Integrated Land Management Bureau, in carrying out reviews of foreshore tenure applications, to take the foregoing factors into consideration, with emphasis on the environmental sensitivity of the foreshore areas, as well as ensuring an appropriate relationship with upland areas.
- Private moorage owners and builders should refer to the Ministry of Environment's Best Management Practices for Small Boat Moorage on Lakes and the Ministry's BMPs for Boat Launch Construction and Maintenance on Lakes. As well, owners and builders should refer to minor works policies published by Transport Canada, Navigable Waters Protection Division prior to construction of any foreshore moorage (works).

Boat Launches and Boat Ramps

5.5.19 Consider boat launch and parking fees at all public boat launches (for boats on trailers), with fees varying with boat size, and separate fees for launching and parking. Use the fees for lake management. Manage the areas near public boat launches to disallow on-road parking.

5.5.20 Encourage distribution of information regarding ramps suitable for small boats.

Mooring Buoys

5.5.21 Mooring buoys must comply with federal government requirements with respect to size, colour and identification, as set out in Transport Canada's An Owner's Guide to Private Buoys.

5.5.22 It is recommended that mooring buoys be secured with ropes, not chains. If chains are used, they should be maintained taut or semi-taut to minimize lakebed scouring.

5.5.23 Explore mechanisms for managing mooring buoys, such as through a head lease with the Province. This might include a registration system for buoys, using the fees to manage unregistered and non-compliant buoys. In the allocation of mooring buoys, consider existing buoys that comply with requirements first, and give priority to sailboats with keels since they are so much more difficult to launch. Additional buoys, if available, may be allocated by lottery.

Discussion/Rationale

The improvement in the quality of the foreshore from a habitat perspective can enhance opportunities for fish and wildlife and lead to improved water quality.

The DPA will provide the RDEK and DOI with significantly greater opportunity to manage structures on the lake in terms of potential impacts on environmental resources.

Boaters are open and accustomed to a “user pay” system for boat launching since it is common practice.

The DOI has expressed a willingness (at the staff level) to manage mooring buoys. There would need to be an agreement with RDEK for management outside the DOI.

Transport Canada will be consulted regarding any proposed management system for mooring buoys.

Public Access onto the Foreshore

5.5.24 Encourage private developments to inform the public that beach areas below the natural boundary are available for public use. July - 271

5.5.25 Do not allow new developments to have beaches that are managed as if they were "private" in terms of access from the water.

5.5.26 If the weir at the lake outlet is to be rebuilt, consider a walkway on all or part of it as an attraction.

Discussion/Rationale

The above methods to support increased public access to the lake are inexpensive and have little impact on environmental resources and recreation values.

5.6 Upland Management and Land Use

The opportunity exists to amend the RDEK and DOI OCPs, zoning, and other bylaws, in addition to adding or refining management activities, to achieve consistency with this LWMP. Some actions of other agencies are also relevant. This section (see Map 15) provides recommendations and the rationale for upland use and management:

5.5.27 RDEK and DOI Management

5.5.28 Revise the designations in the RDEK Lake Windermere OCP to reduce the potential for subdivision of private lots with no community sewer along the lakeshore, unless the subdivision furthers the objectives of this plan, e.g., provides public access, public beach, public boat launch.

5.5.29 Establish a Riparian Development Permit Area (RDPA) in the RDEK and the DOI for the entire Lake Windermere shoreline for new development within 100 metres (328 feet) of the natural boundary. Associated guidelines are to include:

- relevant guidelines from EKILMP Guidance Document,
- setbacks for structures and septic systems,

- retain and enhance native vegetation,
- more sensitive shoreline stabilization works (see below),
- no surface runoff from roads/parking into lake,
- protection of wildlife trees,
- guidelines for landscape design, e.g., limit grass and horticulture that requires fertilizers and other chemicals where not required for active recreational use, use as many permeable surfaces as possible, and thick growing medium and planting to encourage infiltration of rainwater, and July - 233
- advise property owners not to remove vegetation along the shoreline that could result in erosion, loss of food and nutrients for fish, and loss of shade for young fish. Landowners must refer to the Ministry of Environment's Best Management Practices for Hazard Tree and Non Hazard Tree Limbing, Topping or Removal.

5.5.30 Include the following guidelines for shoreline stabilization in the RDPA:

- All shoreline stabilization works must adhere to the Ministry of Environment's "Best Management Practices for Lakeshore Stabilization."
- Recognizing that a natural shoreline is often the best and least expensive protection against erosion, shoreline stabilization activities shall be limited to those necessary to prevent damage to existing structures or established uses on waterfront property. New development should be located and designed to avoid the need for shoreline stabilization.
- Shoreline stabilization structures for extending lawns or gardens or providing space for additions to existing structures or new outbuildings are prohibited.
- Stabilization works should be undertaken only when there is a justifiable level of risk to existing buildings, roads, services, or property, as deemed necessary by a

professional engineer or geoscientist with experience in geotechnical engineering and preferably also with experience in hydraulic engineering. In such cases, the 'softest ' stabilization measures should be applied. Feb - 008

- Stabilization works and measures must be located within the property line of the waterfront parcel, above the natural boundary of the lake. Soft shoreline measures that provide restoration of previously damaged ecological functions may be permitted waterward of the natural boundary.
- Additional guidelines can be found in the Green Shores Program, www.greenshores.ca; these are not a requirement.

5.5.31 Develop public information materials on the values and resources of the lake, and the measures residents can take to reduce their impacts, e.g., native planting, elimination of the use of harmful chemicals and nutrients, foreshore management, and ensuring that runoff from roads and parking lots doesn't enter the lake. Work with strata developments, community groups, the construction industry and others to distribute these materials widely on an ongoing basis, including posting them on the RDEK and DOI websites.

5.5.32 Encourage and support bylaws as needed that work towards banning harmful products used for landscape maintenance in the lake's watershed, e.g., restrict use of fertilizers, pesticides, and other harmful chemicals.

5.5.33 Investigate within RDEK the application of a voluntary riparian tax exemption system that local governments can use under the Local Government Act to compensate riparian landowners who choose to protect eligible riparian land through a conservation covenant. (The DOI already has this in place).

5.5.34 Encourage public walkways along the shoreline, e.g., Taynton Bay to James Chabot Park, Columbia Avenue from the cemetery to Lake Street.

5.5.35 Identify upland waterfront locations with particular values for public use and recreation. Consider purchasing such properties

for public use, with subdivision of a portion of the upland if necessary to finance the purchase.

5.5.36 If the marina at the north end of the lake is relocated, encourage restoration of the shoreline at the current marina site due to its importance for fish, and encourage a park/interpretive area with low-impact trails in that location.

Discussion/Rationale

When water and sewer services are available to more communities around the lake (see below), the potential for subdivision will exist. It is not consistent with the vision, goals and objectives or principles of this plan to allow higher density development along the shoreline than what already exists.

"You only see enforcement on the serious issues. For the small items, it's cumulative, death by 1000 cuts."

The RDPA will provide the RDEK and DOI with significantly greater opportunity to manage upland use along the shoreline in terms of potential impacts on environmental resources.

Public use areas around the lake are very limited, and the local governments could be proactive in acquiring and developing more.

Management by Others

5.5.37 Work persistently and collaboratively with all stakeholders to ensure that all subdivisions around the lake have appropriate sewage treatement. Community sewage treatment systems are preferred. Explore options for helping to finance this and reduce or spread out the costs for property owners.

5.5.38 Encourage MOT to enforce the removal of barriers and other encroachments, and the posting of visible on-site identification of legal public access points to the lake.

5.5.39 Encourage MOT to require any new developments to provide public access to the lake that is convenient, useable and attractive, preferably with some parking on site or nearby.

5.5.40 Ensure that farmers within the watershed of Lake Windermere are aware of funding for, and encourage agricultural practices that enhance natural ecosystems and protect environmental resources, e.g., Environmental Farm Planning. Some methods for managing agricultural related inputs include: fencing livestock from direct access to watercourses and the lake, livestock wintering should be set back from lakeshore areas and the edges of contributing streams, construction of interception ditches to prevent natural runoff from traversing livestock watering or wintering areas, construction of detention basins to retain runoff from livestock wintering areas or primary feeding areas.

5.5.41 Encourage the Province to enforce regulations where poor agricultural practices have caused negative impacts on watercourses or groundwater.

5.5.42 Investigate the establishment of a boat launch at the north end of Columbia Lake.

5.5.43 Encourage CPR to cover rail cars carrying coal dust through the area.

Discussion/Rationale

Sewage leaching into the lake is one of the most significant impacts, and therefore should be among the highest priorities for management.

Establishing actual public access through the many existing public access points will go a long way towards making the lake more accessible for low-impact recreational uses.

Agricultural runoff can cause significant negative impacts and therefore needs to be managed.

A boat launch at the north end of Columbia Lake would likely help to distribute the boats, with some shifting from Lake Windermere to Columbia Lake.

5.7 Environmental Quality

Measures to protect and enhance environmental quality, beyond those already identified, include primarily scientific studies and public education, as outlined below:

5.5.44 Encourage the Province to continue to support water quality monitoring, and to compile and communicate the results widely, including to the media and other public forums, in collaboration with community groups.

5.5.45 Encourage a study on the environmental and hydrological impacts of the weir and options for the future. If a change to the weir is determined beneficial, identify an organization willing to improve, manage and operate it.

5.5.46 Encourage the federal or provincial government to reinstate a water level monitoring station on Lake Windermere. Encourage study of the water balance, including surface and groundwater inputs to the lake, and water withdrawal through mandatory metering and recording. Based on these analyses, make recommendations for managing the water level.

5.5.47 Discourage the granting of additional water licences for irrigation as a precautionary measure until information is available on how much water is withdrawn compared to licences.

5.5.48 Encourage and support education to the public regarding environmental values, including aquatic macrophytes and their habitat values, factors causing their increase, and the risks of spreading exotic aquatic macrophytes. April - 072

5.5.49 Encourage a study of aquatic macrophyte abundance and species for comparison with the 1999 data set. Use aerial photography taken in early September for the best comparison with the 1999 data. Identify the species, and establish a program for ongoing identification and management of invasive species if they occur.

5.5.50 Encourage a study of the environmental impacts of winter uses of the lake.

5.5.51 Recognize and make use of the Lake Windermere Project's resources, including water monitoring equipment and experience, extensive library, and encourage its continued support through the Lake Windermere Ambassadors or Lake Management Committee.

Discussion/Rationale

These are all areas where ongoing or additional information could improve and update management needs.

6.0 IMPLEMENTATION

"Engage the public! Encourage full and part-time residents to "buy" into a lake protection and preservation concept."

Implementation of the LWMP will be the responsibility of RDEK and DOI, with support from all other agencies that have a role in lake management. The following will be some of the implementation measures.

- Support the establishment of a Lake Management Committee, potentially composed of Lake Windermere Ambassadors, other citizens and local government, subject to a Terms of Reference and appointment by RDEK and DOI. Coordinate with various levels of government in outreach activities and sharing of information.
- Establish a protocol and responsibilities for stewardship and enforcement, including observation, recording and reporting, with the understanding that the relevant government agency will respond when needed.
- Establish methods for monitoring compliance with the LWMP and the effectiveness of the LWMP in meeting its objectives through a series of performance measures.
- Incorporate the lake designations and other policies of this plan into the RDEK Lake Windermere OCP and the DOI OCP.
- Implement bylaws within RDEK and DOI to zone the surface of the lake.
- If necessary, apply to Transport Canada for the proposed changes to boating use on the lake. If approved, install the appropriate signs and markers to indicate the regulations to the public.
- Establish a public education program, with initial and ongoing components, to convey the provisions of the LWMP to the public.
- Work with the Province to ensure that all applications for foreshore and Crown Land tenures on and around the lake are referred to local government for comment and collaboration.
- Explore and analyze the implications of obtaining a head lease for foreshore tenures, and if appropriate, acquire a head lease managed by DOI, RDEK or another party.

- Work with the Akisqnuk First Nation and the Shuswap Indian Band on obtaining agreement in principle for this LWMP, and encourage them to incorporate the provisions of the LWMP into their own land use and foreshore planning and development decisions.
- Explore opportunities for obtaining funding for implementation of the LWMP, with potential sources including grants, corporate sponsorships, partnerships, fees and charges.
- Encourage requiring the installation of water meters and a reporting system on water use, especially for water licences from the lake.
- If MOT access points are enhanced for public access, establish an agreement with MOT for RDEK to maintain them.
- The various agencies involved in EKILMP agree to abide by this LWMP in their own planning and management processes. Should they wish to take an action or make a decision which is contrary to the LWMP, it is recommended that they undertake public consultation.

The priority for the RDEK and DOI will be implementing the recommended local government regulations (e.g., zoning, DPAs) and establishing the Lake Management Committee to lead the non-regulatory lake management measures (public education, water quality monitoring).

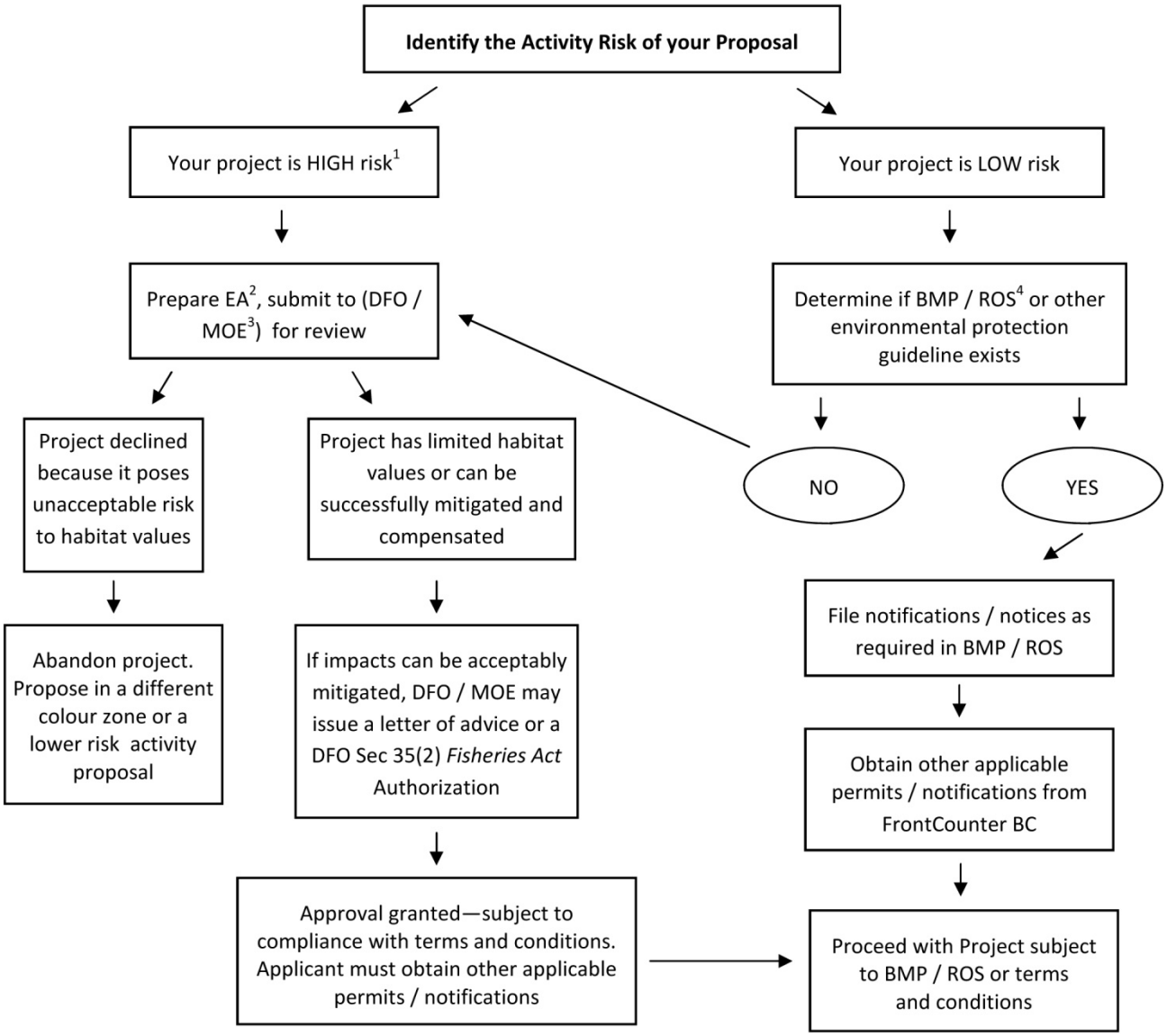
"Implement a volunteer program for all who care about environmental protection."

Appendix A: Table 1 and Flowchart from the Guidance Document

Table 1. Activity Risk Table (NA = Not Acceptable, High = H, Low = L).

Activity	Shore Zone Colour and Activity Risk				Modifier
	Red	Orange	Yellow	Grey	Zone has Species at Risk
Over water piled structure (i.e. building, house, etc.)	NA	NA	NA	NA	NA
Boat house (below HWM)[1]	NA	NA	NA	NA	NA
Dredging (new proposals)	NA	NA	NA	NA	NA
Beach creation above HWM	NA	NA	H	H	H
Beach creation below HWM	NA	NA	H	H	H
Aquatic vegetation removal	NA	NA	H	H	H
Upland vegetation removal	NA	NA	H	H	H
Marina[2]	NA	H	H	H	H
Breakwater	NA	H	H	H	H
Boat launch upgrade	NA	H	H	H	H
New boat launch	NA	H	H	H	H
Infill	NA	H	H	H	H
Groynes	NA	H	H	H	H
Fuel facility[3]	NA	H	H	H	H
Boat house (above HWM with vegetation removal)[1]	NA	H	H	H	H
Waterline trenched	NA	H	H	L	H
Erosion protection hard-joint planted	NA	H	H	L	H
Erosion protection vertical wall or retaining wall[4]	NA	H	H	L	H
Milfoil & invasive weed removal	H	H	H	L	H
Boat house (above HWM without vegetation removal)[1]	NA	H	L	L	H
Permanent rail launch system	NA	H	L	L	H
Removable rail launch system	NA	H	L	L	H
Dock[1]	NA	H	L	L	H
Erosion protection (soft-bioengineered)	NA	H	L	L	H
Elevated boardwalk below HWM	NA	H	L	L	H
Mooring buoy	NA	H	L	L	H
Maintenance dredging (previously approved)	NA	H	L	L	H
Boat lift - temporary	NA	H	L	L	H
Geothermal loops - open[5]	NA	H	L	L	L
Geothermal loops - closed	NA	H	L	L	L
Habitat restoration[6]	H	H	L	L	H
Public beach maintenance	NA	L	L	L	H
Waterline drilled	NA	L	L	L	L

Flow Chart: Decision-making process for High and Low Risk Activities for Fish and/or Wildlife Habitat authorizations



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