
Lake Foreshore Inventory and Mapping (FIM)

Living Lakes Canada

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Program Guide

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Canada's Freshwater Future

Living Lakes Canada promotes the protection of Canada's freshwater legacy by linking science to action and by helping to understand and appreciate the intimate connections between water stewardship, water quality, resource sustainability, climate change and biodiversity.

Canada's four levels of government (municipal, provincial, federal and First Nations) play vital roles in the planning, management and regulation of lakes and their watersheds. Living Lakes Canada fills an essential component of a strategic need to take science to the public as a bridge to stewardship actions, and to provide a unique opportunity to apply consistently standardized monitoring and management planning protocols for the protection of all freshwater bodies in Canada and to share best practices and lessons learned throughout Canada's four major watersheds.

Through the Living Lakes Canada network, organizations connect to collaborate in the monitoring, protection, restoration and policy development for long-term protection of Canada's water bodies. We focus on watershed protection through the following areas:

- Innovative policy and management planning
- Protection of sensitive or critical freshwater ecosystems
- Watershed awareness and stewardship education
- Community-based watershed monitoring
- Sustainable water use
- Restoration of degraded watersheds

The Lake FIM Program

Introduction:

Living Lakes Canada has built significant expertise in lake management planning. Providing support to grassroots organizations and advice to local governments, First Nations and policy makers is an important part of ensuring Canada's lakes remain swimmable, drinkable and fishable. The Foreshore Inventory and Mapping (FIM) protocol was first developed in 2005 by Fisheries and Oceans Canada's Community Mapping Network and several collaborating partners¹ to address the growing concern around shoreline impacts (e.g. development, erosion), riparian fish and wildlife habitat (e.g. fish spawning and rearing habitat), and cumulative impacts. It is a tool that is continuously being enhanced and is increasingly used by regulatory agencies, planners, developers, environmental stewardship

¹ Schleppe, J. and B. Mason. 2009. Standard Methods for Completion of Foreshore Inventory and Mapping Projects. Prepared by: Ecoscape Environmental Consultants Ltd. and The Community Mapping Network.

groups, and First Nations to understand the upland riparian, shoreline, and littoral zones on their lakes. The detailed protocol including methodologies and standards by Schleppe and Mason, 2009 is appended to this document for reference.

Lake Management Planning:

FIM is part of a three-step lake management planning process that has been used for over 40 lakes across Canada including small lakes such as Lake Windermere and Columbia Lake to large lakes such as Shuswap Lake and the South Basin of Lake Winnipeg. The steps are as follows²:

1. First a combination of baseline GIS data compilation and a detailed field shoreline inventory identifies foreshore morphology, land use, riparian condition, sensitive habitats, species at risk occurrences and anthropogenic alterations. This component comprises the bulk of the FIM work in terms of time, resources and expertise but provides a detailed inventory and mapping product (Fig. 1) of the lake with shoreline segments based on homogeneous substrate and landform. Critical areas for conservation or restoration can also be identified here.
2. An aquatic habitat index (AHI) is generated using FIM data to determine the relative ecological value of the shoreline. The relative ecological value is determined for each shoreline segment and categorized from Very High to Very Low (5-class ranking system). This establishes zones of sensitivity that produce the index.
3. Shoreline management guidelines are produced for the shorelines surveyed to allow decision-makers to make informed land use decisions for our watersheds that are based on the risks of potential land-use change. The shoreline management guidelines are intended to provide information to stakeholders, proponents, agencies and other decision-makers when land-use changes or activities are proposed that could alter the shoreline thereby impacting fish and/or wildlife habitat. This information is communicated through an activity³ risk analysis captured in a table accompanied by a decision-making metric.

Outcomes:

Once a FIM project is complete, it should provide the following deliverables:

- Detailed lake maps using the most updated GIS layers (High-resolution orthophoto, LiDAR, bathymetry, etc.); includes a GIS-referenced complement of shoreline photos or video
- A complete inventory of key habitat features (e.g. creek mouths, wildlife corridors, adjacent wetlands, biologically productive areas), fish and wildlife habitat, at-risk species or ecological community occurrences, anthropogenic shoreline alterations, land-use

² Adopted from Schleppe, J. 2011. Kootenay Lake Foreshore Inventory and Mapping. Ecoscape Environmental Consultants Ltd. Project File: 09-513. Prepared for the Regional District of Central Kootenay.

³ Examples of activities include boat houses, aquatic and/or upland vegetation removal, breakwaters, retaining walls, geothermal loops, mooring buoys, etc. and can be tailored to the specific needs of your lake.

- Identification of zones of sensitivity that may be targeted for conservation or restoration (e.g. rehabilitation, remediation or revegetation)
- Identification of important management components (e.g. erosion hazard mapping, point source pollution outlets, or cultural considerations; see below)

Essentially FIM is a component of a much larger picture and can be designed to meet the needs of any lake and community. In the Southern Interior of British Columbia, communities have taken shoreline management guidelines to produce complete lake management plans where local governments have created zoning, bylaws and policy legislation through Official Community Plans to uphold their objectives.

Benefits:

Having the tools and data to properly manage your lake is important for maintaining and enhancing its ecological values. Naturally, this process captures several other benefits at the same time:

- Improved management of point-source pollution, nutrient runoff, sewage and septic systems, erosion issues, drinking water source protection and recreation
- Maintenance and enhancement of multiple values (e.g. cultural, recreational, economic, aesthetic, community, spiritual)
- Realized public sector efficiency: With several agencies working together to develop science and policy, jurisdictional authorities are defined and synergies are realized through the sharing of resources and partnerships
- Mitigated impacts through avoidance, minimization of unavoidable impacts and compensation
- Increased stewardship: awareness is the precursor to good stewardship and improves with a base of science on which to do outreach and educate the public
- Decreased non-compliance and enforcement issues: as a corollary to increased stewardship, an informed public tends to comply more with best practices, bylaws and regulations
- Protection of fish and wildlife habitat

Beyond FIM:

FIM is a process that provides a useful map- and data-set based on science and expert opinion. The shoreline management guidelines are the accompanying tool to be used by decision-makers. While FIM generally focuses on ecology and fish and wildlife values, several additions can be made depending on purpose/functionality, budget, political willpower, and community interests. In parts of British Columbia First Nations interests have been integrated collaboratively into the process. On Kootenay Lake, for example, the lake inventory included an Archaeological Overview Assessment. The Kootenay Lake Partnership has also agreed to complete a Cultural Values Study that considers traditional and contemporary use areas on the lake and will be integrated into the shoreline management guidelines. This will be a precedent-setting document that contains both ecological and First Nations cultural values as critical considerations for lake management planning.

Contact the Living Lakes Canada FIM Technical Team:

Our FIM Technical Team consists of Living Lakes Canada staff and advisors that have a wealth of experience and expertise in a range of lake-related subjects from aquatic biology and water quality to municipal planning and landscape ecology. This lends well to addressing issues on a watershed-scale and caters to a broad array of decision-makers and user groups be it stewardship groups, developers, First Nations, or government agencies. We have been involved in successful lake management planning for several lakes across Canada including over ten lakes in the Southern Interior of British Columbia and Lake Winnipeg's South Basin. For more information on FIM, or any of our other programs, please contact:

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