



B.C.  
Environment

# LAKE CARE

*A property owners guide to conserving fish habitat*



*As a lake property owner you have an important part to play in preserving a valuable, publicly-owned resource. B.C. Environment and local governments want to ensure that you are aware of the complex and delicate systems that exist in lakes. We hope that the information in this brochure will help you appreciate the importance of leaving the lake shore as natural as possible.*

## Why Take Care of Lakes?

Lakes are important for many different reasons. Their beauty and serenity attract people who want to relax and enjoy themselves. They are important sources of clean, fresh water. Lakes are also home to many unique species of plants and animals, including fish.

B.C. is blessed with hundreds of thousands of lakes. Many have been relatively undisturbed since the end of the Ice Age, but in populated regions lakes have been affected by humankind for decades. The recent population boom in B.C. has brought with it a dramatic increase in residential and commercial development along lakeshores and this has many people concerned, including fisheries biologists, wildlife biologists and water managers.

## The Issue

Many lakeshore property owners wish to make changes to the foreshore areas of their properties. The most common changes are clearing, adding fill and building retaining walls. Unfortunately, these "improvements" are not always to the benefit of the lake's natural inhabitants, especially when you add up changes along the entire lake shore and throughout the watershed.

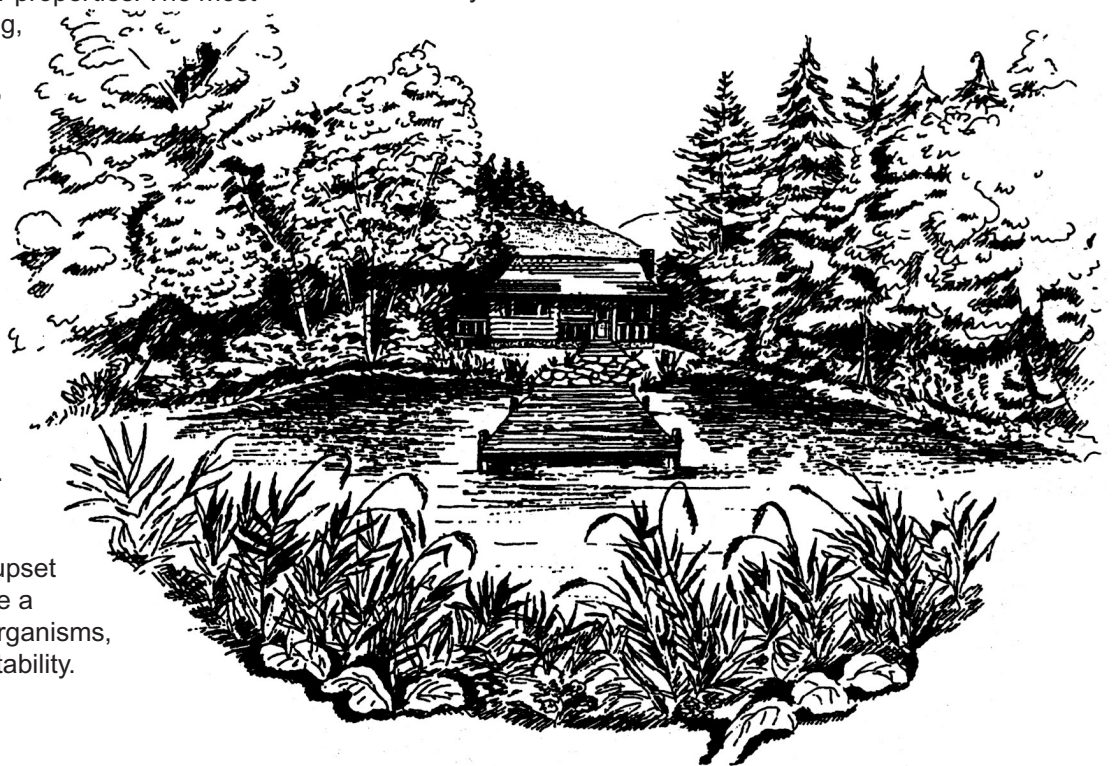
Often these projects are undertaken without knowledge of the biological, chemical or physical impacts. Alterations made without an understanding of the lake as a whole system are likely to upset the delicate balance and have a negative impact on aquatic organisms, water quality and shoreline stability.

## The Natural Balance

A lake is made up of many different parts, including the land, the water, the chemicals and gases dissolved in the water, plants and animals. These parts work together in complex ways and are referred to as an ecosystem. Each lake ecosystem has evolved over thousands of years in response to local conditions. The stability of these systems depends on variety - a variety of species and a variety of physical features.

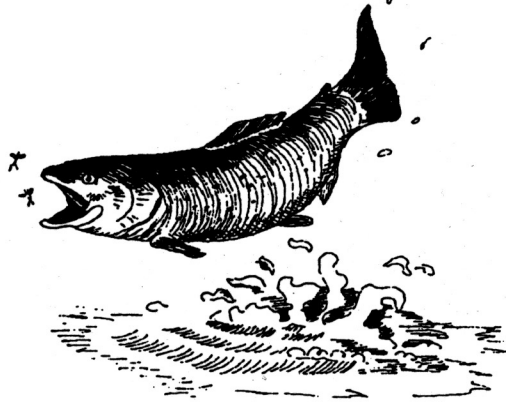
## An Ounce of Prevention or a Pound of Cure?

An ecosystem can be compared to a game of pick-up sticks. Take away (or add) one "stick" and chances are the balance will be lost and the whole structure will shift. Once the balance is upset, a lot of time and money can be spent trying to recreate or replace Nature's design - usually in vain.



# Fish in B.C. Lakes

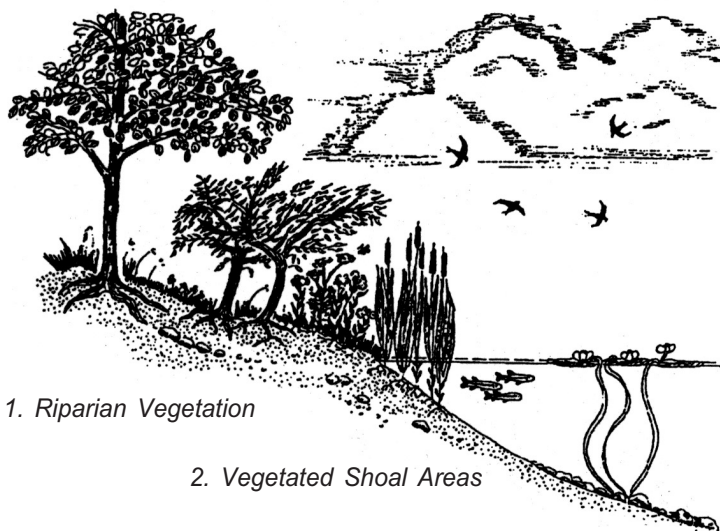
B.C. lakes offer some of the best recreational fishing in the world. There are few countries that can boast wild, native stocks such as we have in many of our lakes. It is essential that we maintain these wild stocks - not only the high profile game fish, but also the many species of non-game fish.



- Fish in B.C. lakes share the same basic needs:
- oxygenated water that is free from excessive nutrient and toxic input, and
  - habitat - places to hide from predators and carry out their basic activities of feeding and reproduction.
  - food supply - insects and other items produced mainly in vegetated riparian and shoal areas.

## Fish Habitat

Most fish are both predators and prey so they depend heavily on cover - both for feeding and for safety. They are constantly on the move. Even though we most often see fish jumping out in open areas of the lake, it is the hiding places, often within 30 metres from shore, where fish spend the majority of their time. The quantity and quality of such habitat often determine how well fish do in a lake.



1. Riparian Vegetation

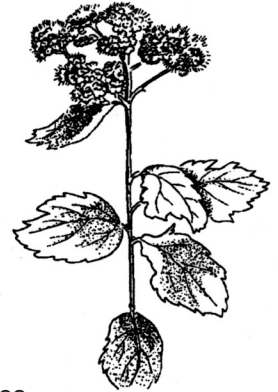
2. Vegetated Shoal Areas

3. Rocky Lakeshore Habitat

## 1. Riparian Vegetation

The lake ecosystem is dependent on influences outside the water. Trees, shrubs, grass and other plants around the edges of the lake are important fish habitat. There are many reasons why both fish and the rest of the lake ecosystem benefit from this fringe of vegetation:

- bank stabilization provided by roots - prevents erosion
- reduced septic field nutrients-uptake provided by roots
- reduced run-off, leading to better water clarity and quality
- shade and temperature stability
- source of insects
- overhead cover provided by overhanging branches and leaves
- underwater cover provided by roots and partially submerged vegetation



In addition, vegetated areas near lakes support many wildlife species including weasels, muskrats, frogs, salamanders, waterfowl and songbirds.

## 2. Vegetated Shoal Areas

The most productive parts of lakes are shallow, protected shoreline areas. Nutrients collect in the fine sediments providing sites where aquatic plants can grow. These plants provide tremendous surface area for algae, shrimp, snails, insects and other invertebrates. They help stabilize sediments, reduce waves and currents and provide protective cover in which many small fish live, feed and spawn. Many delicate organisms live in and amongst their roots, in the fine mud. The greatest variety of species in any lake are present in these vegetated shoals. Not only are these areas the dining rooms of many of the important game fish, but they act as important supply kitchens for the lakes' open waters as well.



## 3. Rocky Lakeshore Habitat

Lake char, kokanee, sockeye, bass and many other species are shore spawners. They lay eggs in gravel, cobble or large stones along the lake shore. Important features of this habitat are clean stones and a good flow of cool, oxygenated water amongst the stones. Spawning usually occurs in fall and the eggs remain in spaces between the rocks through the winter. Eggs hatch in early spring and the young fish rely on the rocky cover for a few more weeks before beginning their life in the open water.

## Close-up: VANCOUVER ISLAND LAKES

Many Vancouver Island lakes such as Cowichan, Cameron, Horne and Sproat are deep, clear and low in nutrients. Fish in these lakes can be plentiful but slow-growing. Other lakes, including Elk, Beaver, Green and Quennel, which lie in more fertile lowland areas, are more like the productive lakes of the interior of B.C. Many lakes on the Island are stocked with rainbow or cutthroat trout. While this provides fish for anglers, it is no substitute for conserving wild stocks and the habitat on which they depend. The main game species in Vancouver Island lakes are:



- Coastal Cutthroat Trout
- Rainbow Trout
- Dolly Varden
- Brown Trout
- Kokanee\*
- Smallmouth Bass\*
- Pacific Salmon (Sockeye\*, Coho, Chinook, Chum)
- Pumpkinseed Sunfish\*
- \*Shore Spawners

## Lakeshore Property Development - What is the Impact?

The impacts of property development vary depending on the type of lake. In low-nutrient lakes, loss of fish habitat is the main concern. With food supplies and vegetated shoreline habitat already in short supply, removal of any more severely limits fish production. In the more productive lakes, nutrient and toxic input may be more critical. While the two concerns may seem unrelated, both are minimized by maintaining as much natural vegetation around the lake as possible.

ACTIVITY	IMPACT	ALTERNATIVE
<p><b>Removal of Natural Aquatic and Riparian Vegetation</b></p> <ul style="list-style-type: none"> <li>• to “clean up” shore line, remove weeds</li> <li>• to create lawns and open up view</li> </ul>	<ol style="list-style-type: none"> <li>1. Loss of physical fish habitat, shade and cover.</li> <li>2. Loss of insects and bottom dwelling organisms which are important to fish production.</li> <li>3. Loss of bank stability. Erosion.</li> <li>4. Increased effects of nutrient and toxic run-off.</li> </ol>	<ol style="list-style-type: none"> <li>1. Leave native plants wherever possible (willow, hardhack, red-osier dogwood, alder, evergreens, sedges, bullrushes are common).</li> <li>2. Create paths for access to water and view, rather than “clean-sweep” approach.</li> <li>3. Replant with native plants where possible.</li> <li>4. <i>Consult with your local government or B.C. Environment if seeking approval to remove shoreline vegetation.</i></li> </ol>
<p><b>Lakeshore Infilling/ Retaining Walls</b></p> <ul style="list-style-type: none"> <li>• property owners wishing to extend property out into lake or to fill in flooded or low-lying property</li> <li>• to create beaches</li> </ul>	<ol style="list-style-type: none"> <li>1. Covers spawning beds. Kokanee and smallmouth bass particularly affected. Sand is carried beyond where it is placed affecting offshore habitat and possibly streams.</li> <li>2. Destroys fish rearing habitat by killing plants and burying food organisms.</li> <li>3. Replaces complex physical features with smooth concrete and sand substrate which are poor fish habitat.</li> </ol>	<ol style="list-style-type: none"> <li>1. Build a small floating dock for swimming and lake access.</li> <li>2. Use public beaches for swimming.</li> <li>3. <i>Be aware that approval is required to infill or make alterations to the lakeshore. Contact your local government or B.C. Environment office.</i></li> </ol>
<p><b>Increased Nutrients and Toxic Run-off</b></p> <ul style="list-style-type: none"> <li>• due mainly to poorly placed or malfunctioning septic systems, lawn fertilizers and chemicals or detergent</li> <li>• storm drain run-off</li> </ul>	<ol style="list-style-type: none"> <li>1. Water quality deterioration</li> <li>2. Overabundance of algae blooms and aquatic weed growth.</li> <li>3. Fish kills resulting from oxygen depletion.</li> <li>4. Storm drain run-off, often diverted into lakes, introduces toxins such as gas, oil, heavy metals and salts.</li> </ol>	<ol style="list-style-type: none"> <li>1. Maintain septic tanks and fields. If installing a septic system, install it as far from the lake as possible.</li> <li>2. Use phosphate-free cleaners.</li> <li>3. Minimize lawn size and watering. Lawns should be as far from lake shore as possible. Don't use fertilizers, herbicides and pesticides.</li> <li>4. Maintain a strip of natural vegetation between developed area and lake shore. Plants help to soak up harmful chemicals dissolved in run-off.</li> <li>5. Discuss routing of storm drain run-off with municipal government. What is the impact and what are the alternatives?</li> </ol>

## Government Guidelines to Protect Aquatic Habitat

In recent years, many local governments have adopted bylaws that protect riparian areas adjacent to lakes, streams and ponds. These regulations do not prohibit development, but help lakeshore property owners become



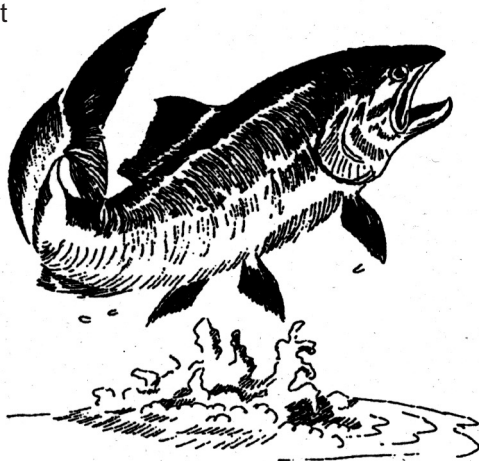
more knowledgeable about whether their building and landscaping activities may cause negative impacts. The by-laws may require property

owners to apply for a 'Permit' prior to any development near the lake - shoreline - usually within a distance of 15 to 30 meters (depending on the community). Clearing or building next to a lake without a permit can result in a fine or penalty. Property owners should call their local government for information. Lakeshore property owners should also know that the Federal Fisheries Act and the Provincial Water Act prohibit activities that cause harm to the lake and fish habitat. Violations of these Acts can also lead to prosecution, and the court can order restoration of the habitat at owners expense in addition to other penalties.

## Look Before You Leap

The Message is simple - **don't do any work in or near the water without talking to your Local Government or B.C. Environment**

They will assist you with your proposed development and identify whether environmental permitting is required.

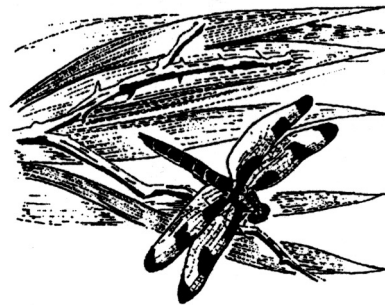


## TAKE CHARGE! What You Can Do to Become a Steward of Your Lake

1. **Start at Home - Plan** your own property development carefully to conserve natural vegetation and consider replacing lost habitat where possible.
2. **Observe and Report** - Notify your local Fisheries Branch if you notice anyone carrying on work that could be harmful to the lake environment or fish habitat.
3. **Educate and Co-operate** - Discuss conservation issues with your neighbours and promote the idea of shared responsibility for the whole lake.
4. **Form a Group** - if there isn't already a local lake conservation society, consider forming one. There are a growing number of such organizations in



B.C. As a group it is possible to persuade local government to implement by-laws that limit the impact of residential and commercial development.



## Who to Contact?

To discuss plans or concerns about your lakeshore property, we recommend that you call your **local government**

**Development Services Department,**

or

**B.C. Environment**

2080 Labieux Road, Nanaimo, BC, V9T 6J9

Telephone: **751-3100**

For toll-free access, call Enquiry B.C.:

from Victoria - **387-6121**

elsewhere in B.C. - **1-800-663-7867**

and request a transfer to **751-3100**



This brochure was funded by the Habitat Conservation Trust Fund. The Habitat Conservation Trust Fund was created to preserve, restore and enhance populations of fish and wildlife and their habitats in British Columbia. Projects are financed by a surcharge on angling, hunting, trapping, and guiding licences. The Habitat Conservation Trust Fund also accepts donations and bequests from private citizens. All donations are tax deductible. The Fund is therefore; self-perpetuating and there is virtually no direct cost to the general taxpayer. The Habitat Conservation Trust Fund welcomes donations from individuals, corporations, sportsmen's clubs, and conservation organizations. In addition, suggestions for habitat projects are welcome. It's a chance to become involved. Truly an opportunity for fish and wildlife. For further information about the Habitat Conservation Trust Fund, contact the nearest regional office of B.C. Environment, or write to: **Habitat Conservation Fund - Wildlife Branch, B.C. Environment, Parliament Buildings, Victoria, B.C. V8V 1X5**